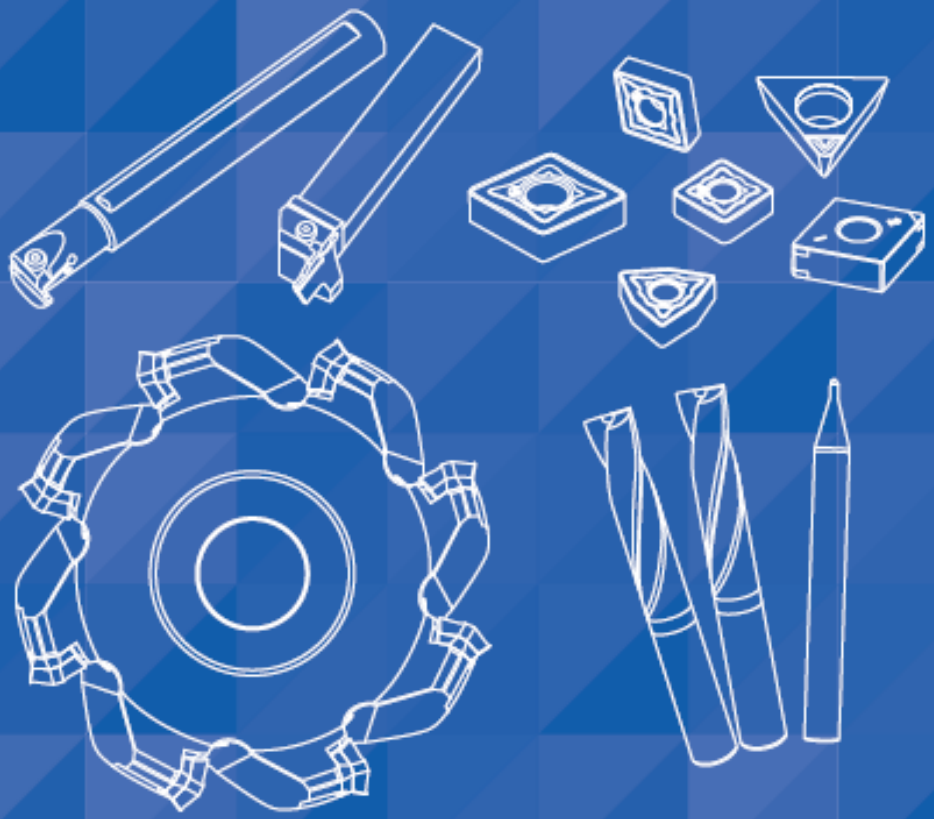
2016

General Catalogue

SUMITOMO

CARBIDE - CBN - DIAMOND

PERFORMANCE CUTTING TOOLS



Sumitomo Electric Hartmetall GmbH
Sumitomo Electric Hardmetal Ltd.

SUMITOMO ELECTRIC

NEW PRODUCTS GUIDANCE

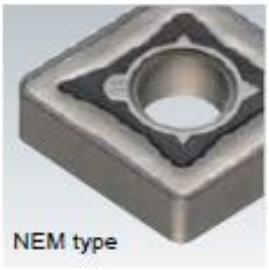
A15

Grades for Stainless Steel Machining

AC6030M / AC6040M

New grades for stainless steel cutting with excellent wear and fracture resistance.
AC6030M employs Absotech Platinum, a new CVD coating exhibiting improved fracture and adhesion resistance.
AC6040M employs Absotech Bronze, a new PVD coating suppressing the progress of crater and flank wear.




NEM type

C6

Chipbreakers for Stainless Steel Machining

NEM Type

Achieves excellent wear resistance and cutting edge strength and thereby ensures stable turning of stainless steel thanks to an edge shape that enables smooth chip evacuation.



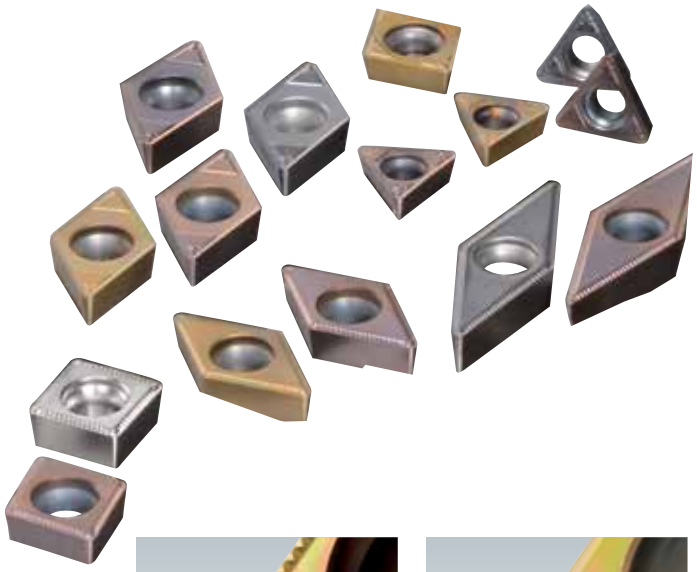


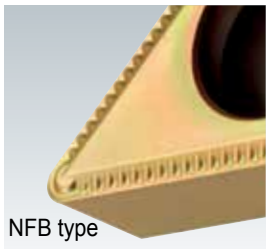
C 7

M-Class Positive Type Chipbreakers

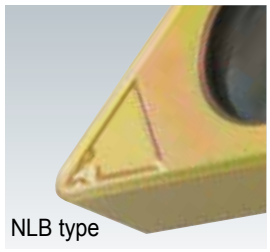
NFB Type / NLB Type

A new series of M-class positive type chipbreakers.
This series improves chip control in steel plate and soft steel turning. The NFB type increases chip strain and thereby improves chip breaking performance thanks to the variable rake angle in nose radius.
The NLB type achieves excellent chip control and machining stability thanks to the special concave ridge shape.





NFB type



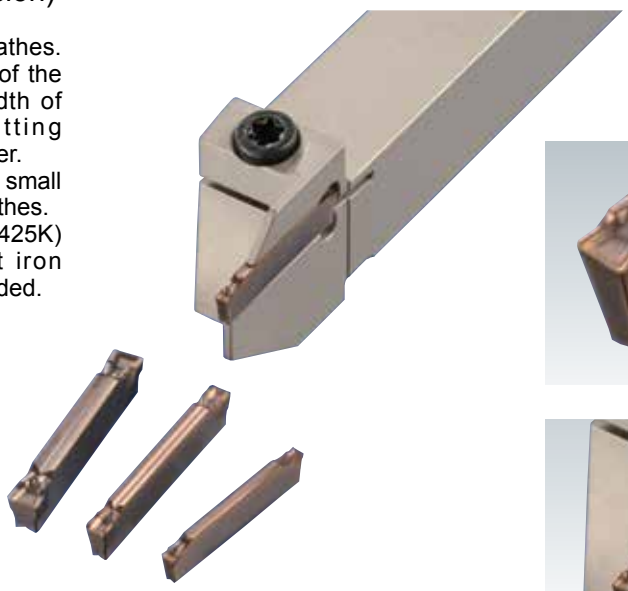
NLB type

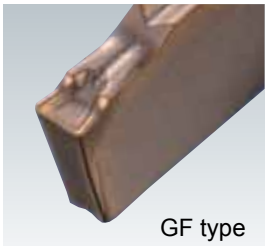
F 3

Grooving Tools

GND Series (Expansion)

Series expansion for small lathes. Introducing the combination of the smallest grooving insert width of 1,25mm and the low cutting resistance GF type chipbreaker.
Series expansion also include small shank size holders for auto-lathes.
2 new grades (AC520U / AC425K) for exotic alloys and cast iron machining have also been added.





GF type



GND type Mini Tool Holder

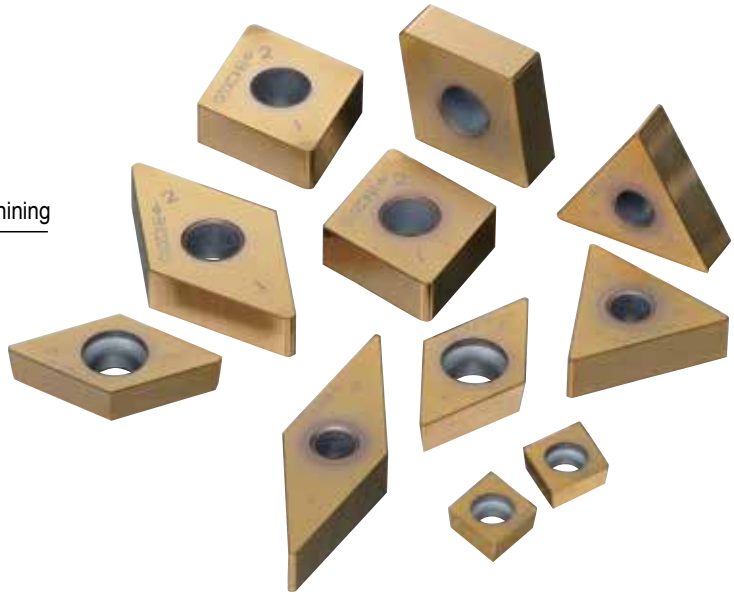
NEW PRODUCTS GUIDANCE

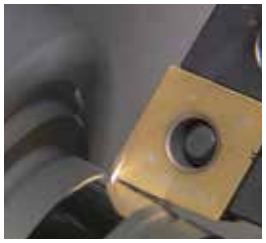
L 10

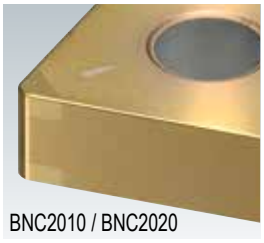
Coated CBN Grades for Hardened Steel Machining

Coated SUMIBORON
BNC2010 / BNC2020

A new series of Coated CBN grades has been released.
BNC2010 achieves excellent boundary wear resistance and maintains the intended surface roughness for a long time.
BNC2020 achieves excellent fracture resistance and ensures stable tool life.







BNC2010 / BNC2020



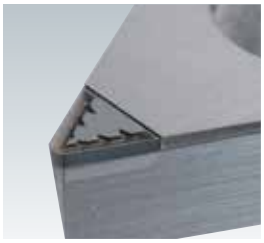


L 25

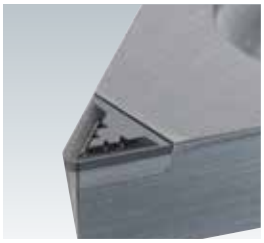
PCD Chipbreakers for Non-Ferrous Metals

SUMIDIA Break Master
NLD Type / NGD Type

3D chipbreakers have been added to the SUMIDIA insert series.
The NLD type and NGD type chipbreakers achieve outstanding chip control in semi-finishing and finishing of aluminum alloys. The employment of high toughness grade DA1000 achieves stable, long tool life.



NLD type



NGD type

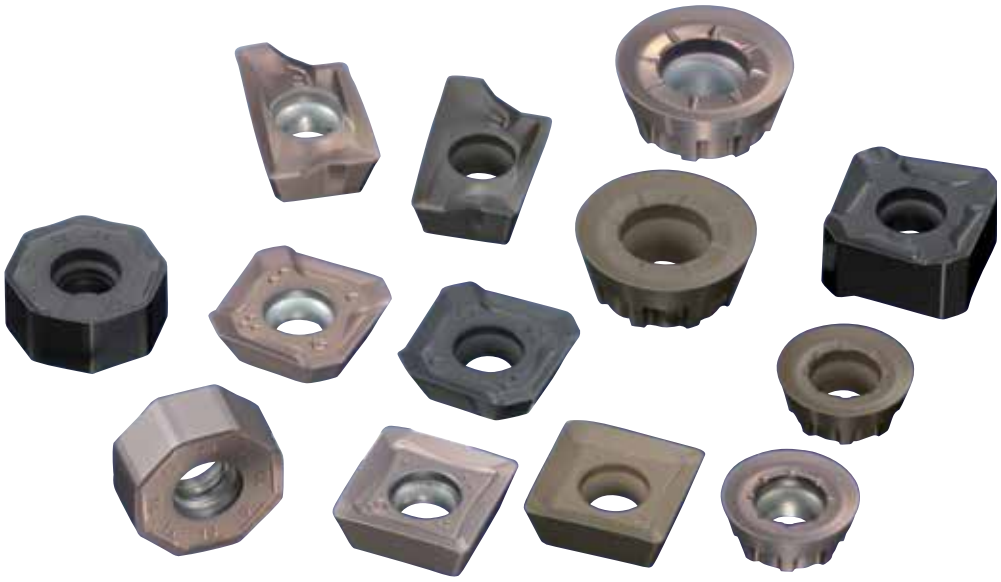
G 21

Grades for Stainless Steel and Exotic Alloy Milling

ACM100 / ACM200 / ACM300

A new series of coated grades for stainless steel and exotic alloy milling.
ACM100 and ACM300 employ "New Super ZX Coating" thereby enabling milling that is 1,5 times faster and more efficient compared to conventional grades.
ACM200 employs "Super FF Coating" and achieves smooth coating as well as excellent chipping resistance.







NEW PRODUCTS GUIDANCE

G24 H12

Cutter for Shoulder Milling

Sumi Dual Mill Series
DFC Type



The Sumi Dual Mill DFC type is designed for performance reliability and has a wide milling cutter range to cover various applications.
This cutter type employes cost effective double-sided inserts for high toughness and enhanced accuracy.

G20 H36

Radius Cutter for Exotic Alloys

Wave Radius Mill
RSX Series

Achieving stable machining by suppressing vibrations and chattering during helical milling and ramping of exotic alloys, with a high-raked cutting edge design that reduces cutting resistance.





G28 H14

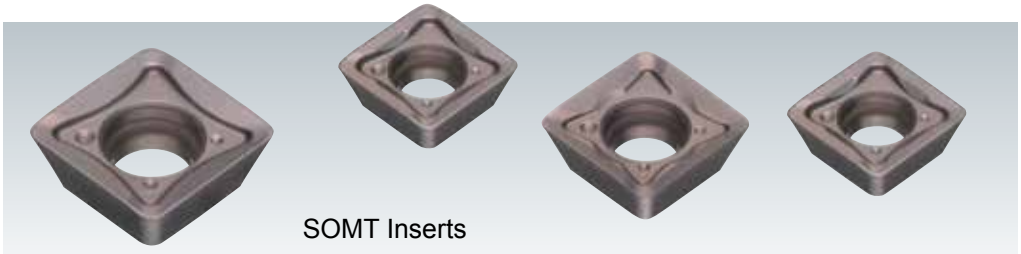
Cutter for Shoulder Milling

Wave Mill

WFX Series (Expansion)

WaveMill WFX series expansion with smaller-sized inserts.
The fine-pitched design of this series improves milling efficiency, and the emphasis on cutting edge squareness reduces machined wall level differences thus achieving excellent surface finish in shoulder milling.





SOMT Inserts



Sumitomo Electric's

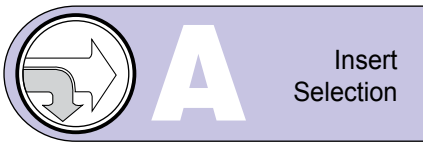
Innovative Tools Support a Variety of Industries



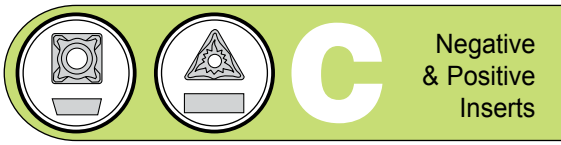
Energy


Aerospace
Automotive
Steel and
Construction Equipment



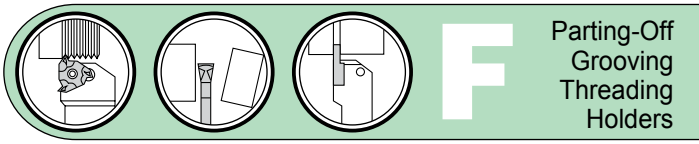


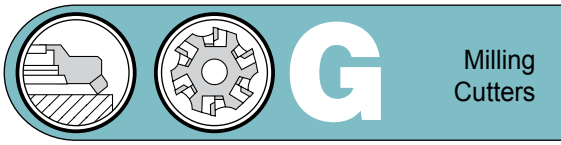




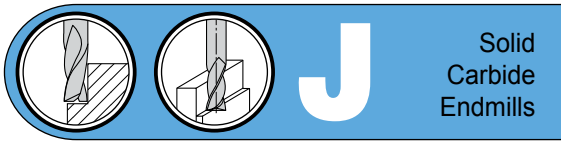




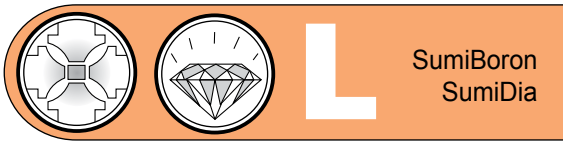


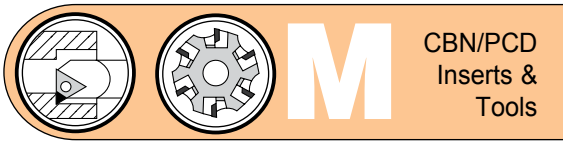


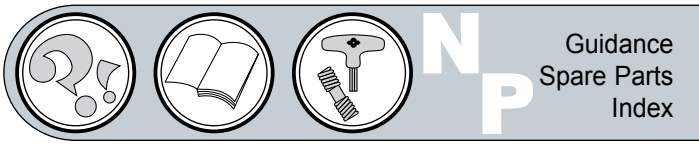












Stock marking chart

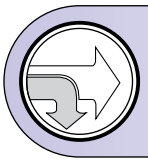
- ● : Euro stock item
- ○ : Japan stock item
- ◻ : Delivery on request

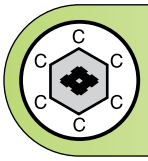
- ▲ : To be replaced by new item

- ☐ : Made to order
- – : We cannot produce

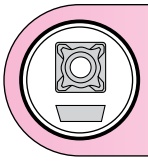
Note:
Stocking policy may change without prior notice, please consult our sales representative for actual stock situation.

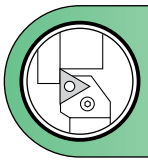
Contents

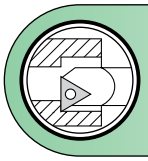

Insert Selection A1~

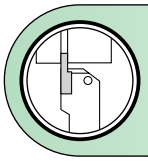

Grades B1~

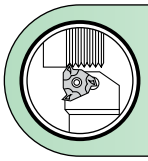

Inserts
Negative Type C1~


Inserts
Positive Type C45~


External Holders D1~


Boring Bars E1~


Grooving Holders
Parting-Off Holders F1~


Threading Holders F29~

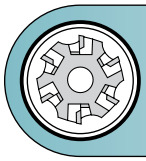
	Negative	Positive
C 80° Diamond Type	C16	C45
D 55° Diamond Type	C21	C51
R Round Type		C54
S Square Type	C27	C55
T 60° Triangular Type	C32	C58
V 35° Diamond Type	C39	C66
W 80° Trigon Type	C41	C70

CBN Inserts M1~

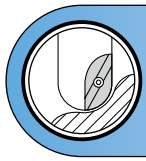
PCD Inserts M1~

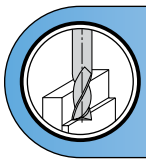

Guidance N1~

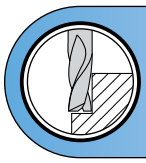


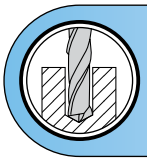

Milling Cutters G1 ~

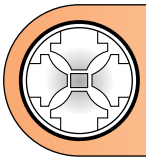

Milling Cutters G39~
High Feed / Special Purpose Cutters


Indexable Endmills H1 ~

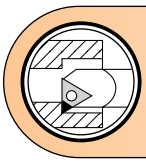

Endmills J1 ~
Coated Solid Types


Endmills J41 ~
Uncoated Solid Types


Multi-Drills K1 ~


SumiBoron L1 ~
CBN Grades


SumiDia L22 ~
PCD Grades


CBN / PCD M1 ~
Inserts and Tools

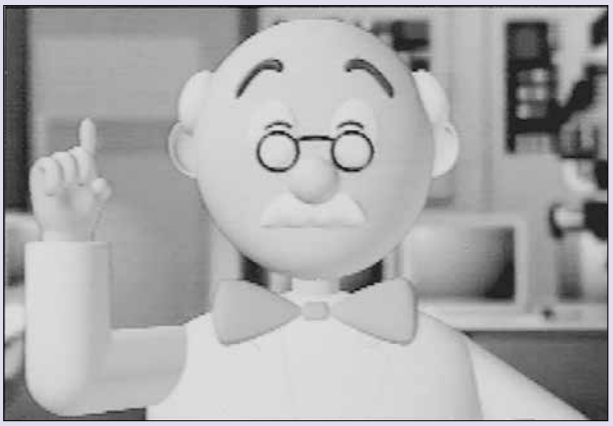

Spare Parts P1 ~


Index P9 ~

Insert Selection

A

A1 ~ A29





Insert Selection

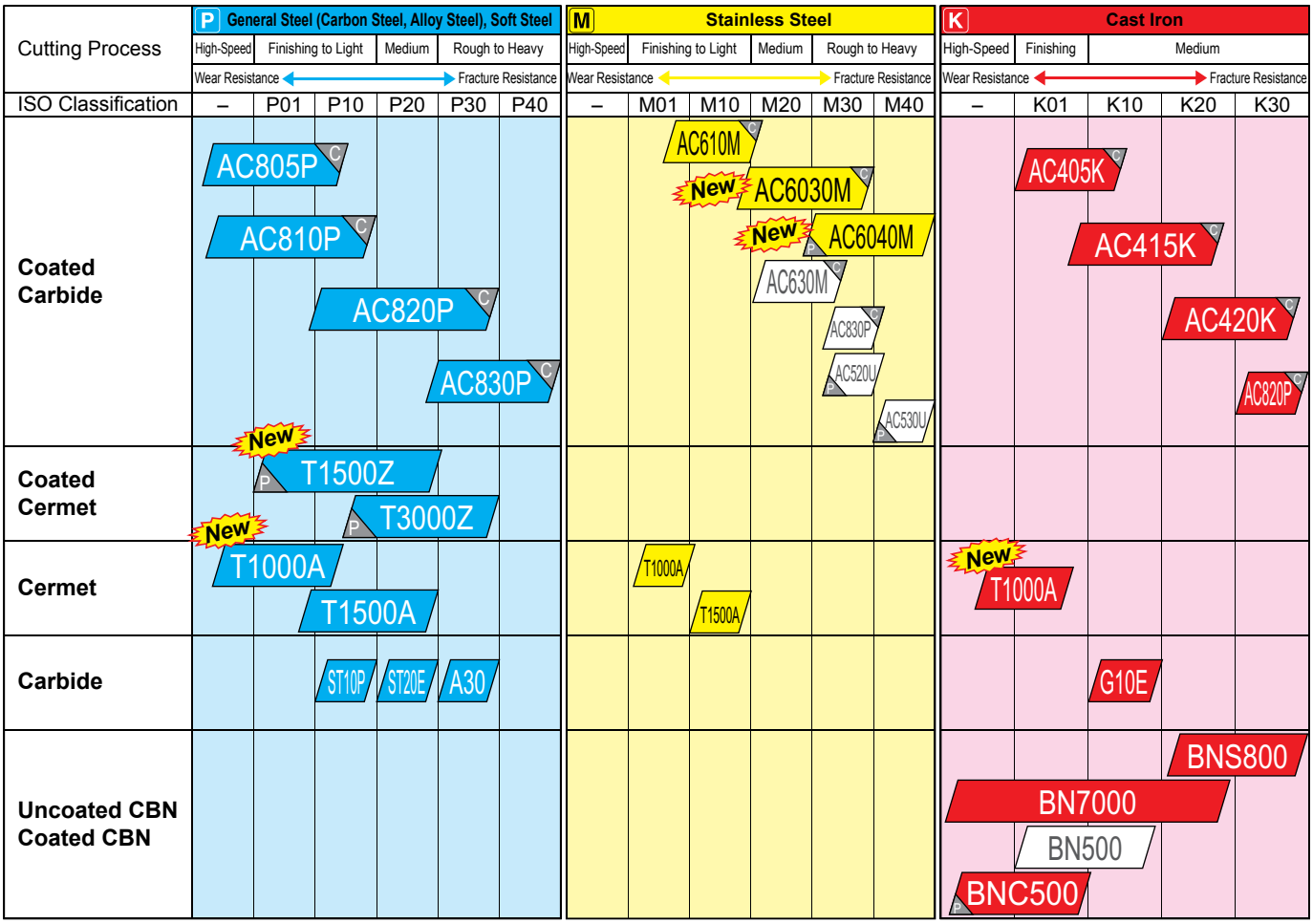
Sumitomo Grades (Turning) A2
Sumitomo Grades (Milling) A3

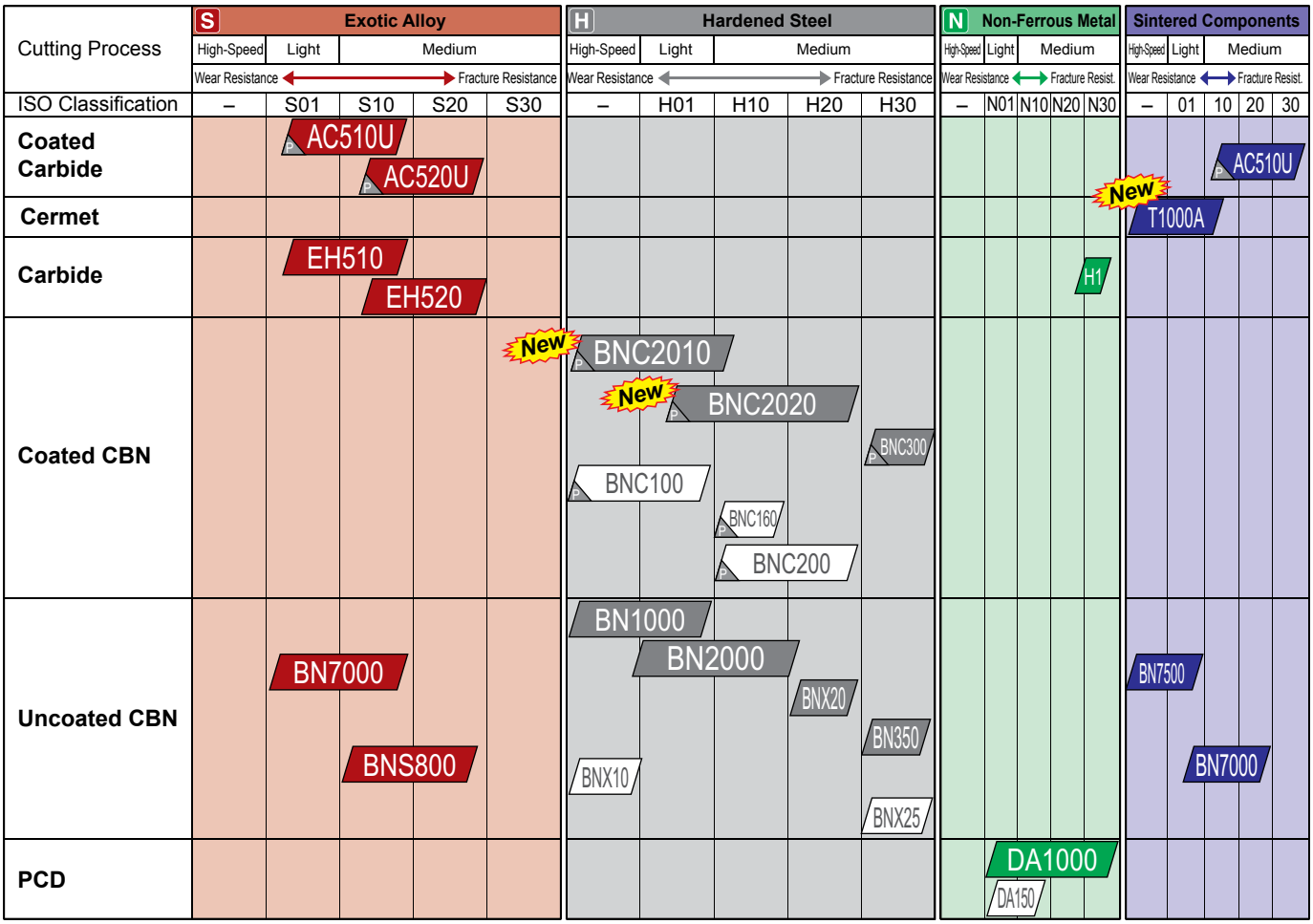
Chipbreaker and Grade Selection

Steel Turning Inserts ..... A 4-13
Stainless Steel Turning Inserts A14-17
Cast Iron Turning Inserts A18-21
Exotic Alloy Inserts A22-23
Hardened Steel Turning Inserts A24-27
Non-Ferrous Metal Turning Inserts A28-29

Selection of Sumitomo Grades (Turning)

According to Work Materials and Applications

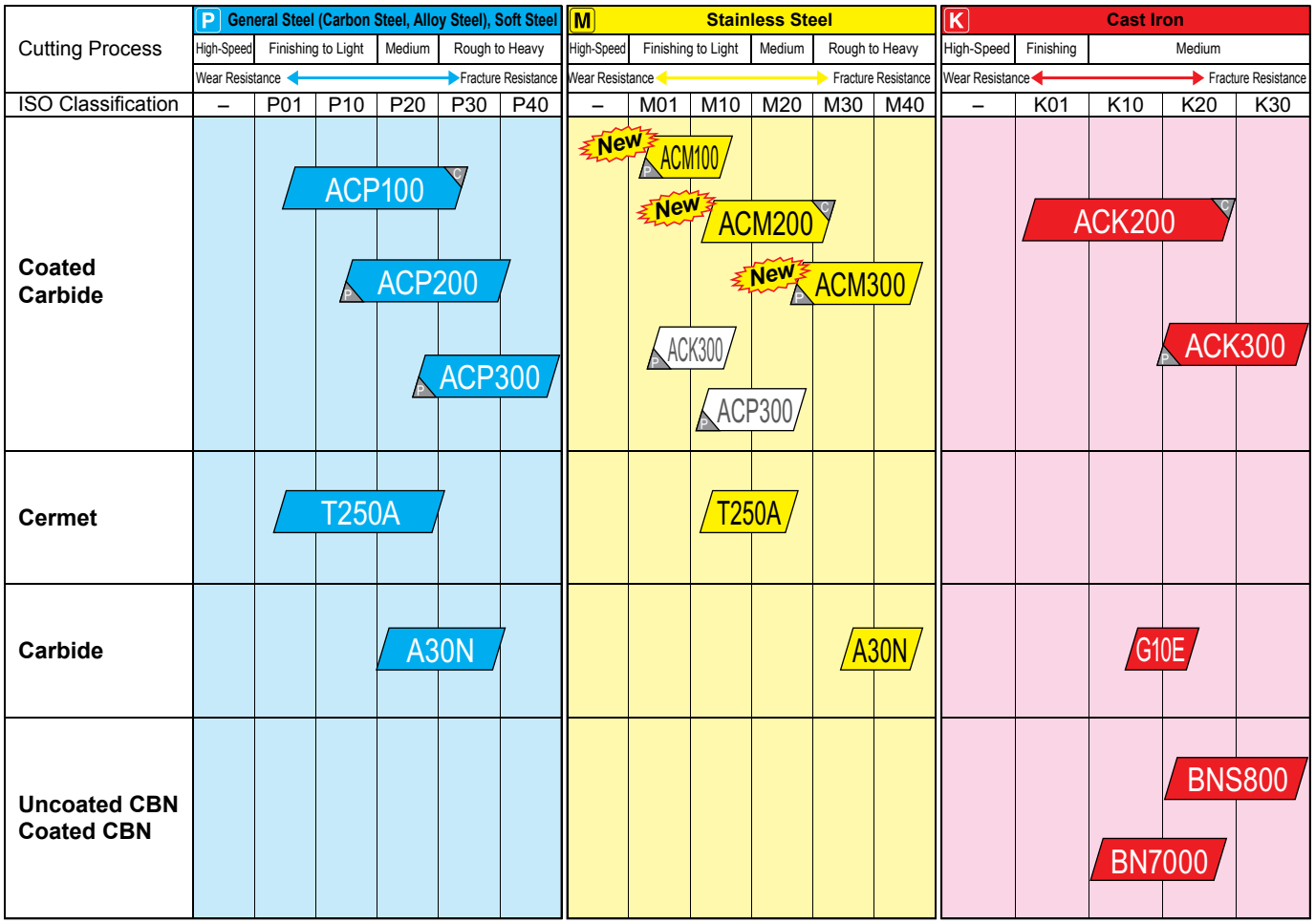


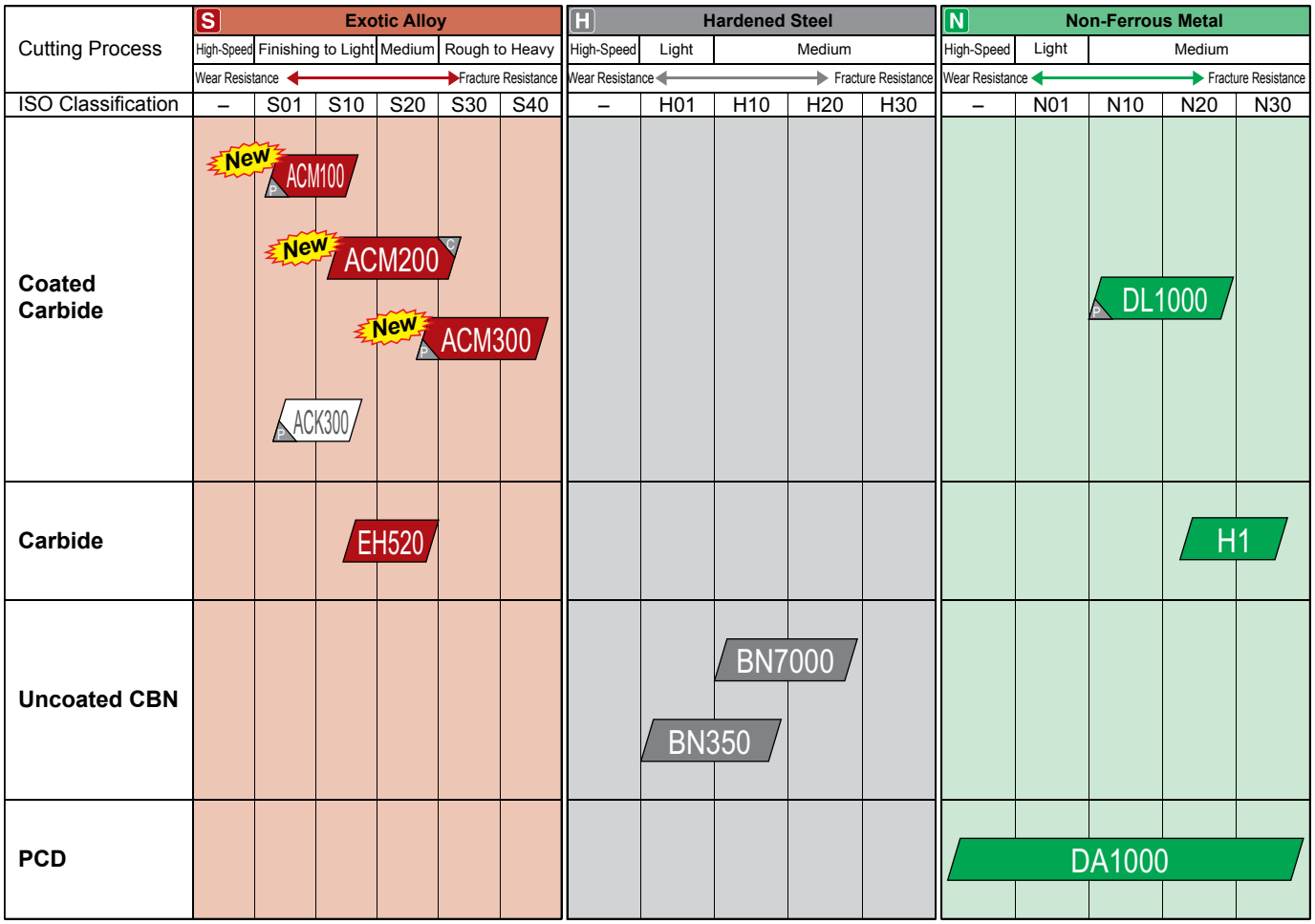


: 1st Recommendation : 2nd Recommendation : CVD Coating : PVD Coating Blank: Uncoated

Selection of Sumitomo Grades (Milling)

According to Work Materials and Applications

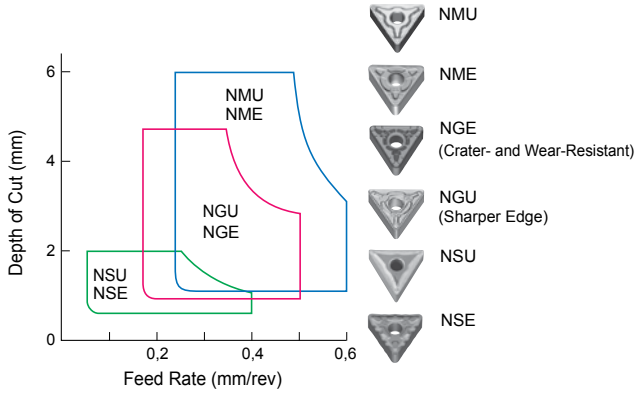




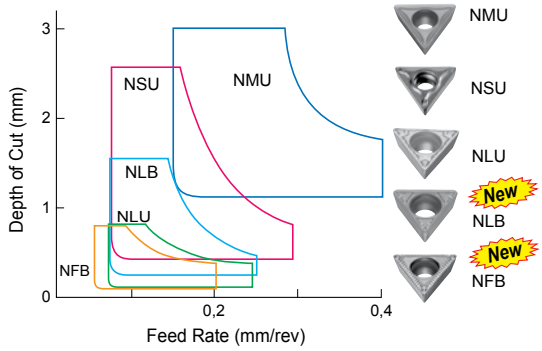
: 1st Recommendation : 2nd Recommendation : CVD Coating : PVD Coating Blank: Uncoated

Main Chipbreakers

Negative Type



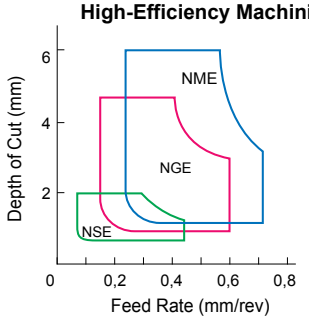
Positive Type



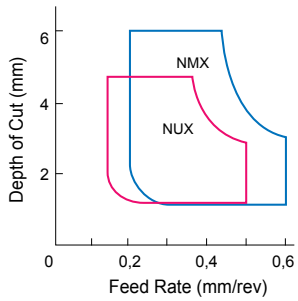
Sub-Chipbreakers

Negative Type

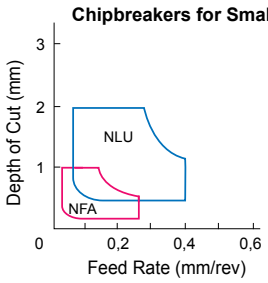
Chipbreakers for High-Efficiency Machining



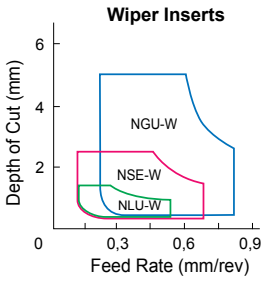
Strong Edge Chipbreakers



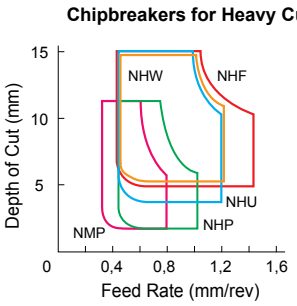
Chipbreakers for Small Depths



Wiper Inserts

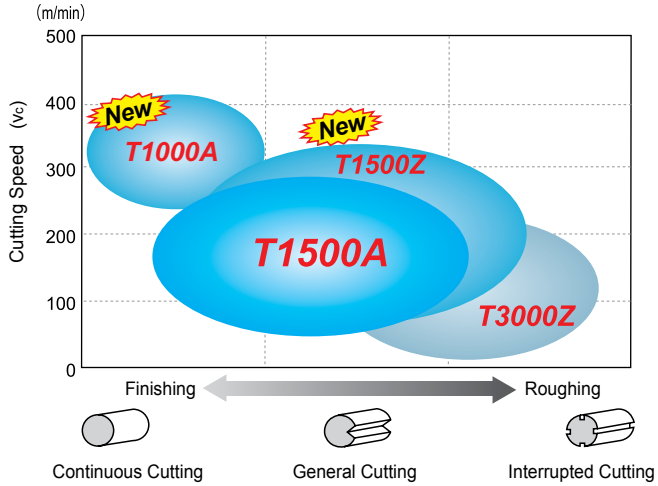


Chipbreakers for Heavy Cutting

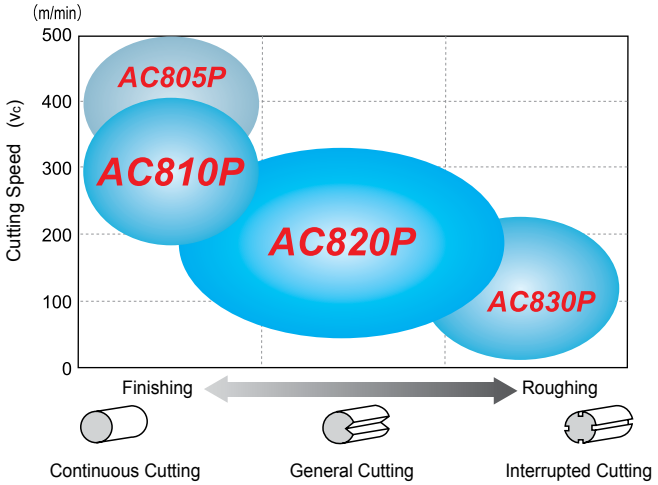


Grades

● Fine Finishing to Finishing



● Finishing to Rough Cutting



P Recommended Cutting Conditions

(Min. - **Optimum** - Max.)

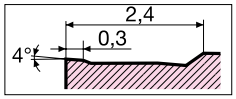
Work Material	Cutting Process	Chipbreaker	Grade	Depth of Cut (mm)	Feed Rate (mm/rev)	Cutting Speed (mm/min)
Soft Steel	Fine Finishing	NFA	**T1500Z**	0,2-**0,6**-1,0	0,05-**0,15**-0,25	100-**250**-400
	Finishing	NLU	**AC810P**	0,5-**1,0**-1,5	0,1-**0,25**-0,4	260-**340**-420
	Medium Cutting	**NGU**	**AC820P**	1,0-**2,5**-4,0	0,2-**0,35**-0,5	200-**260**-320
	Roughing	NMU	**AC830P**	2,0-**4,0**-6,0	0,3-**0,45**-0,6	140-**180**-220
Medium Carbon Steel	Fine Finishing	NFA	**T1500Z**	0,2-**0,6**-1,0	0,05-**0,15**-0,25	100-**200**-300
	Finishing	NLU	**AC810P**	0,5-**1,0**-1,5	0,1-**0,25**-0,4	210-**275**-340
	Medium Cutting	**NGU**	**AC820P**	1,0-**2,5**-4,0	0,2-**0,35**-0,5	150-**190**-230
	Roughing	NMU	**AC830P**	2,0-**4,0**-6,0	0,3-**0,45**-0,6	110-**135**-160
High Carbon Steel	Fine Finishing	NFA	**T1500Z**	0,2-**0,6**-1,0	0,05-**0,15**-0,25	50-**150**-250
	Finishing	NLU	**AC810P**	0,5-**1,0**-1,5	0,1-**0,25**-0,4	170-**225**-280
	Medium Cutting	**NGU**	**AC820P**	1,0-**2,5**-4,0	0,2-**0,35**-0,5	130-**165**-200
	Roughing	NMU	**AC830P**	2,0-**4,0**-6,0	0,3-**0,45**-0,6	90-**120**-150

Chipbreaker

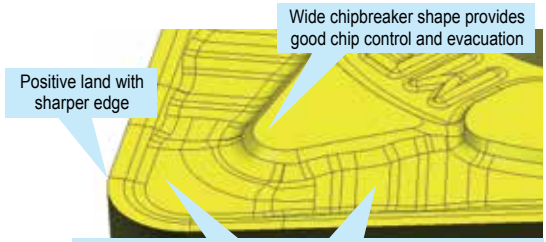
● NME Type Chipbreaker for Roughing

Achieves high efficiency and longer tool life with reduced rake face wear.
Delivers stable chip control from shallow cutting depths onwards.



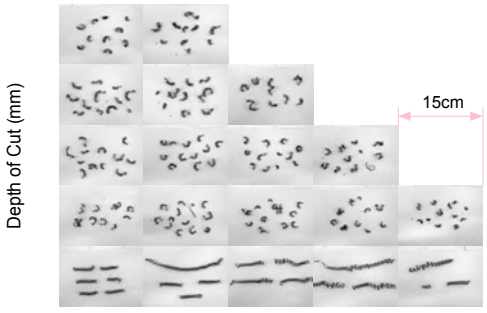


Cross Section of Chipbreaker



● Chip Management

Work Material: 15CrMo5
Cutting Conditions: v_c=200m/min, Dry

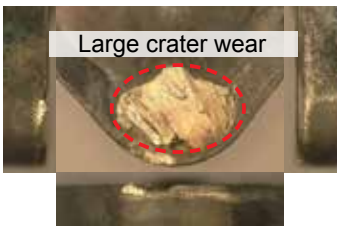


Delivers stable chip control from cutting depths as shallow as 1mm.

● Wear Resistance

Work Material: 100Cr6 Bearing Component
Insert: CNMG 160612 NME
Cutting Conditions: v_c=240m/min, f=0,4mm/rev, d_{oc}=2,5mm, Wet


NME Type (AC810P)
No. of Workpieces 30

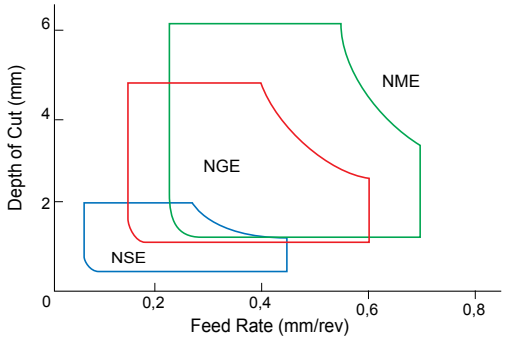


Competitor's Roughing Chipbreaker (P10)
No. of Workpieces 30

Drastically reduced rake face wear achieves stable tool life.

● Shared Features of the High Efficiency Chipbreaker Series

● Application Range



● Characteristics

Rake face profile relieves stress concentration with smooth chip evacuation

● Conventional chip flow


Limited chip contact area increases stress and causes insert damage

● Chip flow by NSE, NGE and NME


Smooth flow improves chip direction and shape.

Grades AC805P / AC810P / AC820P / AC830P

AC800P Series covers a wide range of machining applications from high speed to interrupted cutting.

- All grades feature Super FF Coat, which has excellent wear and chipping resistance.
- Versatile GE Type chipbreaker suited to high-feed applications. High efficiency, long tool life.

AC805P : The ultra-thick alumina coating achieves excellent wear resistance at high speed cutting above 300 m/min under dry cutting conditions.

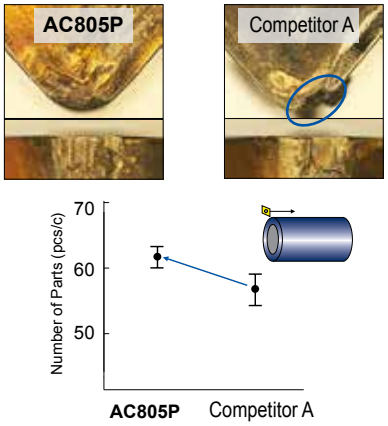
AC810P : In addition to FF-TiCN, which has excellent peel-off and wear resistance, this grade features a tough, thick Alumina coating enhanced by newly developed grain growth control technology, excellent wear resistance and long tool life in high-speed, high-feed cutting.

AC820P : In addition to FF-TiCN, which has excellent peel-off and wear resistance, this grade features a high-density structured FF-Al_2O_3 layer using new smooth surface treatment technology, and also employs coating thickness control technology to achieve excellent versatility, stability, and long tool life.

AC830P : In addition to FF-TiCN, which has excellent peel-off and wear resistance, this grade features a strengthened FF-Al_2O_3 layer using new stress control technology, and moreover provides excellent reliability and wear- resistance in heavy interrupted cutting to achieve long tool life.

AC805P Cutting Performance

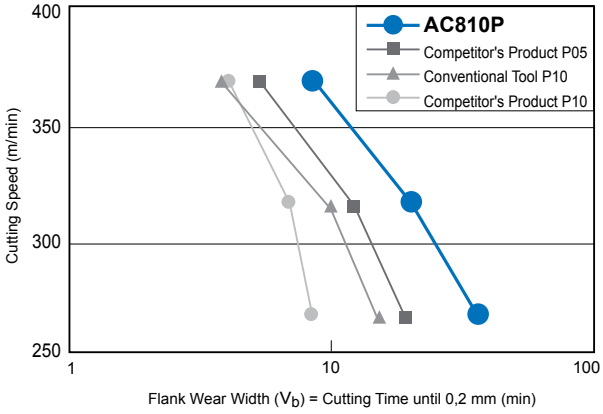
● **High speed Cutting**



Work Material: 21NiCrMo2 (HB212), Insert: CNMG 120408NGUW
Cutting Conditions: v_c=457m/min, f=0,36mm/rev, d_{oc}=1,5mm, Wet

AC810P Cutting Performance

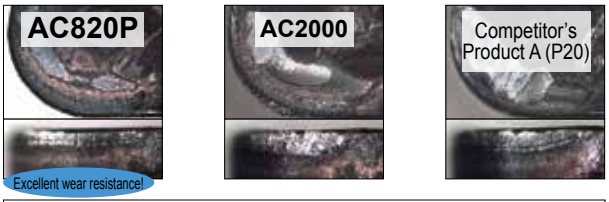
● **Continuous Cutting (V-T chart)**



Work Material: 34CrMo4 (Continuous), Insert: CNMG 120408
Cutting Conditions: v_c=270 ~ 370m/min, f=0,3mm/rev, d_{oc}=1,5mm, Wet

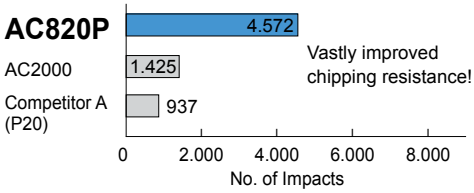
AC820P Cutting Performance

● **Continuous Cutting**



Work Material: S45C (Continuous), Insert: CNMG 120408 NGE
Cutting Conditions: v_c=270m/min, f=0,4mm/rev, d_{oc}=1,2mm, Wet, T_c=21min

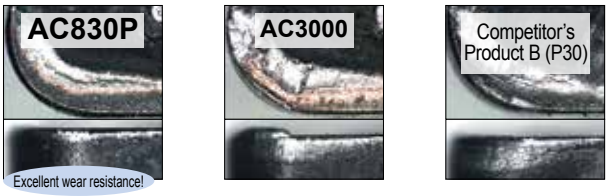
● **Interrupted Cutting**



Work Material: 34CrMo4 (Interrupted), Insert: CNMG 120408 NGE
Cutting Conditions: v_c=350m/min, f =0,2mm/rev, d_{oc}=1,5mm, Wet

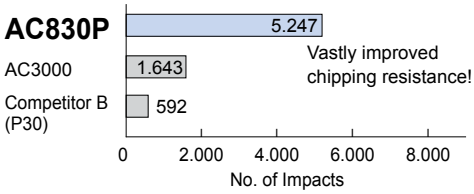
AC830P Cutting Performance

● **Continuous Cutting**



Work Material: 34crMo4 (Continuous), Insert: CNMG 120408 NGU
Cutting Conditions: v_c=240m/min, f=0,3mm/rev, d_{oc}=1,5mm, Wet, T_c=18min

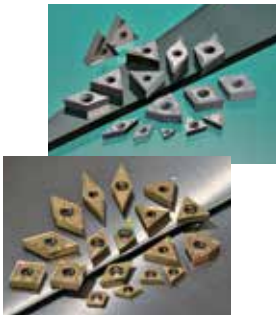
● **Interrupted Cutting**



Work Material: 34CrMo4 (Interrupted), Insert: CNMG 120408 NGU
Cutting Conditions: v_c=250m/min, f =0,24mm/rev, d_{oc}=1,5mm, Wet

Grades

New T1000A / T1500A / T1500Z New



T1000A: An uncoated cermet grade designed with wear resistance in mind that provides long tool life and excellent wear resistance in continuous finishing and profiling applications.

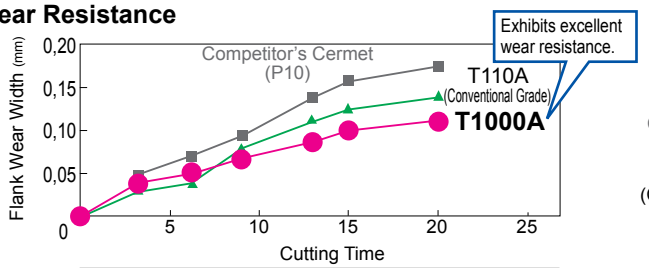
T1500A: A general purpose uncoated cermet grade that provides excellent value for money and delivers improved finished surface quality while providing good wear and fracture resistance.

T1500Z: Superior turning quality thanks to „Brilliant Coat". PVD coating with excellent adhesion resistance. A general purpose coated cermet grade capable of maintaining high-quality finished surfaces while providing excellent wear resistance.

Performance

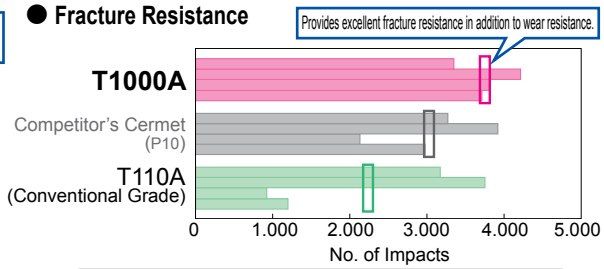
New T1000A Performance

● Wear Resistance



Work Material: 34CrMo4 Insert: NMG120408NSU
Cutting Conditions: v_C=320m/min, f=0,20mm/rev, a_p=1,5mm, Dry

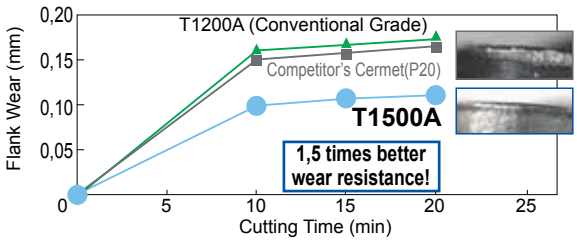
● Fracture Resistance



Work Material: 34CrMo4 Insert: CNMG120408NSU
Cutting Conditions: v_C=230m/min, f=0,20mm/rev, a_p=1,0mm, Wet

T1500A Performance

● Wear Resistance



Work Material: 34CrMo4 Insert: CNMG120408NSU
Cutting Conditions: v_c = 230m/min, f = 0,20mm/rev, a_p = 1,0mm, Wet

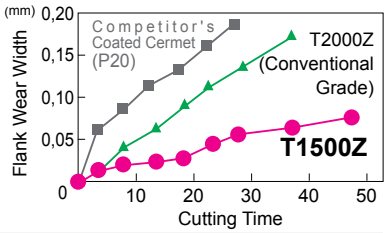
● Machined Surface Finish



Work Material: C45, Insert: CNMG120408NLU,
Cutting Conditions: v_c = 150m/min, f = 0,12mm/rev, a_p =1,0mm, Wet

New T1500Z Performance

● Wear Resistance

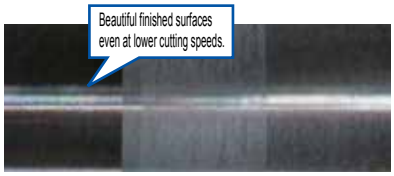


Work Material: 34CrMo: Insert: CNMG120408NSU
Cutting Conditions: v_C=230m/min, f=0,20mm/rev, a_p=1,0mm, Wet

● Machined Surface Finish



Work Material: 21NiCrMo2, Insert:DNMG150408NSU
Cutting Conditions: v_C=150m/min ,f=0,20mm/rev, a_p=1,0mm, Wet



Work Material: H240LA, Insert: CNMG120408NSU
Cutting Conditions: v_C=100m/min, f=0,15mm/rev, a_p=1,0mm, Wet

P Recommended Cutting Conditions

(Min. - **Optimum** - Max.)

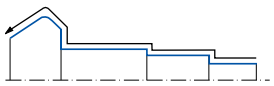
Work Material	Cutting Process	Chipbreaker	Grades	Depth of Cut (mm)	Feed Rate (mm/rev)	Cutting Speed (m/min)
Soft Steel	Fine Finishing	NFA / NFL	T1500A	0,2-**0,5**-1,0	0,05-**0,15**-0,25	150-**280**-400
	Finishing	NLU	T3000Z	0,3-**1,0**-1,8	0,08-**0,20**-0,35	150-**280**-400
Alloy Steel Carbon Steel	Fine Finishing	NFA / NFL	T1500A	0,2-**0,5**-1,0	0,05-**0,15**-0,25	100-**200**-300
	Finishing	NSU / NSE	T1500A	0,5-**1,0**-2,0	0,08-**0,20**-0,35	100-**200**-300
	Medium	NGU	T1500Z	0,8-**2,2**-4,0	0,15-**0,25**-0,50	100-**200**-300
High Carbon Steel Carbon Steel	Fine Finishing	NFA / NFL	T1000A	0,2-**0,5**-1,0	0,05-**0,15**-0,25	50-**150**-250
	Finishing	NSU / NSE	T1500Z	0,5-**1,0**-2,0	0,08-**0,20**-0,35	50-**150**-250
	Medium	NGU	T1500Z	0,8-**2,2**-4,0	0,15-**0,25**-0,50	50-**150**-250

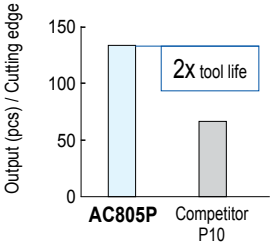
Application Examples

AC805P

17MnCr5, Crown Wheel

AC805P achieved 2 times longer tool life under same cutting conditions compared with competitor's grade P10.



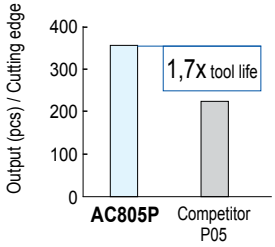


Insert: WNMG 080408 NGE (AC805P)
Cutting Conditions: v_c =350m/min, f=0,42mm/rev, d_{oc} =2,0mm, Emulsion

CK45, Drive Shaft

AC805P provides superior wear resistance and higher tool life, 1,6 times, also under lower cutting conditions.





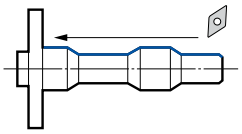
Insert: TNMG 160408 NGE (AC805P)
Cutting Conditions: v_c =153m/min, f=0,3-0,35mm/rev, d_{oc} =1,5mm, Emulsion

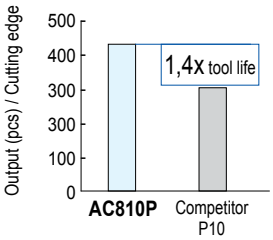
AC810P

15CrMo5, Hub

Good tool life in rough cutting of mill-scaled work.

In rough cutting of mill-scaled work, AC810P provides superior wear resistance and cutting edge stability compared to competitor's grade(P10 coating) and has achieved 1,4 times longer tool life.



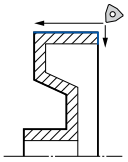


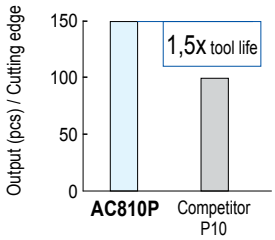
Insert: DNMG 150612 NGE (AC810P)
Cutting Conditions: v_c =204m/min, f=0,35 ~ 0,45mm/rev, d_{oc} =1,5 ~ 3,0mm, Wet

C45, Hub

Good tool life in rough cutting of mill-scaled work.

In rough cutting of mill-scaled work, AC810P provides superior wear resistance compared to competitor's grade (P10 coating) and has achieved 1,5 times longer tool life.



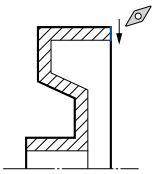


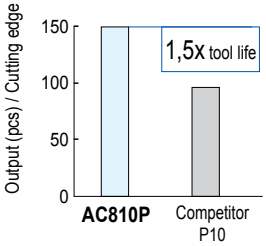
Insert: WNMG 080412 NGU (AC810P)
Cutting Conditions: v_c =250m/min, f=0,4mm/rev, d_{oc} =1,5mm, Wet

C45, Hub

Long tool life and stable cutting edge.

AC810P gives higher cutting edge stability than competitor's grade (P10 coating) and achieves 1,5 times longer tool life.



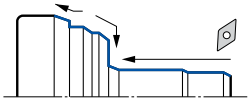


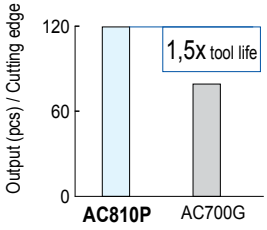
Insert: VBMT 160408 NSU (AC810P)
Cutting Conditions: v_c =240m/min, f=0,25mm/rev, d_{oc} =0,7mm, Wet

C45, CVJ (constant velocity joints) Outer Race

Long tool life in high speed machining applications.

In high-speed dry machining, AC810P provides superior wear resistance compared to conventional grade (AC700G) and has achieved 1,5 times longer tool life.



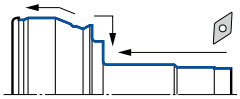


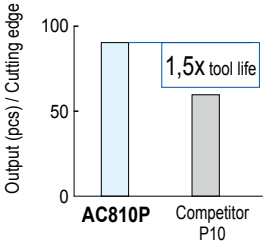
Insert: DNMG 150612 NLU (AC810P)
Cutting Conditions: v_c =350m/min, f=0,20 ~ 0,45mm/rev, d_{oc} =0,4 ~ 0,5mm, Dry

Ck53, CVJ (constant velocity joints) Outer Race

Long tool life in dry cutting applications.

In dry machining, AC810P provides superior wear resistance compared to competitor's grade (P10 coating) and has achieved 1,5 times longer tool life.



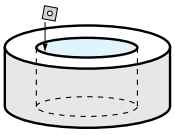


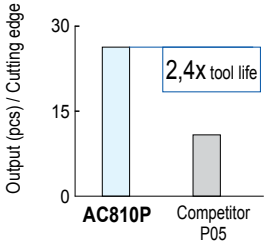
Insert: DNMG 150612 NGE (AC810P)
Cutting Conditions: v_c =270m/min, f=0,35 ~ 0,38mm/rev, d_{oc} =1,5mm, Dry

C45, Coupling

On par with P05 grade.

In high-feed cutting, AC810P provides superior wear resistance compared to competitor's grade (P05 coating) and has achieved 2,4 times longer tool life.





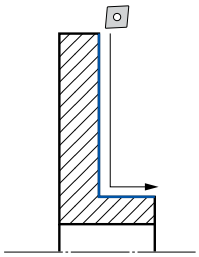
Insert: SNMG 150616 NMU (AC810P)
Cutting Conditions: v_c =175m/min, f=0,66mm/rev, d_{oc} =2,6mm, Wet

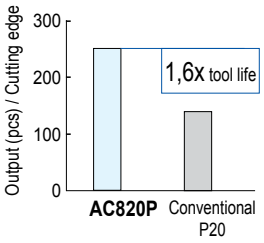
Application Examples

AC820P

Ck45, Turbine Hub

Good stability and wear resistance in rough cutting of mill-scaled work with 1,6x tool life.

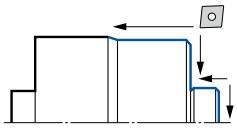


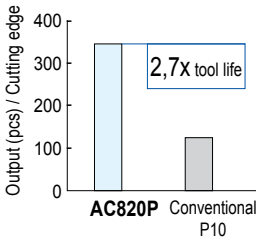


Insert: CNMG 120408 NGE (AC820P)
Cutting Conditions: v_c=210m/min, f=0,3mm/rev, d_{oc}=1,0mm, Wet

20Cr4, Output Shaft

Good wear resistance in high-speed conditions and 2,7x tool life.

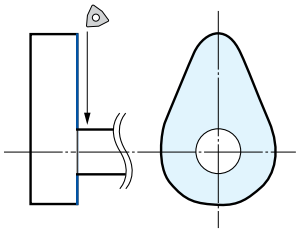


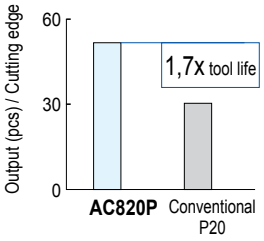


Insert: CNMG 120408 NSX (AC820P)
Cutting Conditions: v_c = ~ 400m/min, f=0,25mm/rev, d_{oc}=0,5 ~1,2mm, Wet

34CrMo4, Balancer

High reliability in interrupted cutting with 1,7x tool life.

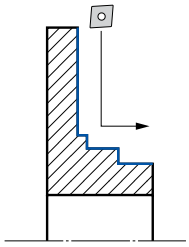


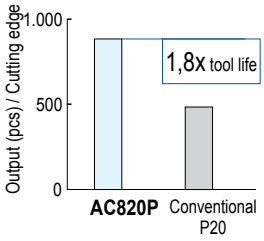


Insert: WNMG 080408 NGU (AC820P)
Cutting Conditions: v_c=220m/min, f=0,18mm/rev, d_{oc}=1,0mm, Wet

15CrMo5, Turbine Hub

Low alloy steel and good finishing. Stable cutting with 1,8x tool life.

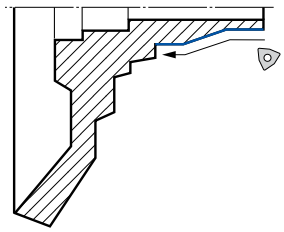


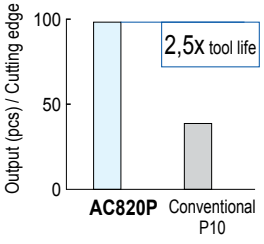


Insert: CNMG 120408 NGU (AC820P)
Cutting Conditions: v_c=200m/min, f=0,25mm/rev, d_{oc}=2,0mm, Wet

Ck45, Compact Knuckle

No sudden breakages and significantly improved stability with 2,5x tool life.

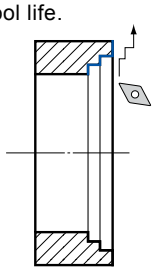


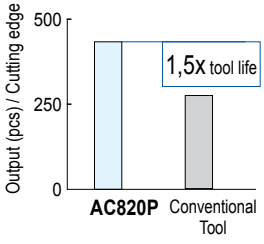


Insert: WNMG 080412 NLU (AC820P)
Cutting Conditions: v_c=192m/min, f=0,45mm/rev, d_{oc}=1,0 ~ 2,0mm, Wet

C45, Ring

Good wear resistance in rough cutting of mill-scaled work and 1,5x tool life.

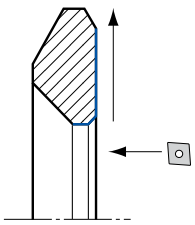


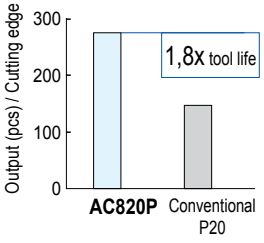


Insert: DNMG 150612 NSX (AC820P)
Cutting Conditions: v_c=200m/min, f=0,15 ~ 0,35mm/rev, d_{oc}=1,0 ~ 2,0mm, Wet

25CrMo4, Gear

Good wear resistance in high-feed conditions with 1,8x tool life.

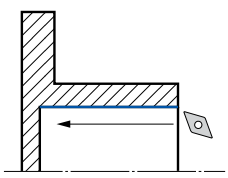


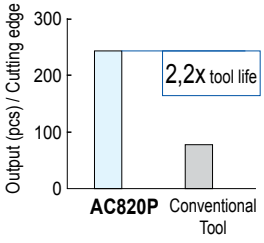


Insert: CNMG 120408 NMU (AC820P)
Cutting Conditions: v_c=220m/min, f=0,5mm/rev, d_{oc}=5mm, Wet

C35, Carrier Flange

Positive type with good wear resistance and 2,2x tool life.





Insert: DCMT 11T308 NSU (AC820P)
Cutting Conditions: v_c=180m/min, f=0,17mm/rev, d_{oc}=1mm, Wet

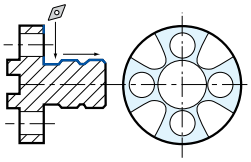
Application Examples

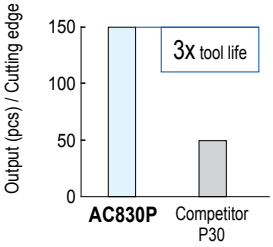
AC830P

C55, Hub Unit

Long tool life in both interrupted and continuous cutting!

AC830P offers reduced chipping compared to competitor's grade (P30) in both continuous and interrupted cutting to give 3x tool life.



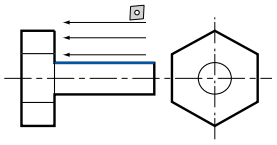


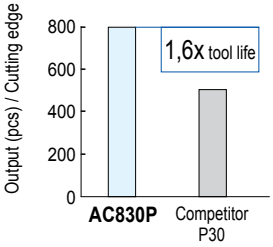
Insert: DNMG 150612 NUX (AC830P)
Cutting Conditions: v_c=150m/min, f=0,25mm/rev, d_{oc}=1,0mm, Wet

USt.42-2, Bolt

Long tool life in both interrupted and continuous cutting!

AC830P offers superior chipping and wear resistance compared to competitor's grade (P30) and has 1,6x tool life.



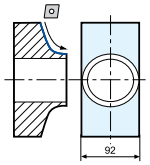


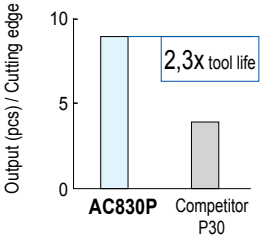
Insert: CNMG 120408 NGU (AC830P)
Cutting Conditions: v_c=170m/min, f=0,25mm/rev, d_{oc}=2,5mm, Wet

C50, Machine Component

Improved efficiency and long tool life.

AC830P provides cutting speed that is 25% faster than competitor's grade (P30 coating) and achieves 2,3 times longer tool life.



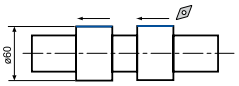


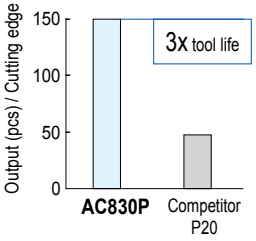
Insert: CNMG 120412 NMU (AC830P)
Cutting Conditions: v_c=120 ~ 150m/min, f=0,25mm/rev, d_{oc}=1,5mm, Wet

15CrMo5, Cam Shaft

On par with P20 grade.

In comparison to competitor's grade (P20 coating) which suffered from sudden breakages leading to unstable tool life (30 to 70 workpieces), AC830P provides stable tool life that is 3 times longer (140 to 160 workpieces).



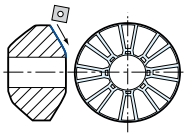


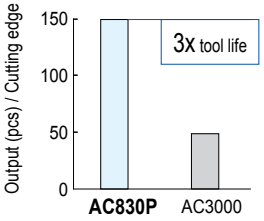
Insert: DNMG 150608 NGU (AC830P)
Cutting Conditions: v_c=220m/min, f=0,25mm/rev, d_{oc}=1,0mm, Wet

20Cr4, Pinion Gear

Stable, long tool life in heavy interrupted cutting.

In heavy interrupted cutting of gears, AC830P provides less abnormal damage compared to conventional grade (AC3000) and has achieved stable tool life that is 3 times longer.



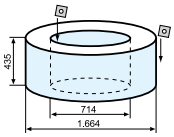


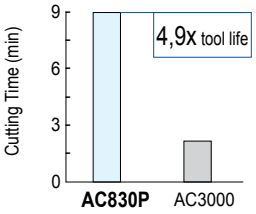
Insert: SNMG 120412 NUX (AC830P)
Cutting Conditions: v_c=170m/min, f=0,35mm/rev, d_{oc}=1,5mm, Wet

40NiCrMo6, Gear

Stable, long tool life in heavy cutting.

In heavy cutting with varying cut depths, AC830P achieves stable tool life that is 4,9 times longer compared to conventional grade (AC3000).



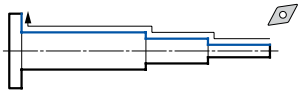


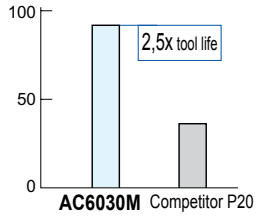
Insert: SNMM 190616 NHG (AC830P)
Cutting Conditions: v_c=115m/min, f=0,8mm/rev, d_{oc}=5 ~ 10mm, Wet

New AC6030M

34CrNiMo6 Shaft

AC6030M suppresses vibration and has 2,5x tool life of competitor's P20 grade.

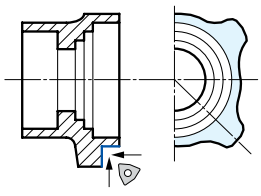


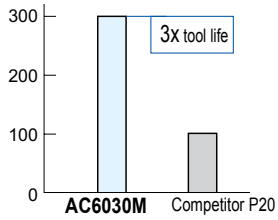


Insert: DNMG 150404 NEX (AC6030M)
Cutting Conditions: v_c=180m/min, f=0,18mm/rev, a_p= 0,5mm, Wet

C55 Hub

AC6030M has no chipping during light interrupted cutting and has 3x tool life of competitor's P20 grade.



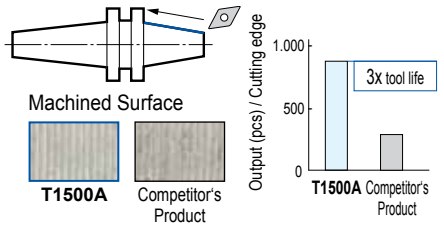


Insert: WNMG 080412 NGU (AC6030M)
Cutting Conditions: v_c=180m/min, f=0,35mm/rev, a_p=0,8mm, Wet

Application Examples

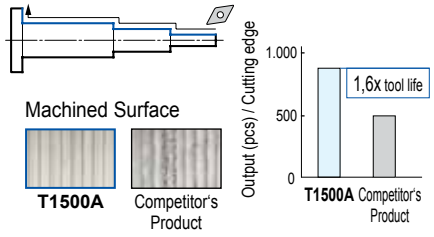
T1500A (Uncoated Cermet, M Class)

15CrMo5, Arbour



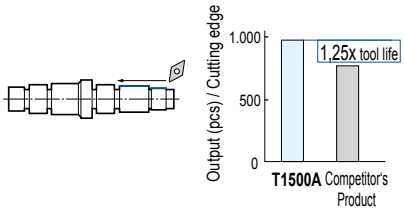
Insert: DNMG 150608 NLU (T1500A)
Cutting Conditions: v_c=200m/min, f=0,25mm/rev
d_{oc}=0,3mm, Wet

34CrMo4, Shaft



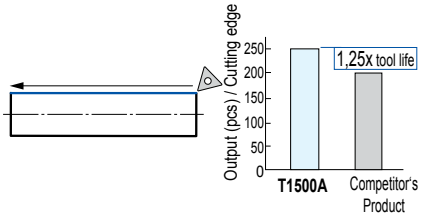
Insert: DNMG 150408 NSU (T1500A)
Cutting Conditions: v_c=200m/min, f=0,18mm/rev
d_{oc}=0,15mm, Wet

34CrMo4, Gear Shaft



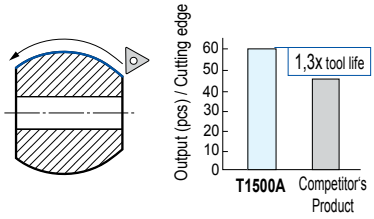
Insert: DNMG 150404 NLU (T1500A)
Cutting Conditions: v_c=90-140m/min, f=0,15mm/rev
d_{oc}=0,25mm, Wet

C45, Shaft



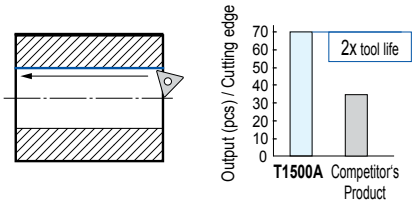
Insert: TNMG 160404 NFL (T1500A)
Cutting Conditions: v_c=200m/min, f=0,12mm/rev,
d_{oc}=0,35mm, Wet

X5CrMo17 12 2, Valve



Insert: TNMG 160408 NSU (T1500A)
Cutting Conditions: v_c=140m/min, f=0,12mm/rev
d_{oc}=0,15mm, Wet

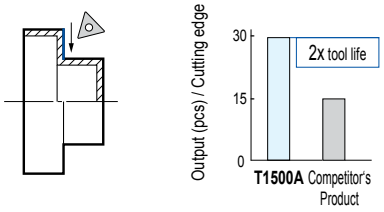
St.34-2, Machine Component



Insert: TNMG 160404 NSU (T1500A)
Cutting Conditions: v_c=150m/min, f=0,07mm/rev
d_{oc}=0,1mm, Wet

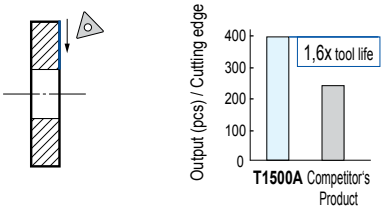
T1500A (Uncoated Cermet, G Class)

Hot Press Steel, Automotive Component



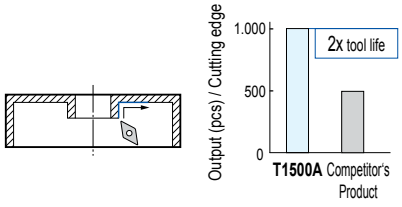
Insert: TNGG 160402 LUM (T1500A)
Cutting Conditions: v_c=180m/min, f=0,25mm/rev
d_{oc}=0,25mm, Wet

C45, Transmission Part



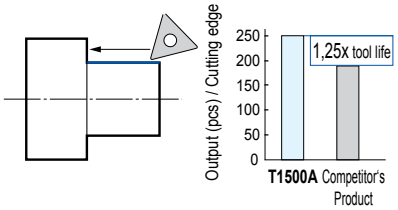
Insert: TNGG 160402 LFY (T1500A)
Cutting Conditions: v_c=300m/min, f=0,05mm/rev
d_{oc}=0,1mm, Wet

Hot Plate Steel, Drum Brake Component



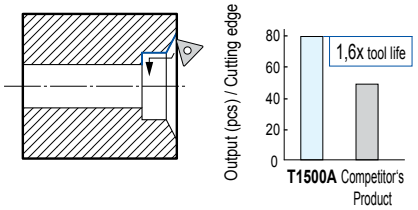
Insert: DNGG 150404 RUM (T1500A)
Cutting Conditions: v_c=280m/min, f=0,07mm/rev
d_{oc}=0,25mm, Wet

34CrMo4, Pump Part



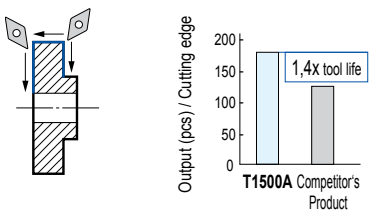
Insert: TNGG 160404 RUM (T1500A)
Cutting Conditions: v_c=100m/min, f=0,25mm/rev
d_{oc}=1.0mm, Wet

C45, Sleeve



Insert: TPGT 110304 LSD (T1500A)
Cutting Conditions: v_c=200m/min, f=0,15mm/rev
d_{oc}=0.2mm, Wet

C45, Machine Component

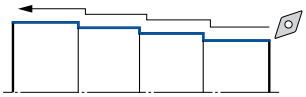


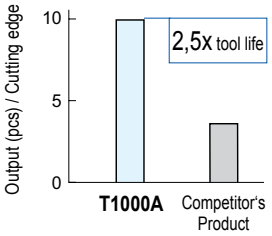
Insert: DCGT 070202 LFX (T1500A)
Cutting Conditions: v_c=240m/min, f=0,03mm/rev
d_{oc}=0,05mm, Wet

Application Examples

New *T1000A* (Uncoated Cermet)

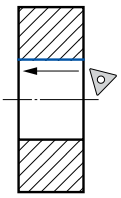
42CrMo4, Shaft

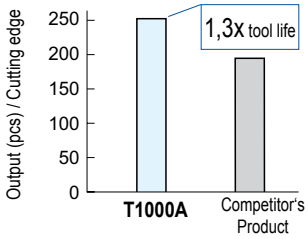




Insert: DNMG 150408 NSU (T1000A)
Cutting Conditions: v_c =180m/min, f=0,10~0,25mm/rev, d_{oc} =0,4mm, Wet

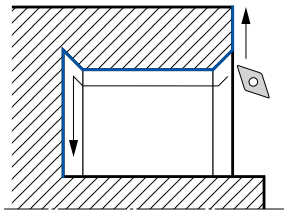
S45, Flange

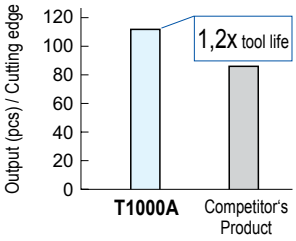




Insert: TPGT 110304 LSD (T1000A)
Cutting Conditions: v_c =180m/min, f=0,08mm/rev, d_{oc} =0,15mm, Wet

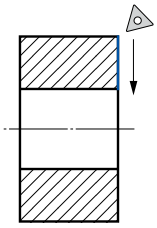
C35, Automotive Component

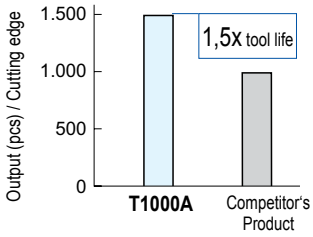




Insert: DCMT 070208 NSU (T1000A)
Cutting Conditions: v_c =230m/min, f=0,05m/rev, d_{oc} =0,3~0,7mm, Wet

C25, Automotive Component

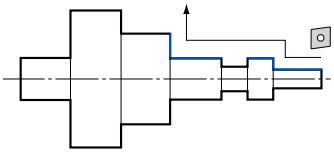


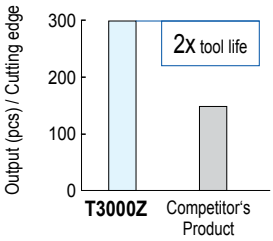


Insert: TNGG 160404 LFX (T1000A)
Cutting Conditions: v_c =80~170m/min, f=0,10mm/rev, d_{oc} =0,2mm, Dry

T3000Z (Coated Cermet)

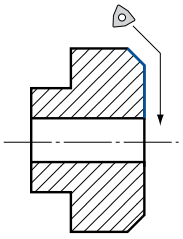
Ck45, Shaft (Interrupted Cutting)

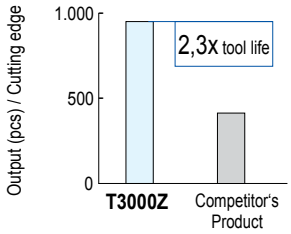




Insert: CNMG 120408 NSX (T3000Z)
Cutting Conditions: v_c =220m/min, f=0,25mm/rev, d_{oc} =1,8mm, Wet

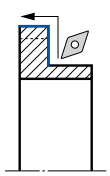
20Cr4, Cone Clutch

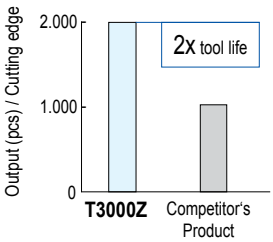




Insert: WNMG 080408 NLU(T3000Z)
Cutting Conditions: v_c =200m/min, f=0,20mm/rev, d_{oc} =1,0mm, Wet

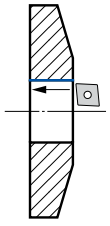
20Cr4, Clutch Gear (Interrupted Cutting)

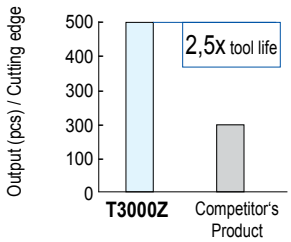




Insert: DNMG 150608 NLU (T3000Z)
Cutting Conditions: v_c =200m/min, f=0,3mm/rev, d_{oc} =0,3 ~ 0,5mm, Wet

C45, Machine Component





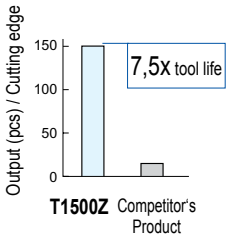
Insert: CPMT 090304 NSU (T3000Z)
Cutting Conditions: v_c =100m/min, f=0,20mm/rev, d_{oc} =1,0mm, Wet

Application Examples

New T1500Z (Coated Cermet)

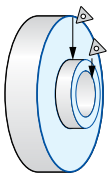
15CrMo5, Shaft

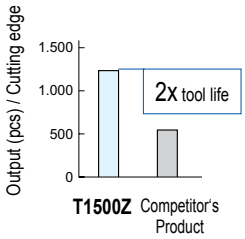




Insert: TNMG 160408 NSU (T1500Z)
Cutting Conditions: v_c =220m/min, f=0,26~0,34mm/rev, d_{oc} =0,2~0,25mm, Wet

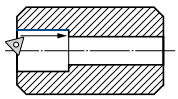
20CrMo5, Automotive Component

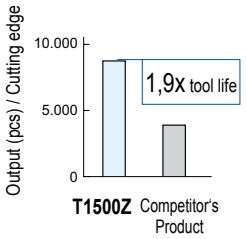




Insert: TNMG 160408 NLU (T1500Z)
Cutting Conditions: v_c =200m/min, f=0,15mm/rev, d_{oc} =1,0mm, Wet

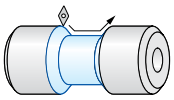
C45E, Guide

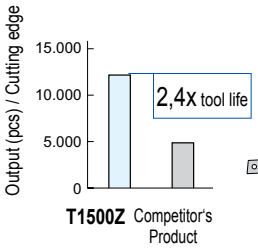




Insert: TPMT 090204 NLU (T1500Z)
Cutting Conditions: v_c =162m/min, f=0,13mm/rev, d_{oc} =0,55mm, Wet

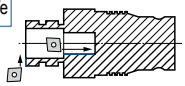
C45, Sleeve

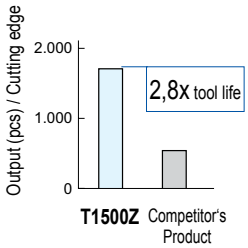




Insert: DCMT 11T304 NLU (T1500Z)
Cutting Conditions: v_c =230m/min, f=0,10mm/rev, d_{oc} =0,50mm, Wet

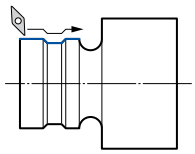
S43C, Shaft

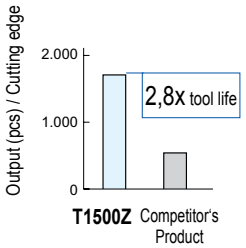




Insert: CPGT 080208 NSD (T1500Z)
Cutting Conditions: v_c =140m/min, f=0,15mm/rev, d_{oc} =0,5mm, Wet

S43C, Machine Component



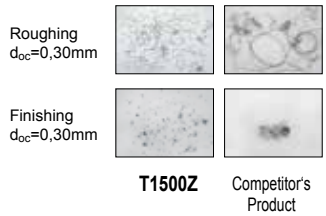


Insert: TPMT 090204 NLU (T1500Z)
Cutting Conditions: v_c =162m/min, f=0,2mm/rev, d_{oc} =0,2~0,9mm, Wet

SAPH440, (Press Material) Piston Part

Criteria: Undulation of Finished Surface

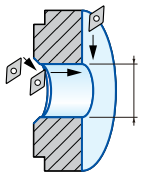


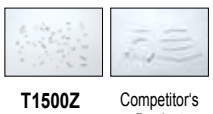


Insert: DCMT 11T308 NFB (T1500Z)
Cutting Conditions: v_c =360m/min, f=0,14mm/rev, d_{oc} =Rough: 0,30mm, Finish: 0,02mm, Wet

SCMr443C, Clutch Part

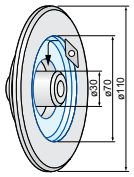
Criteria: Surface Properties (Clouding and Exit Burrs)

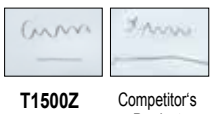




Insert: DCMT 11T304 NFB (T1500Z)
Cutting Conditions: v_c =220m/min, f=①0,15 ②0,12 ③0,18mm/rev, d_{oc} =0,25mm, Wet

C45, Hub

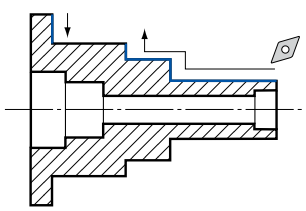


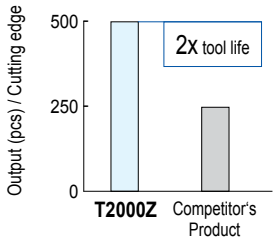


Insert: VBMT 160408 NLB (T1500Z)
Cutting Conditions: v_c =240m/min, f=0,25~0,28mm/rev, d_{oc} =0,6mm, Wet

T2000Z (Coated Cermet)

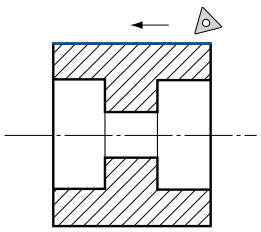
C45, Flange

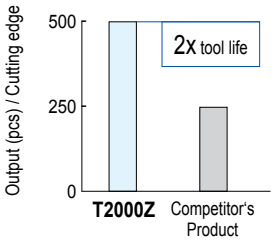




Insert: DNMG 150608 NSU (T2000Z)
Cutting Conditions: v_c =200m/min, f=0,28mm/rev, d_{oc} =1,5mm, Wet

C45, Gear (Interrupted Cutting)

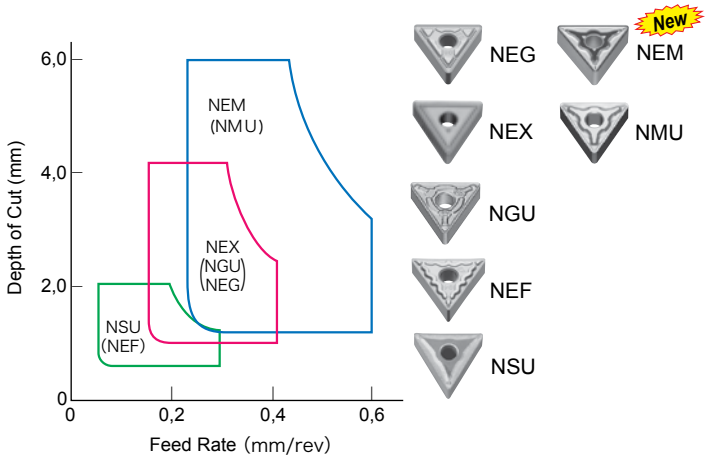




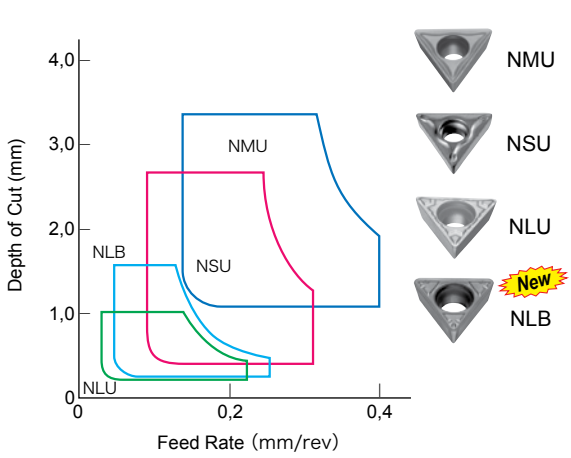
Insert: TNGG 160404 RUM (T2000Z)
Cutting Conditions: v_c =300m/min, f=0,15mm/rev, d_{oc} =2,0mm, Wet

Chipbreakers

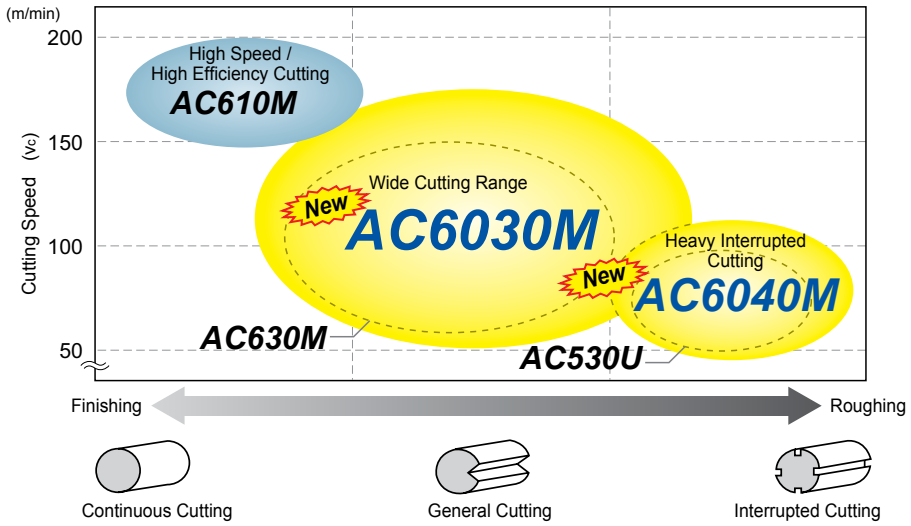
Negative Type



Positive Type



Grades



M Recommended Cutting Conditions

(Min. - **Optimum** - Max.)

Work Material			Cutting Range	Chipbreaker	Grade	Cutting Conditions		
						Depth of Cut a_p (mm)	Feed Rate f (mm/rev)	Cutting Speed v_c (m/min)
Cr-Based	Ferritic Materials	X6CrAl 13, X8CrNiS 18 9, X29CrS 13, X6CrMoS 17, X12CrS 13	Finishing	NEF (NSU)	AC610M	0,5-**1,5**-2,0	0,05-**0,15**-0,25	170-**225**-300
			Medium	**NEG** · NEX · NGU	**AC6030M**	1,0-**2,5**-4,0	0,10-**0,25**-0,40	140-**180**-235
			Roughing	NEM	AC6040M	1,5-**3,5**-6,0	0,20-**0,35**-0,60	120-**150**-180
	Martensitic Materials	X12Cr 13, X20Cr 13, X30Cr 13, X6Cr 17, X19CrNi 17 2, X6CrNi 18 9	Finishing	NEF (NSU)	AC6030M	0,5-**1,5**-2,0	0,05-**0,15**-0,25	120-**175**-230
			Medium	**NEG** · NEX · NGU	**AC6030M**	1,0-**2,5**-4,0	0,10-**0,25**-0,40	100-**140**-180
			Roughing	NEM	AC6040M	1,5-**3,5**-6,0	0,20-**0,35**-0,60	80-**120**-160
Cr/Ni-Based	Austenitic Materials	X5CrNi 18 10, X2CrNi 19 11, X2CrNiMo 18 10, X4CrNiMo 17 12 2, X2CrNiMo 17 12 2, X5CrNiMo 17 13, X6CrNiTi 18 10, X70CrMo 15	Finishing	NEF (NSU)	AC6030M	0,5-**1,5**-2,0	0,05-**0,15**-0,25	90-**115**-140
			Medium	**NEG** · NEX · NGU	**AC6030M**	1,0-**2,5**-4,0	0,10-**0,25**-0,40	70- **90**-110
			Roughing	NEM	AC6040M	1,5-**3,5**-6,0	0,20-**0,35**-0,60	50- **75**-100
	Two-Phase (Austenite / Ferrite) Materials	X5CrNi 17 7, X2CrNi 18 9, X6CrNi 25 20, X2CrNiMoN 17 12 2, X6CrNiNb 18 10	Finishing	NEF (NSU)	AC6030M	0,5-**1,5**-2,0	0,05-**0,15**-0,25	90-**115**-140
			Medium	**NEG** · NEX · NGU	**AC6030M**	1,0-**2,5**-4,0	0,10-**0,25**-0,40	70- **90**-110
			Roughing	NEM	AC6040M	1,5-**3,5**-6,0	0,20-**0,35**-0,60	50- **75**-100
	Precipitation Hardening	X5CrNiCuNb 16 4, X7CrNiAl 17 7, X4CrNuMo 27 5 2, X2CrNiMoN 22 5 3, X2CrNiMoCuN 25 6 3	Finishing	NEF (NSU)	AC6030M	0,5-**1,5**-2,0	0,05-**0,15**-0,25	90-**115**-140
			Medium	**NEG** · NEX · NGU	**AC6030M**	1,0-**2,5**-4,0	0,10-**0,25**-0,40	70- **90**-110
			Roughing	NEM	AC6040M	1,5-**3,5**-6,0	0,20-**0,35**-0,60	50- **75**-100

Grades

New AC6030M / New AC6040M / AC610M / AC630M / AC520U / AC530U

AC6030M: Employes "Absotech Platinum", a new CVD coating. The first recommended grade for general machining of stainless steel that drastically reduces the occurrence of abnormal damage, which is a problem in stainless steel machining. Achieves long and stable machining thanks to the improved coating strength and excellent adhesion.

AC6040M: Employes "Absotech Bronze", a new PVD coating and exclusive tough carbide substrate. The first recommended grade for interrupted machining of stainless steel that drastically improves the reliability in unstable machining thanks to the excellent adhesion and peel-off resistance of the new PVD coating as well as the improved fracture resistance of the exclusive carbide substrate.

AC610M: High hardness carbide substrate coupled with Super FF Coat. For high efficiency machining with superior wear resistance.

AC630M: High toughness carbide substrate coupled with Super FF Coat. A general purpose grade with sharp cutting edges for superior stability.

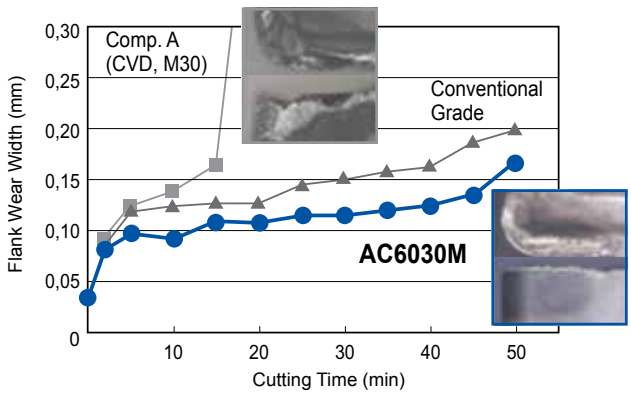
AC520U: Tough carbide grade that utilises the high wear resistant Super ZX Coat for excellent stability

AC530U: Tough grade with long tool life and high efficiency for precision machining of stainless steel and small components.

Performance

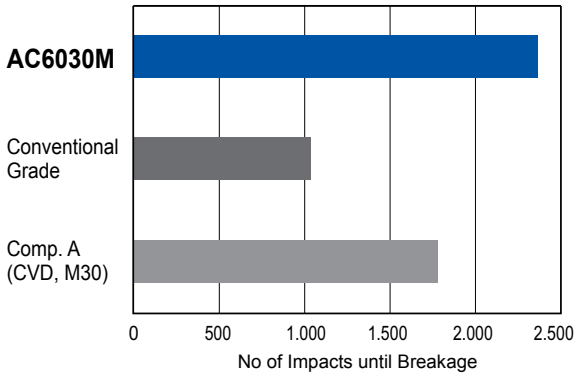
New AC6030M

● **Continuous Cutting**



Work Material: X6CrMo17 12 2 Insert: CNMG 120408 NEX
Cutting Conditions: v_c=200m/min, f=0,2mm/rev, d_{oc}=2,0mm, Wet

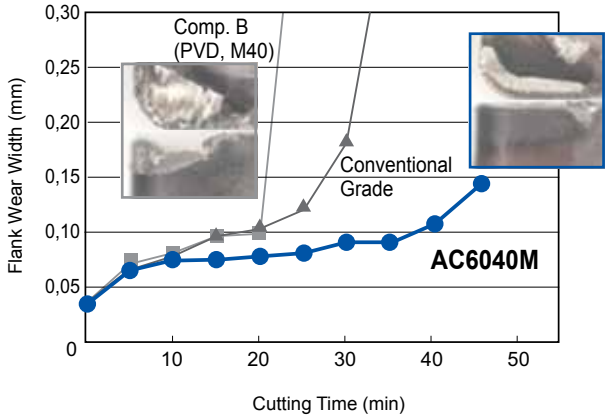
● **Interrupted Cutting**



Work Material: X6CrMo17 12 2 Insert: CNMG 120408 NGU
Cutting Conditions: v_c=100m/min, f=0,1mm/rev, d_{oc}=1,0mm, Wet

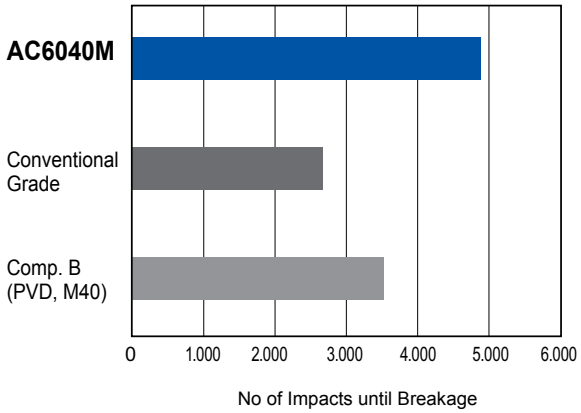
New AC6040M

● **Continuous Cutting**



Work Material: X6CrMo17 12 2 Insert: CNMG 120408 NGU
Cutting Conditions: v_c=150m/min, f=0,2mm/rev, d_{oc}=2,0mm, Wet

● **Interrupted Cutting**



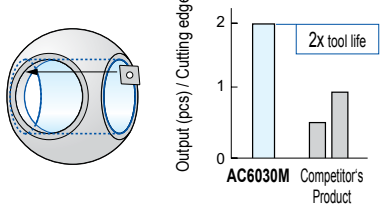
Work Material: CNMG 120408 NGU Insert: CNMG 120408 NGU
Cutting Conditions: v_c=230m/min, f=0,23mm/rev, d_{oc}=0,80mm, Dry

Application Examples

New AC6030M

GX40CrNi24-4, Valve Ball

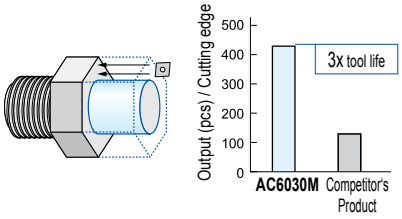
Achieves stable, 2 times longer tool life in interrupted machining of cast steel.



Insert: CNMG 120412 NEM (AC6030M)
Cutting Conditions: v_c=100m/min, f=0,30 ~ 0,35mm/rev
d_{oc}=2,5mm, Wet

X5CrNiS1810, Joint Component

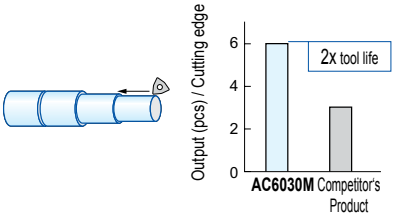
Enables roughing to finishing from hexagonal bars with one grade and achieves 3 times longer tool life.



Insert: CNMG 120412 NGU (AC6030M)
Cutting Conditions: v_c=50 ~ 75m/min, f=0,16mm/rev
d_{oc}=2,0mm, Wet

X5CrNiS1810, Shaft

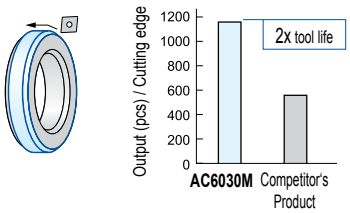
Achieves 2 times longer tool life thanks to excellent wear resistance.



Insert: WNMG 080408 NEX (AC6030M)
Cutting Conditions: v_c=60 ~ 70m/min, f=0,32mm/rev
d_{oc}=3,0mm, Wet

X6Cr17, Motorcycle Component

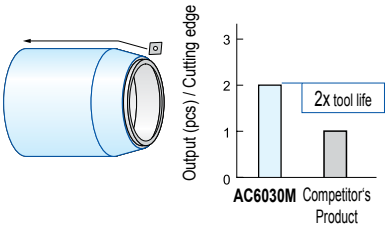
Provides stable machined surface qualitiy and achieves 2 times longertool life thanks to excellent adhesion resistance.



Insert: CNMG 120404 NEF (AC6030M)
Cutting Conditions: v_c=120m/min, f=0,10mm/rev,
d_{oc}=0,8 ~ 1,5mm, Wet

GX6CrNi18-9, Pump Part

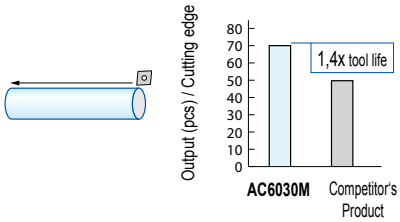
Provides 2,5 times efficiency (v_c=60~100m/min, f=0,2~0,3mm/rev) and 2 times longer tool life.



Insert: CNMG 120408 NEG (AC6030M)
Cutting Conditions: v_c=100m/min, f=0,3mm/rev
d_{oc}=0,5mm, Wet

X5CrNiS1810, Shaft

Achieves 1,4 times longer tool life thanks to excellent wear resistance.

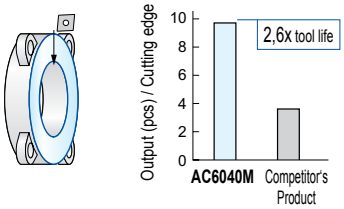


Insert: CNMG 120408 NGU (AC6030M)
Cutting Conditions: v_c=160m/min, f=0,25mm/rev
d_{oc}=3,0mm, Wet

New AC6040M

X6CrNiMo1810, Flange,

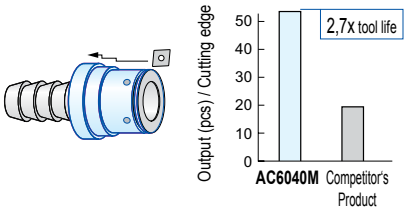
Achieves 2,6 times longer tool life thanks to excellent fracture resistance.



Insert: CNMG 120408 NGU (AC6040M)
Cutting Conditions: v_c=200 ~ 360m/min, f=0,12mm/rev
d_{oc}=0,4mm, Wet

X5CrNiS1810, Nipple

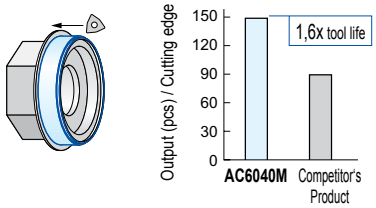
Achieves 2,7 times longer tool life thanks to excellent adhesion resistance.



Insert: CNMG 120408 NGU (AC6040M)
Cutting Conditions: v_c=150m/min, f=0,15mm/rev
d_{oc}=1,5mm, Wet

X6CrNiMo1810, Valve Joint

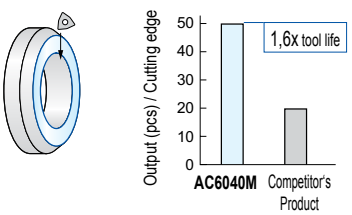
Achieves 1,6 times longer tool life thanks to excellent crater wear resistance.



Insert: WNMG 080408 NEX (AC6040M)
Cutting Conditions: v_c=130 ~ 160m/min, f=0,10mm/rev
d_{oc}=0,7mm, Wet

GX40CrNi24-4, Flange Joint Component

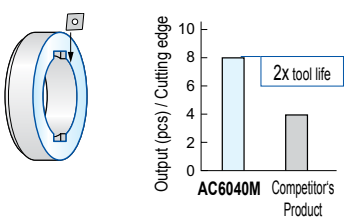
Provides stable machined surfaces and achieves 1,6 times longer tool life thanks to excellent wear resistance.



Insert: WNMG 080408 NEX (AC6040M)
Cutting Conditions: v_c=140 ~ 200m/min, f=0,06mm/rev
d_{oc}=0,5mm, Wet

GX40CrNi24-4, Coupling

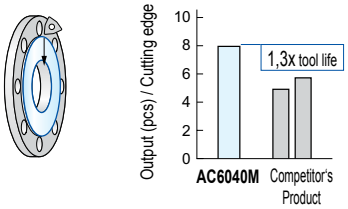
Achieves 2 times longer tool life thanks to excellent fracture resistance.



Insert: CNMG 120408 NEG (AC6040M)
Cutting Conditions: v_c=70 ~ 180m/min, f=0,14mm/rev
d_{oc}=2,5mm, Wet

X6CrNiMo1810, Valve Flange

Achieves over 1,3 times longer stable tool life thanks to excellent fracture resistance.



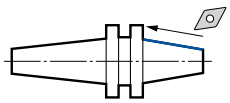
Insert: WNMG 080408 NGU (AC6040M)
Cutting Conditions: v_c=180 ~ 340m/min, f=0,15mm/rev
d_{oc}=0,4mmx4pass, Wet

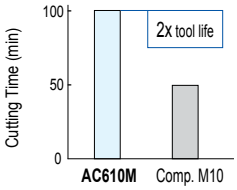
Application Examples

AC610M

X5CrNi1810, Arbour

AC610M has good wear resistance with 2x tool life of competitor's.

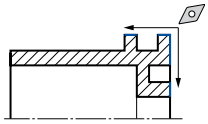


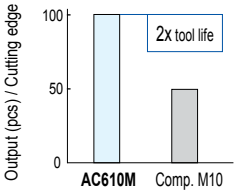


Insert : DNMG 150408 NEX (AC610M)
Cutting Conditions : v_c=210m/min, f=0,3mm/rev, d_{oc}=2,0mm, Wet

X510Cr13, Sleeve

AC610M features superior wear resistance compared to competitor's with 2x tool life.



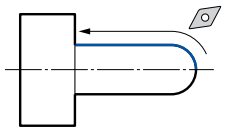


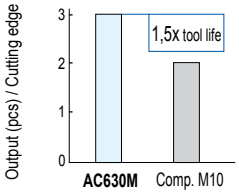
Insert : DNMG 150408 NGU (AC610M)
Cutting Conditions : v_c=215m/min, f=0,35mm/rev, d_{oc}=0,85mm, Wet

AC630M

X5CrNi1810, Machine Component

AC630M enables stable cutting without breakages with 1,5x the tool life of competitor's grade.

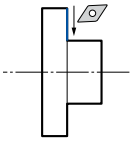


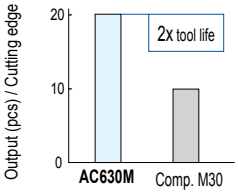


Insert : DNMG 150408 NEX (AC630M)
Cutting Conditions : v_c=130m/min, f=0,4mm/rev, d_{oc}=0,5mm, Wet

X2CrNiMo17132, Automotive Component

AC630M enables stable cutting even in light interrupted cutting with 2x the tool life of competitor's grade.

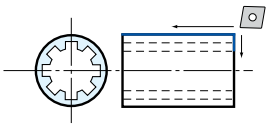


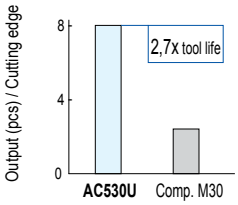


Insert : DNMG 150408 NGU (AC630M)
Cutting Conditions : v_c=150m/min, f=0,15mm/rev, d_{oc}=1,6mm, Wet

AC520U

X5CrNi1810, Machine Component

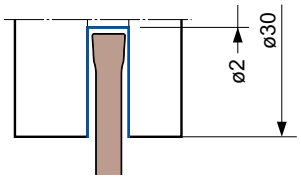




Insert : CNMG 120408 NEX (AC520U)
Cutting Conditions : v_c=150m/min, f=0,2mm/rev, d_{oc}=2,0mm, Wet

Grooving X5CrNiMo1810, Measuring Component

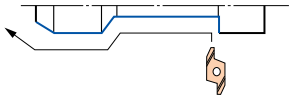
Enables stable machining without chattering thanks to excellent chip control performance and a high rigidity holder.

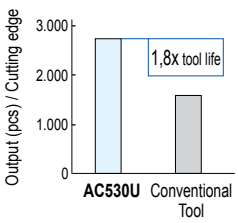


Insert: GCM N3002GG (AC520U) Toolholder: GNDL R2525M320
Cutting Conditions: v_c=60m/min, f=0,025mm/rev, d_{oc}=2,0mm, Wet, Cutting edge: 3mm

AC530U

X12CrS13, Pulley Shaft

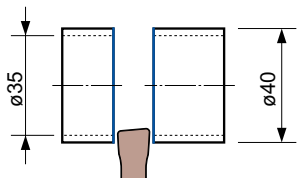




Insert : BTR3515 (AC530U)
Cutting Conditions : v_c=60 ~ 90m/min, f=0,04mm/rev, d_{oc}=1,5 ~ 2,5mm, Wet

Cutting Off Round Hollow X10CrNiS18 9, Pipe

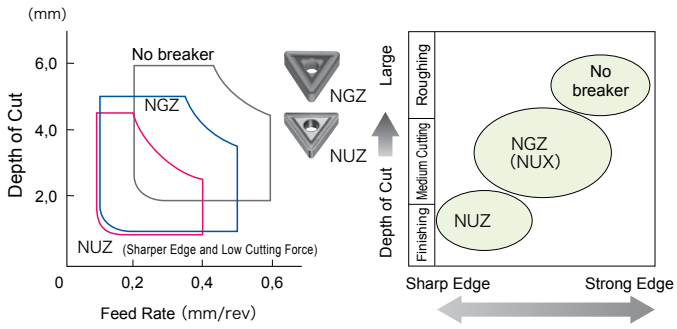
Enables stable machining thanks to superior cutting performance and excellent chip control.



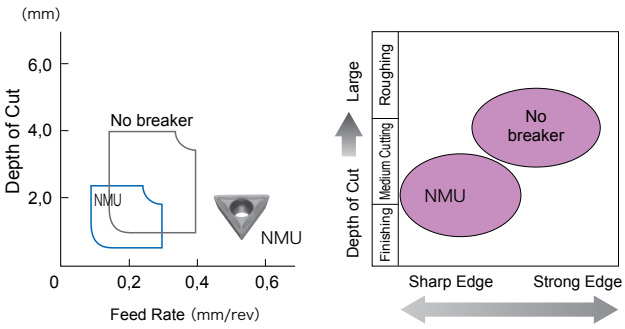
Insert: GCMR2002CG05 (AC530U) Toolholder: GNDL R2020K220
Cutting Conditions: v_c=140m/min, (n=1.000rpm), f=0,03mm/rev, Wet, Cutting edge: 2mm

Chipbreakers

Negative Type

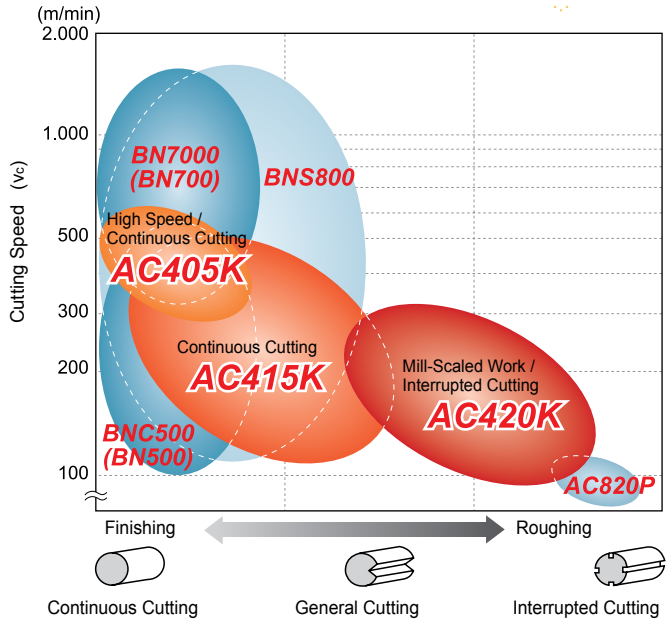


Positive Type

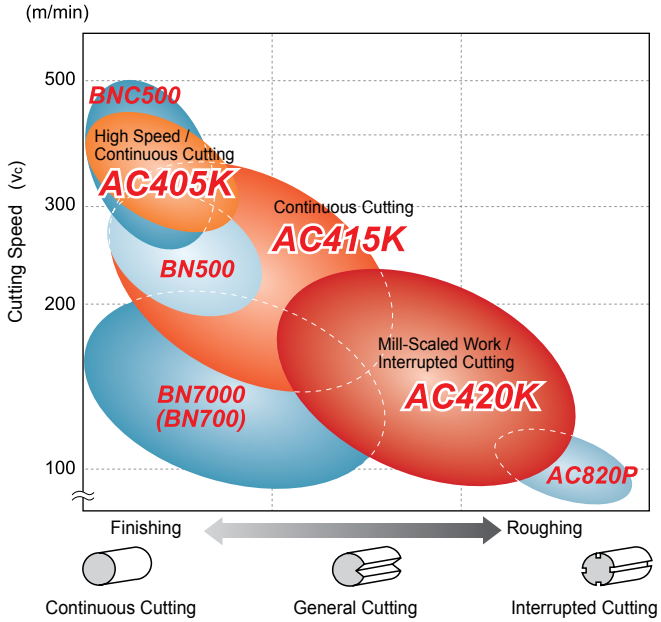


Grades

● GG (Grey Cast Iron)



● GGG (Ductile Cast Iron)



Recommended Cutting Conditions

(Min. - **Optimum** - Max.)

Applications	Cutting Process	Chipbreakers	Grades	GG (Grey Cast Iron)		GGG (Ductile Cast Iron)	
				Feed Rate (mm/rev)	Cutting Speed (m/min)	Feed Rate (mm/rev)	Cutting Speed (m/min)
High Speed Cutting	Continuous	–	**BN7000**	0,1-**0,20**-0,5	500-**1.500**-2.000	0,1-**0,20**-0,4	250-**350**-500
Finishing	Continuous	NUZ	AC405K	0,1-**0,25**-0,4	230-**400**-570	0,1-**0,25**-0,4	170-**350**-500
	General	**NUZ**	**AC415K**	0,1-**0,25**-0,4	200-**350**-500	0,1-**0,25**-0,4	150-**300**-450
	Interrupted	NGZ	AC415K	0,1-**0,30**-0,5	150-**275**-400	0,1-**0,30**-0,5	150-**250**-350
Light Interrupted Medium	Continuous	NGZ	AC405K	0,1-**0,30**-0,5	170-**315**-460	0,1-**0,30**-0,5	170-**285**-400
	General	**NGZ**	**AC415K**	0,1-**0,30**-0,5	150-**275**-400	0,1-**0,30**-0,5	150-**250**-350
	Interrupted	NGZ	AC420K	0,1-**0,30**-0,5	100-**200**-300	0,1-**0,30**-0,5	80-**150**-220
Roughing	Continuous	NGZ	AC415K	0,1-**0,30**-0,5	150-**275**-400	0,1-**0,30**-0,5	150-**250**-350
	General	**NGZ**	**AC420K**	0,1-**0,30**-0,5	100-**200**-300	0,1-**0,30**-0,5	80-**150**-220
	Interrupted	–	AC420K	0,2-**0,35**-0,6	100-**175**-250	0,2-**0,35**-0,6	80-**130**-180

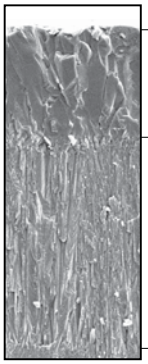
Grades AC405K / AC415K / AC420K



AC405K: Suitable for high-speed continuous cutting. Excellent resistance to wear and plastic deformation.
AC415K: First recommended grade for cast iron turning. Provides stability and long tool life in a wide range of processes.
AC420K: Superior fracture resistance provides excellent stability in interrupted unstable cutting and when cutting mill-scaled work.

● Improvements to super FF-TiCN coating grain and hardness provide significantly improved wear resistance.
Newly developed stress control technology enhances micro-grained α Alumina (FF-Al_2O_3) coating for superior reliability.

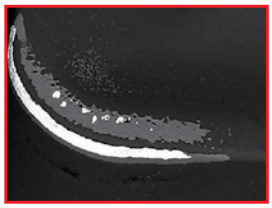
● Coating Structure



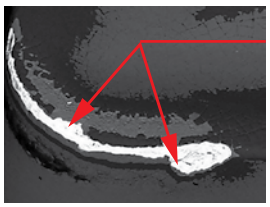
Micro-grained α Alumina (FF-Al_2O_3)
Improved adhesion and peel-off resistance.

Super FF-TiCN
Ultra-fine grained, ultra-hard TiCN coating increases wear resistance 1,5 times.

Coating stress control technology reduces abnormal damage caused by chipping.

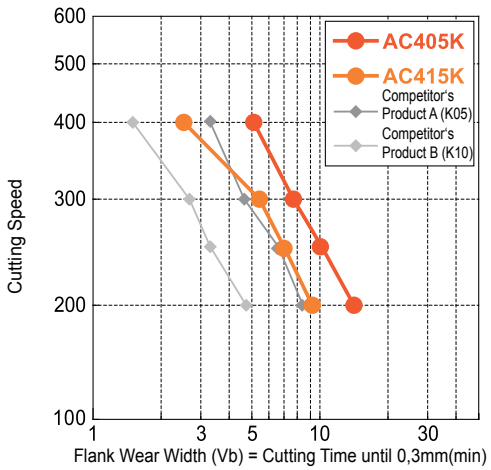


AC400K Series Coating



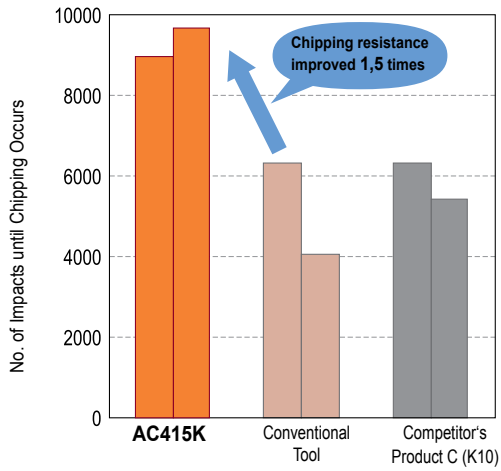
Conventional Coating

AC405K / AC415K Wear Resistance



Work Material: GGG-40,3 (Round Bar)
Insert: CNMG120408
Cutting Conditions: v_c=200 ~ 400m/min, f=0,30mm/rev, d_{oc}=1,5mm, Wet

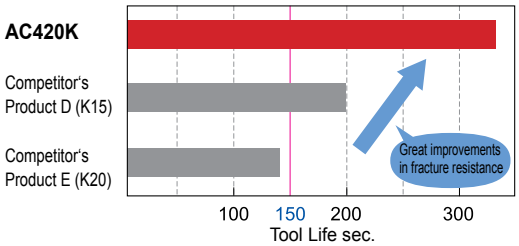
AC415K Chipping Resistance



Work Material: GGG-40,3
Insert: CNMG120408
Cutting Conditions: v_C=300m/min, f=0,25mm/rev, d_{oc}=1,5mm, Wet

AC420K Fracture Resistance

GGG-40,3 Grooved (Heavy Interrupted Acceleration Test)



Edge Wear Comparison (After 150s)



AC420K | Competitor's Product D (K15) | Competitor's Product E (K20)

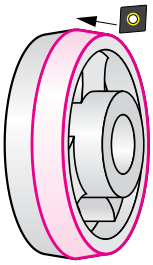
Work Material: GGG-40,3
Toolholder: PCLNR2525-43, Insert: CNMG120408
Cutting Conditions: v_C=350m/min, f=0,25mm/rev, d_{oc}=1,5mm Wet

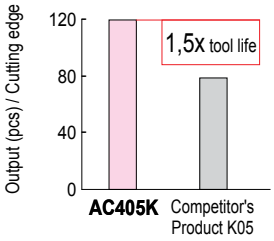
Application Examples

AC405K

GG20, Compressor Component (Pulley)

AC405K achieves 1,5 times longer tool life through improved wear resistance.

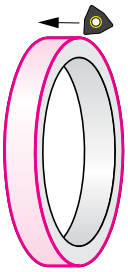


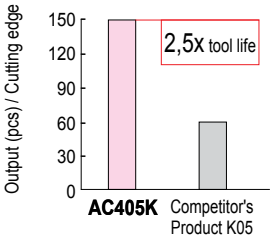


Insert: CNMG120412 NGZ (AC405K)
Cutting Conditions: v_c=500m/min, f =0,25mm/rev, d_{oc} = ~ 2,0mm, Dry

GGG65, Ring

Thanks to reduced chipping and improved wear resistance, AC405K eliminates problems with unstable tool life and achives 2,5 times longer stable tool life.

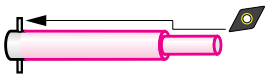


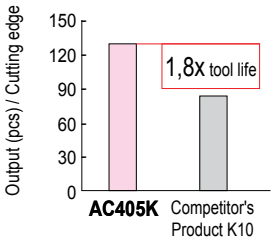


Insert: WNMG080408 NUZ (AC405K)
Cutting Conditions: v_c=340m/min, f =0,3mm/rev, d_{oc} =0,2mm, Wet

GGG70, Input Shaft

Thanks to reduced chipping and improved wear resistance, AC405K achieves 1,8 times longer tool life.

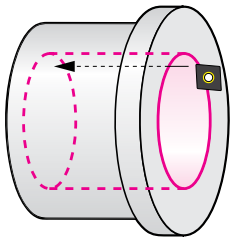


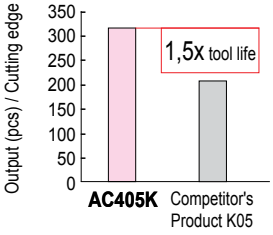


Insert: DNMG150408 NUZ (AC405K)
Cutting Conditions: v_c=200m/min, f =0,45mm/rev, d_{oc}=0,25 ~ 0.40mm, Wet

GGG45, Sleeve

Excellent wear resistance enabless 1,5 times longer tool life in continuous hole finishing applications.
The number of tool compensations required had also been halved.



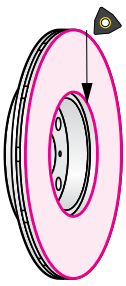


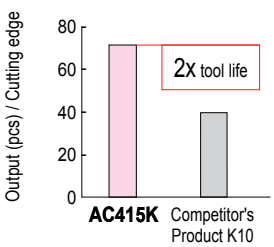
Insert: CNMG120408 NUZ (AC405K)
Cutting Conditions: v_c=300m/min, f =0,20mm/rev, d_{oc}=0,5mm, Wet

AC415K

GG20, Brake Disc

AC415K achieves 1,4 times longer tool life through improved wear resistance.

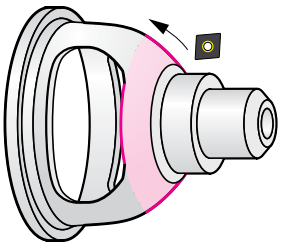


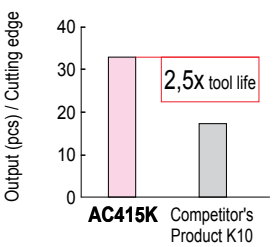


Insert: WNMA080412 (AC415K)
Cutting Conditions: v_c=450m/min, f =0,25mm/rev, d_{oc} = ~1,5mm, Dry

GGG45, Differential Case

Thanks to reduced chipping and improved wear resistance, AC415K eliminates problems with unstable tool life and achieves 1,6 times longer tool life.





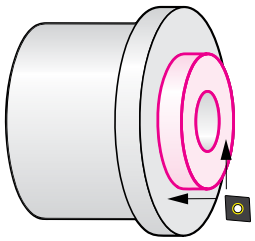
Insert: CNMG120408 NGZ (AC415K)
Cutting Conditions: v_c=240m/min, f =0,3mm/rev, d_{oc} =2,0 ~ 3,0mm, Wet

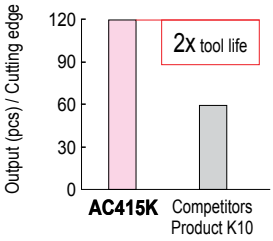
Application Examples

AC415K

GGG50, Hub

AC415K delivers 2 times longer tool life in light interrupted cutting of mill-scaled work thanks to improved chipping and wear resistance.

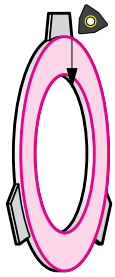


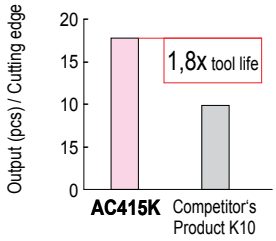


Insert: CNMA120408 (AC415K)
Cutting Conditions: v_c=230m/min, f =0,2 ~ 0,3mm/rev, d_{oc}=1,5 ~ 2,0mm, Wet

GG25, Pressure Plate

Reduces occurrence of sudden breakages and achieves 1,8 times longer stable tool life in heavy interrupted cutting.



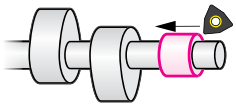


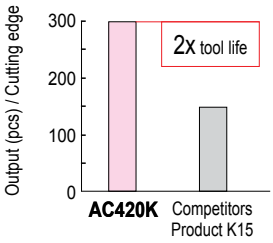
Insert: WNMA080412 (AC415K)
Cutting Conditions: v_c=230m/min, f =0,30mm/rev, d_{oc}=1,5 ~ 2,5mm, Dry

AC420K

GGG70, Cam Shaft

AC420K delivers 2 times longer tool life when cutting hardened steel and mill-scaled work.

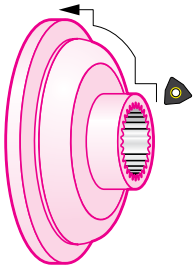


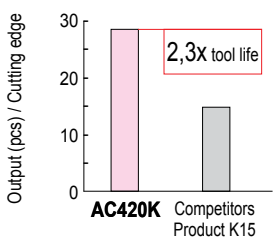


Insert: WNMA080408 (AC420K)
Cutting Conditions: v_c=100 ~ 250m/min, f =0,15 ~ 0,30mm/rev, d_{oc}=1,0mm, Wet

GGG45, Drive Sprocket

AC420K delivers 2 times longer stable tool life in unstable machining of mill-scaled work.

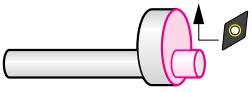


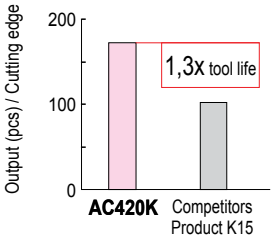


Insert: WNMA080412 (AC420K)
Cutting Conditions: v_c=200m/min, f =0,32mm/rev, d_{oc}=3,0mm, Wet

GGG50, Shaft

AC420K delivers 1,3 times longer stable tool life in heavy interrupted cutting.

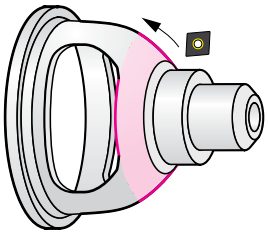


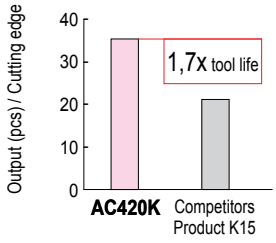


Insert: DNMG150412N-GZ (AC420K)
Cutting Conditions: v_c=100 ~ 270m/min, f =0,15 ~ 0,40mm/rev, d_{oc}=1,5mm, Wet

GGG35, Differential Case

Reduces the occurrence of sudden breakages and achieves 1,7 times longer and stable tool life in heavy interrupted cutting.

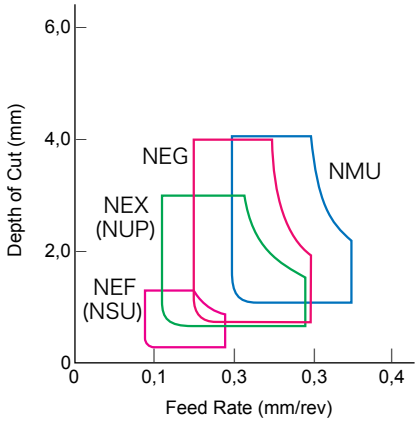




Insert: CNMA120408 (AC420K)
Cutting Conditions: v_c=250m/min, f =0,30mm/rev, d_{oc}=2,0 ~ 3,0mm, Wet

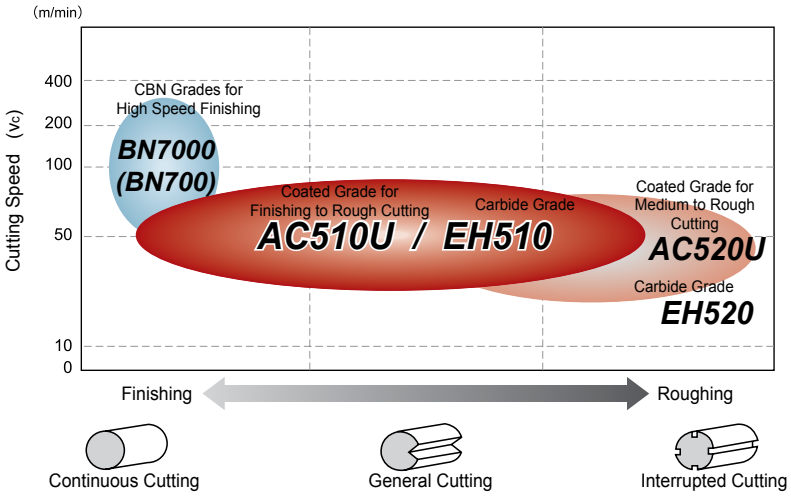
Chipbreakers

Negative Type





Grades



S Recommended Cutting Conditions

(Min. - **Optimum** - Max.)

Work Material	Cutting Process	Chipbreakers	Grades	Depth of Cut (mm)	Feed Rate (mm/rev)	Cutting Speed (m/min)
Heat-Resistant Alloy	Finishing	**NEF**(NSU)	**AC510U**	0,2-**0,5**-1,5	0,1-**0,12**-0,2	50-**60**-90
	Light	NEX	**AC510U**	0,5-**1,0**-3,0	0,1-**0,20**-0,3	40-**50**-80
	Medium	**NEG**	**AC510U**	0,5-**2,0**-4,0	0,15-**0,25**-0,3	40-**50**-80
	Rough	NMU	**AC520U**	1,0-**2,0**-4,0	0,2-**0,25**-0,35	30-**45**-60
Titanium Alloy	Finishing	**NEF**(NSU)	**EH510** (AC510U)	0,2-**0,5**-1,5	0,1-**0,15**-0,2	50-**65**-80
	Light	NEX	**AC510U**	0,5-**1,0**-2,5	0,1-**0,20**-0,25	40-**55**-70
	Medium	**NEG**	**EH510 (AC510U)**	0,5-**2,0**-3,5	0,15-**0,25**-0,3	40-**55**-70
	Rough	NMU	**AC520U**	1,0-**2,0**-3,5	0,2-**0,25**-0,3	30-**40**-50

Grades

AC510U / AC520U / EH510 / EH520

- PVD (Super ZX Coat) grade with excellent wear and thermal resistance.

AC510U: Excellent sharpness and reliability. A general purpose grade suitable for a wide range of applications from roughing to finishing.

AC520U: Excellent fracture resistance. A tough grade that is perfect for heavy interrupted cutting and mill-scaled work.

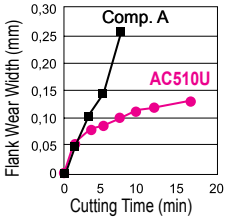
- Carbides with excellent thermal, wear, and fracture resistance for use with exotic alloys. Lineup also includes new chipbreaker design.

EH510: General purpose grade for titanium machining that features excellent wear and thermal resistance. For applications from roughing to finishing.

EH520: Tough grade for titanium machining with excellent fracture and thermal resistance. Perfect for interrupted cutting and mill-scaled work.

AC510U Cutting Performance

- Turning of Thermal Resistant (Ni-based) Alloys

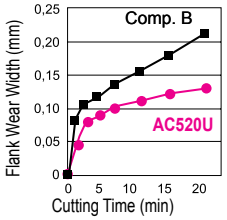




Work Material: Inconel 718 (45HRC)
Insert: CNMG 120408 NEX (AC510U)
Cutting Conditions: v_c=80m/min, f=0,12mm/rev, d_{oc}=0,8mm, Wet

AC520U Cutting Performance

- Turning of Thermal Resistant (Fe-based) Alloys



Stable turning with no notch wear!

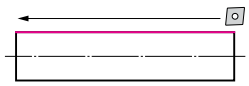


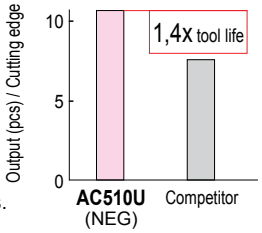
Work Material: Heat resistant ferrous alloy
Insert: CNMG 120408 NMU (AC520U)
Cutting Conditions: v_c=40m/min, f=0,2mm/rev, d_{oc}=2,0mm, Wet

Application Examples

AC510U / EH510

Inconel 718, Shaft Component

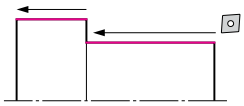


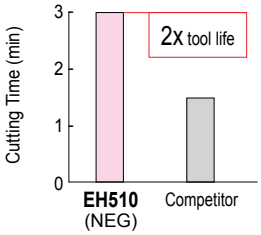


Stable, long tool life with no breakages. Small chips.

Insert: CNMG 120408 NEX (AC510U)
Cutting Conditions: v_c=45m/min, f=0,23mm/rev, d_{oc}=2mm, Wet

Titanium Ti-6Al-4V



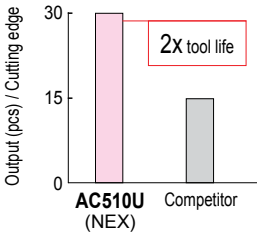


Tool life doubled with reduced crater wear. Now with drastically improved chip control.

Insert: CNMG 120412 NEG (EH510)
Cutting Conditions: v_c=65m/min, f=0,2mm/rev, d_{oc}=2,5mm, Wet

Inconel 718, Pin

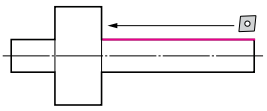


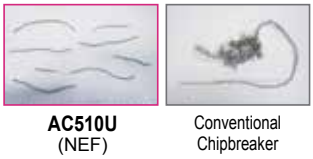


Achieving 1,3x higher efficiency and stable tool life with cutting speeds of 40m/min as compared to 30m/min for conventional grades.

Insert: CNMG 120408 NEX (AC510U)
Cutting Conditions: v_c=40m/min, f=0,25mm/rev, d_{oc}=2,0mm, Wet

Inconel 718, Shaft Component



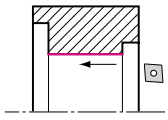


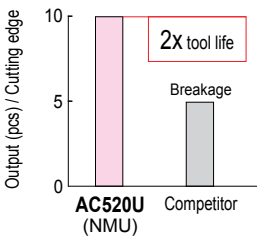
Drastically improved chip control.
Eliminate final polishing process without damaging work.

Insert: CNMG 120408 NEF (AC510U)
Cutting Conditions: v_c=45m/min, f=0,1mm/rev, d_{oc}=0,25mm, Wet

AC520U

Inconel 718, Machine Component

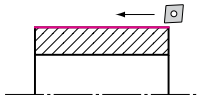


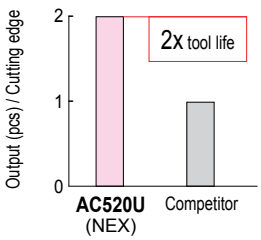


Stable, long tool life with no breakage.

Insert: CNMG 120412 NMU (AC520U)
Cutting Conditions: v_c=35m/min, f=0,2mm/rev, d_{oc}=2,5mm, Wet

Stellite, Machine Component



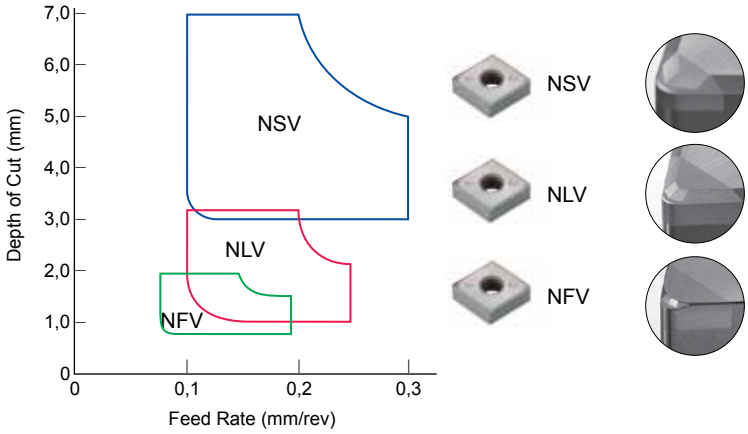


Achieving 1,5x higher efficiency with cutting speeds of 30m/min as compared to 20m/min for conventional grades.

Insert: CNMG 120408 NEX (AC520U)
Cutting Conditions: v_c=30m/min, f=0,1mm/rev, d_{oc}=1,0mm, Wet

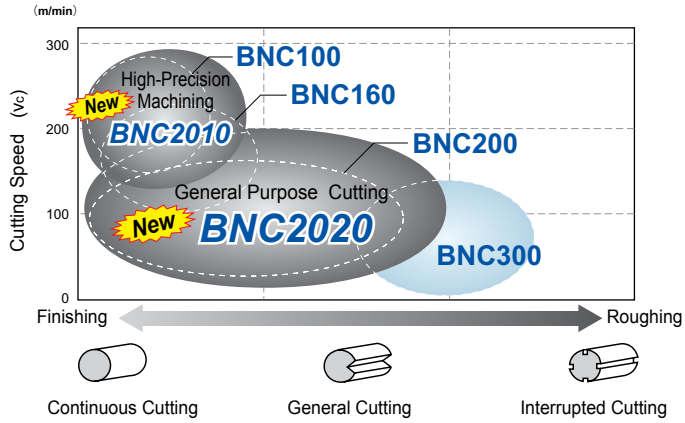
Chipbreakers

NSV Type Chipbreaker: For chip control during carburized layer removal
NLV Type / NFV Type Chipbreaker: For chip control during finishing of hardened steel

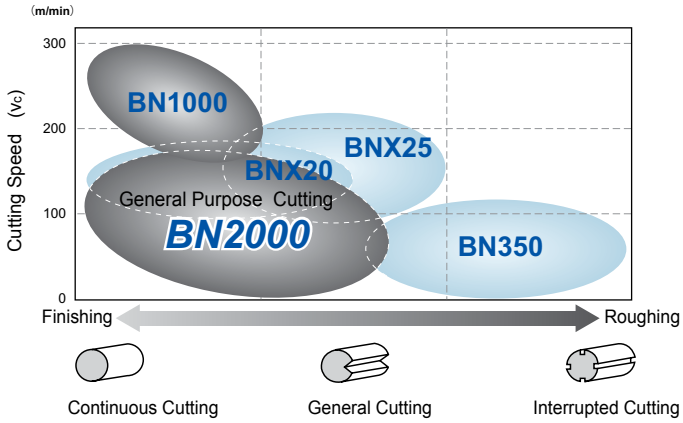


Grades

● Coated SUMIBORON



● Uncoated SUMIBORON



H Recommended Cutting Conditions

(Min. - **Optimum** - Max.)

Cutting Process	Grade	Depth of Cut (mm)	Feed Rate (mm/rev)	Cutting Speed (m/min)
Continuous Cutting	**BNC2010**	0,03-**0,20**-0,35	0,03-**0,10**-0,20	120-**200**-300
	BNC100	0,03-**0,20**-0,30	0,03-**0,10**-0,20	120-**200**-300
	BN1000	0,03-**0,15**-0,20	0,03-**0,10**-0,15	100-**150**-300
	BNX10	0,03-**0,10**-0,20	0,03-**0,10**-0,15	120-**180**-300
General Turning	**BNC2020**	0,03-**0,30**-0,50	0,03-**0,20**-0,40	50-**130**-220
	BNC160	0,03-**0,20**-0,35	0,03-**0,10**-0,25	120-**180**-220
	BNC200	0,03-**0,30**-0,50	0,03-**0,10**-0,30	50-**130**-220
	BN2000	0,03-**0,20**-0,30	0,03-**0,10**-0,20	50-**100**-200
	BNX20	0,03-**0,20**-0,35	0,03-**0,15**-0,30	70-**130**-170
Interrupted Cutting	**BNC300**	0,03-**0,20**-0,30	0,03-**0,10**-0,20	50-**100**-150
	BN350	0,03-**0,20**-0,30	0,03-**0,10**-0,20	50-**100**-150
	BNX25	0,03-**0,20**-0,50	0,03-**0,15**-0,30	120-**160**-220

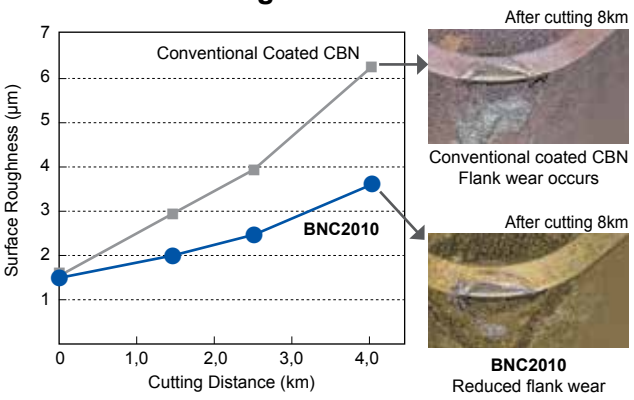
Grades

New BNC2010 / New BNC2020

BNC2010: A grade for high-precision machining applicable for finishing requiring good surface roughness and dimensional accuracy.
Provides further improved wear resistance thanks to a newly developed CBN substrate coated with a TiCN layer.
Reduces flank wear and achieves excellent surface finish thanks to newly developed special stable multi-layered coating.

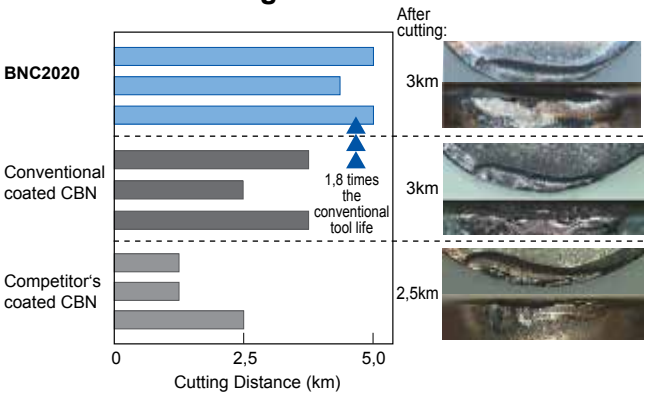
BNC2020: A general-purpose grade applicable to general hardened steel machining.
A newly developed tough CBN-substrate coated with a highly wear-resistant TiAlN layer.
Achieves more stable machining and longer tool life by employing a highly adhesive layer for high chipping resistance.

● BNC2010 Cutting Performance



Work Material:	15CrMo5, 58-62HRC, Continuous
Insert:	DNGA 150408 NC4 (BNC2010)
Cutting Edge Treatment:	S01225
Cutting Conditions:	v_c=160m/min, f=0,08mm/rev, a_p=0,1mm, Wet

● BNC2020 Cutting Performance



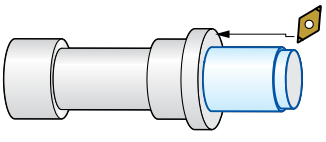
Work Material:	SCM415-5V, 58-62HRC, Interrupted
Insert:	CNGA 120412 NC4 (BNC2020)
Cutting Edge Treatment:	S01225
Cutting Conditions:	v_c=130m/min, f=0,1mm/rev, a_p=0,6mm, Dry

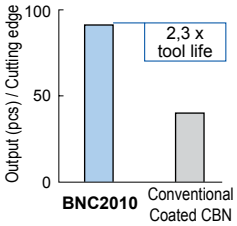
Application Examples

New BNC2010

Continuous External Turning of Main Shaft

BNC2010 provides excellent wear resistance and achieves excellent surface roughness.

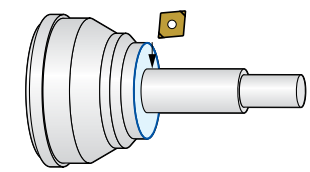


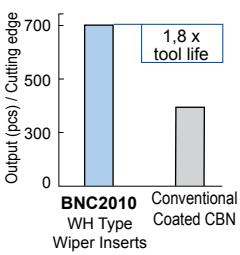


Insert:	DNGA 150408 NC4 (BNC2010)
Cutting Conditions:	v_c=200m/min, f=0,10mm/rev, a_p=0,35mm, Dry

Facing of CVJ Outer Race

BNC2010 with a WH type wiper insert maintains excellent surface finish for an extended time.



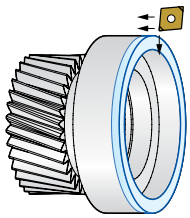


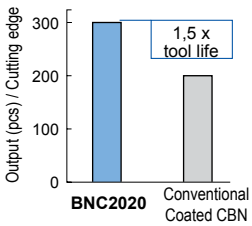
Insert:	CNGA 120412 NCWH2 (BNC2010)
Cutting Conditions:	v_c=150m/min, f=0,2mm/rev, a_p=0,2mm, Dry

New BNC2020

Carburised Layer Removal for Sun Gears

BNC2020 achieves a longer tool life in high load cutting.

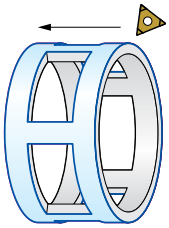


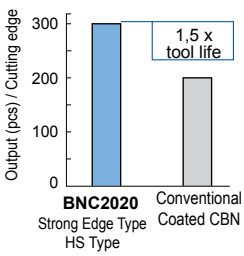


Insert:	DNGA 120408 NC4 (BNC2020)
Cutting Conditions:	v_c=100m/min, f=0,15mm/rev, a_p=0,5mm, Wet

Interrupted Machining of CVJ Cage Window

BNC2020 strong edge HS type provides stable performance in interrupted cutting.



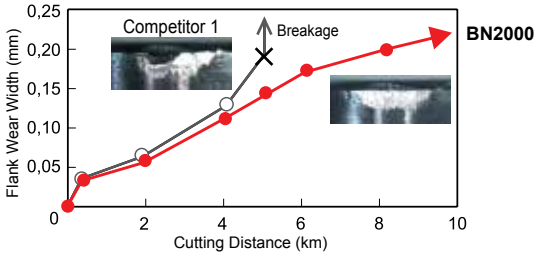


Insert:	TNGA 160420 HSNC3 (BNC2020)
Cutting Conditions:	v_c=120m/min, f=0,10mm/rev, a_p=0,15mm, Dry

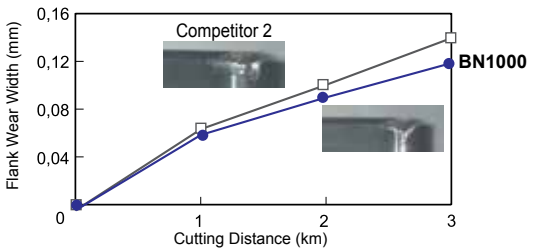
Grades BN2000 / BN1000

BN2000: General purpose grade suitable for typical hardened steel machining applications.
Provides a high degree of fracture and wear resistance.
BN1000: For high speed machining. BN1000 provides the highest wear resistance of all uncoated SUMIBORON grades.
Features improved fracture resistance while still placing a priority on wear resistance.

● Wear Resistance (Continuous Cutting)

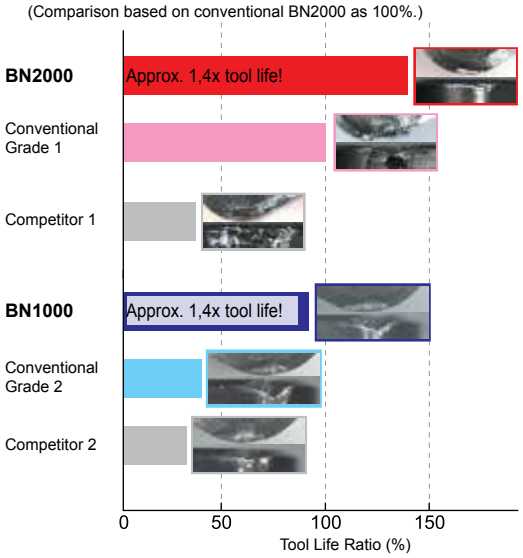


Work Material: 15CrMo5, Round Bar (58-62HRC)
Cutting Conditions: v_c=100m/min, f=0,1mm/rev, a_p=0,2mm, Dry



Work Material: 100Cr6, Round Bar (58-62HRC)
Cutting Conditions: v_c=150m/min, f=0,1mm/rev, a_p=0,2mm, Dry

● Chipping Resistance (Interrupted Cutting)



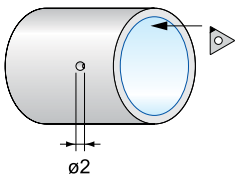
Work Material: 15CrMo5, 8V Grooved Material (58-62HRC)
Insert: CNGA120408 NU-2
Cutting Conditions: v_c=150m/min, f=0,1mm/rev, a_p=0,2mm, Dry

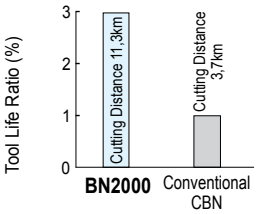
Application Examples

BN2000

15CrMo5 Clutch Component

Employs BN2000 for superior fracture resistance compared to conventional grade and longer tool life.

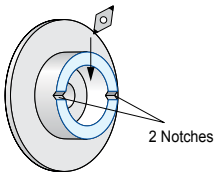


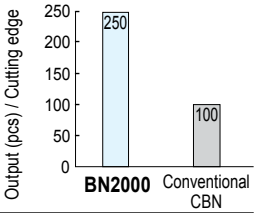


Insert: TPGW 110308 NU (BN2000)
Cutting Conditions: v_c=135m/min, f=0,08mm/rev, d_{oc}=0,15mm, Dry

15CrMo5 CVT Pulley Slide

Whereas conventional products required replacement after 100 workpieces (preset tool change), BN2000 has no breakage after 250 workpieces.

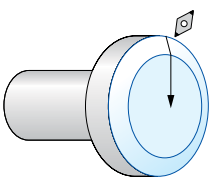


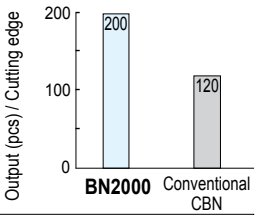


Insert: DNGA 150408 NU-2 (BN2000)
Cutting Conditions: v_c=150m/min, f=0,1mm/rev, d_{oc}=0,2mm, Dry

X155CrVMo12-1 Plunger

Long tool life and more stable surface roughness than coated CBN at extremely low cutting speeds.



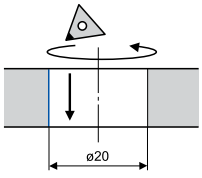


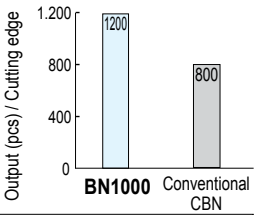
Insert: DNGA 150408 NU-2 (BN2000)
Cutting Conditions: v_c= ~ 100m/min, f=0,03 ~ 0,25mm/rev, d_{oc}=0,04mm, Dry

BN1000

100Cr6 Internal Boring

BN1000 ensures less friction than conventional grades and achieves long tool life.





Insert: TPGW 110304 NU (BN1000)
Cutting Conditions: v_c=120m/min, f=0,06mm/rev, d_{oc}=0,2mm, Wet

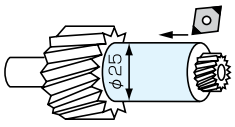
Application Examples

BNC100 / BNC160 / BNC200 / BNC300 / BNX10 / BNX20 / BNX25 / BN350

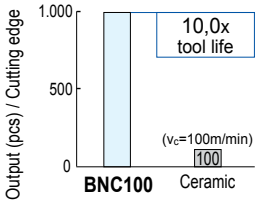
BNC100

Shaft Component (Carburised Material 58-62HRC)

BNC100 provides 1,5x cutting speed and 10x tool life.



Continuous turning of hardened steel

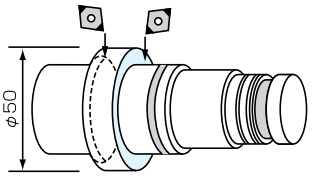


Insert: CNGA 120408 NC-4 (BNC100)
Cutting Conditions: v_c=150m/min, f=0,1mm/rev, d_{oc}=0,15mm, Wet

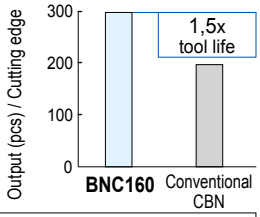
BNC160

Shaft Component (Carburised Material 58-62HRC)

BNC160 has excellent wear resistance while LS type gives best surface roughness stability in machining at Rz = 1,6 µm, and achieves 1,5x tool life.



Surface roughness Rz=1,6µm

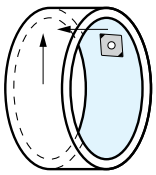


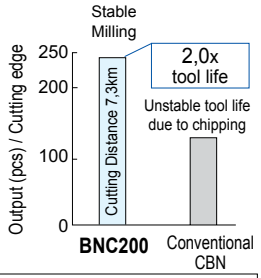
Insert: CNGA 120408LS NC-4 (BNC160)
Cutting Conditions: v_c=200m/min, f=0,05mm/rev, d_{oc}=0,1mm, Dry

BNC200

Bearing Steel (62HRC)

Provides superior stability and 2 times longer life than competitor`s CBN.



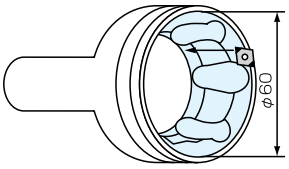


Insert: CNGA 120412 NC-4 (BNC200)
Cutting Conditions: v_c=150m/min, f=0,15mm/rev, d_{oc}=0,25mm, Dry

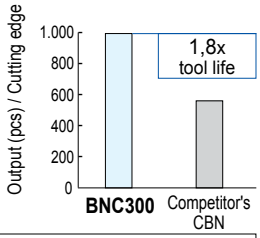
BNC300

Input Shaft Component (58-60HRC)

BNC300HS has no chipping, gives stable performance for 900 workpieces, and now has an extended preset tool life that is 1,8 times longer.



Boring of hardened steel

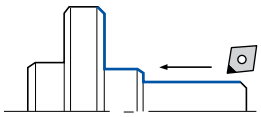


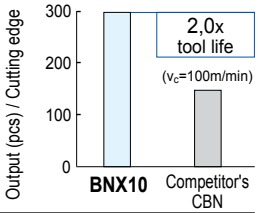
Insert: DNGA 150412HS NC-4 (BNC300)
Cutting Conditions: v_c=100m/min, f=0,12mm/rev, d_{oc}=0,2mm, Dry

BNX10

C30 Shaft Component (60HRC)

Double the efficiency and more than double the tool life of competitor's CBN.



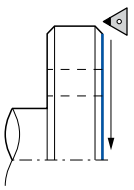


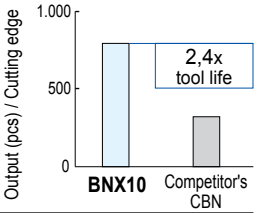
Insert: CNMA 120412 NU (BNX10)
Cutting Conditions: v_c=200m/min, f=0,08mm/rev, d_{oc}=0,15mm, Wet

BNX20

15CrMo5 Flange Component (62HRC)

Better wear resistance and 2,4 times longer tool life than competitor's CBN.



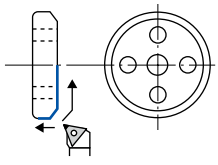


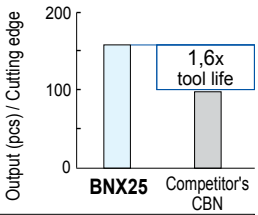
Insert: TNMA160408 NU (BNX20)
Cutting Conditions: v_c=150m/min, f=0,1mm/rev, d_{oc}=0,12mm, Dry

BNX25

20CrMo5 Gear Component (60HRC)

Lower variance and 1,6 times longer tool life than competitor's CBN.



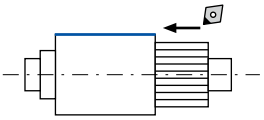


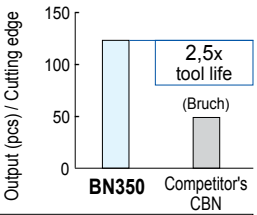
Insert: TNMA 160408 NS (BNX25)
Cutting Conditions: v_c=150m/min, f=0,12mm/rev, d_{oc}=0,2mm, Dry

BN350

20Cr4 Gear Shaft Component (58-62HRC)

Better fracture resistance and 2,5 times longer tool life than competitor's CBN.

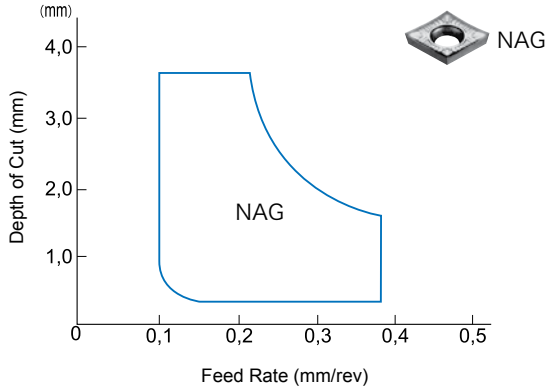


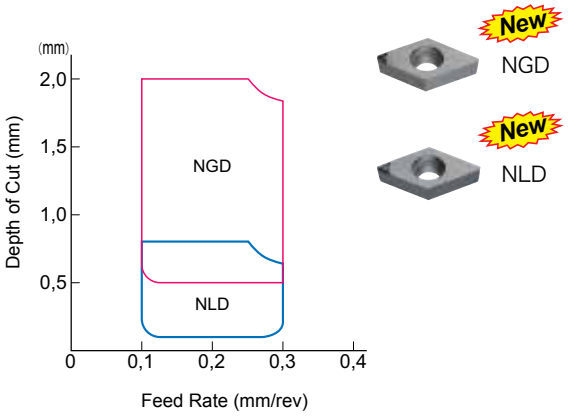


Insert: CNMA120412 NU (BN350)
Cutting Conditions: v_c=125m/min, f=0,15mm/rev, d_{oc}=0,3mm, Dry

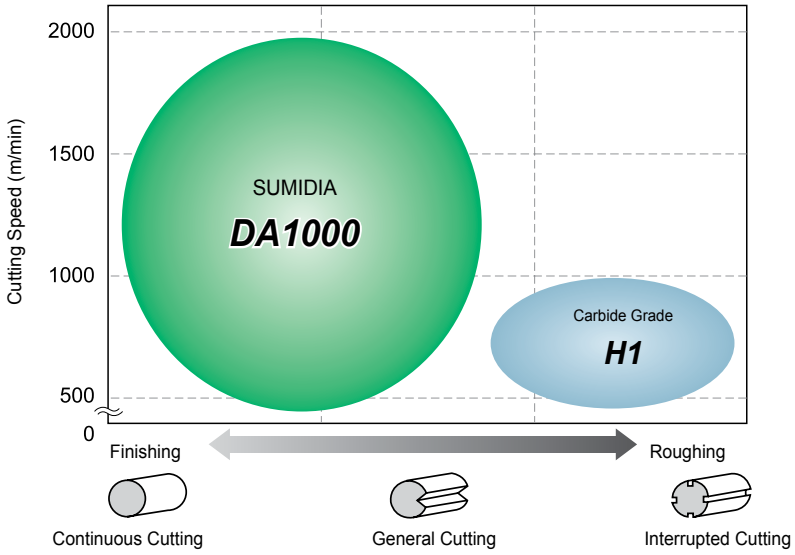
Chipbreakers

Positive Type





Grades



Recommended Cutting Conditions

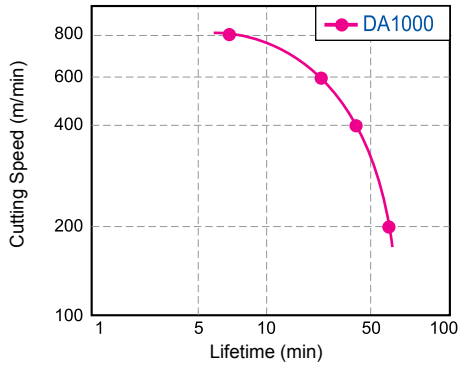
(Min. - **Optimum** - Max.)

Cutting Process	Category	Grades	Cutting Conditions		
			Depth of Cut (mm)	Feed Rate (mm/rev)	Cutting Speed (m/min)
Continuous Cutting General Turning Interrupted Cutting	SUMIDIA	**DA1000**	0,1-**0,5**-3,0	0,05-**0,10**-0,20	~ 2000
		DA2200	0,1-**0,5**-3,0	0,05-**0,10**-0,20	~ 2000
		DA150	0,1-**0,5**-3,0	0,05-**0,10**-0,20	~ 2000
	Carbide	**H1**	0,3-**1,0**-5,0	0,1-**0,20**-0,5	~ 1000

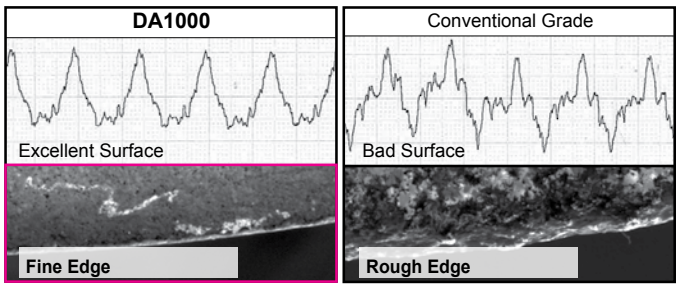
Grades DA1000

- Ultra-high-density sintered, ultra-fine diamond particles
- Significantly improved surface roughness on machined surfaces
- World's best wear resistance and strength
- Suitable for use with all aluminium and non-ferrous alloys

● DA1000 Wear Resistance

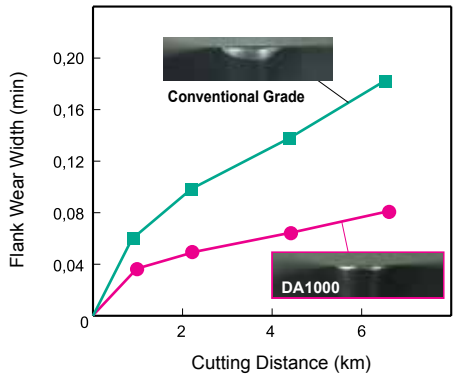


● Comparison of Surface Roughness of Nose Radius Cutting Edge



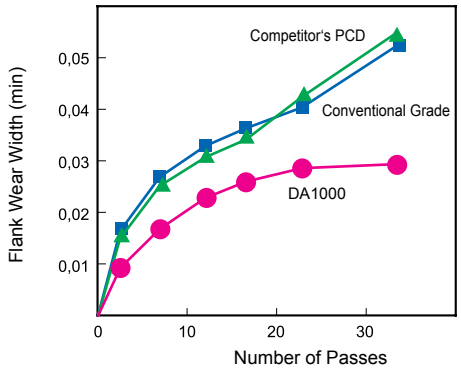
Insert: TPGW 160308
Cutting Conditions: v_c=1000m/min, f=0,15mm/rev, d_{oc} =0,2mm, Wet

● Wear Resistance in Turning Applications



Insert: TPGN160304
Cutting Conditions: v_c=800m/min, f=0,12mm/rev, d_{oc} =0,5mm, Wet

● Wear Resistance in Milling Applications



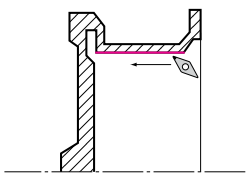
Insert: SNEW1204 ADFR-NF
Cutting Conditions: v_c=2000m/min, f=0,15mm/rev, d_{oc} =3,0mm, Wet

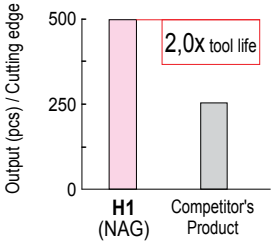
Application Examples

H1 + NAG Type Breakers

ADC12 Aluminium Wheel

Excellent adhesion resistance.
Longer tool life.



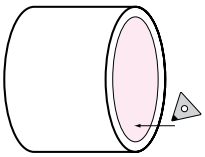


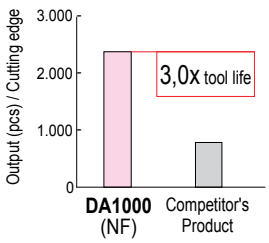
Insert: VCGT160408 NAG (H1)
Cutting Conditions: v_c=2000m/min, f=0,25mm/rev, d_{oc} =2,0mm, Wet

DA1000

Copper Alloy Bush

Stable surface roughness with no edge breakage (3,2S).
Tool life improved to 3x that of conventional models.



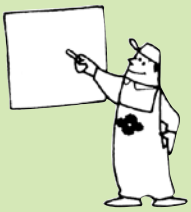


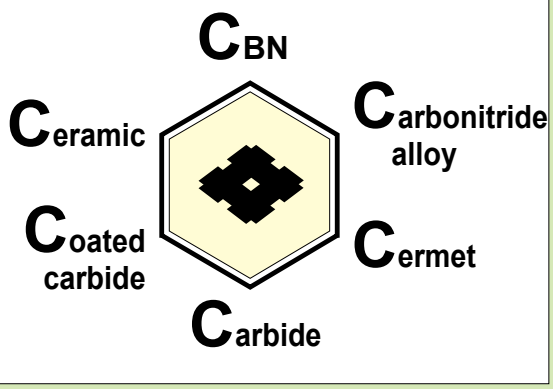
Insert: TPGN160308 NF (DA1000)
Cutting Conditions: v_c=300m/min, f=0,07mm/rev, d_{oc} =0,08mm, Wet

Grades

B

B1 ~ B14





Coated Grades	**Coating Series**	B2
	CVD / PVD Series New	B3 - 4
Coated and Uncoated	**Cermet**	B5
Uncoated Carbide	**"Igetalloy"**	B6
CBN Grades	**"SUMIBORON"**	B7 - 8
PCD Grades	**"SUMIDIA"**	B9
Chart	Grades Comparision Chart	B10-12
	Recommended Cutting Conditions	B13
	Properties of Base Materials	B14

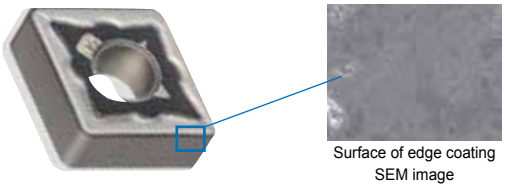
Coated Carbide

Coating Series

Sumitomo Electric Hardmetal's Coating Series are high-quality, high-performance indexable grades that combines a proprietary, special ultra-hard carbide substrate with a multi-layered coating that provides excellent wear and heat resistance plus superior adhesion strength. Utilised in high-speed, high-efficiency applications on a wide range of work material including, steel, cast iron, and exotic alloys.

Characteristics

Absotech Platinum — New — CVD

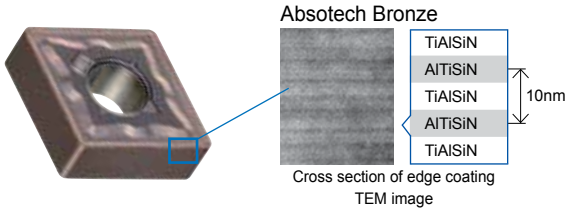


Achieves a good balance between drastically-improved coating strength and excellent surface smoothness thanks to a newly-developed, boride-based titnaium compound coating.

- Achieves more than double the chipping resistance of conventional coatings thanks to the improved coating strength.
- Drastically improves the adhesion resistance and reduces the occurrence of abnormal damage thanks to excellent surface smoothness.
- Improves the corner visibiltiy with a unique light color.

Adopted Grades — For stainless steel turning: AC6030M

Absotech Bronze — New — PVD

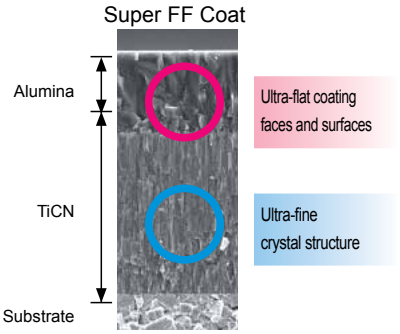


Improves the stability of cutting edge by succeeding our unique-multi-layered coating structure, which is applied to Super ZX coating and by employing highly-heat-resistant coating of new composition, as well as improving the adhesion strength between carbide substrate and coating.

- Achieves excellent wear and oxidation resistance thanks to the new composition's TiAlSiN-based ultra-multi-layered coating structure.
- Drastically improves the peeling-off resistance of coating by improving the boundary control technology between carbide substrate and coating.
- Compared to conventional grades, achieves more than double the fracture resitance in stainless steel machining.

Adopted Grades — For stainless steel turning: AC6040M

Super FF Coat — CVD



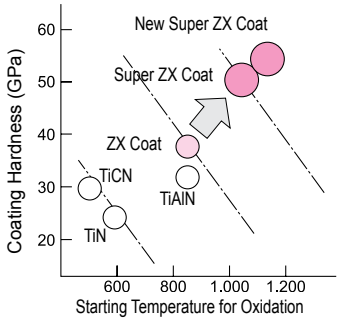
Our unique new CVD process, Super FF Coat technology, produces ultra-flat boundary faces between coating layers and super ultra-fine coating particles to achieve higher reliability and longer tool life.

- Smooth coating surface provides excellent adhesion and chipping resistance. Improved coating adhesion strength.
- Harder than conventional coatings with huge improvements in wear resistance.
- High speed, high efficiency machining of more than 1,5 times that of conventional grades is possible.
- Achieving more than double the tool life of conventional grades under conventional cutting conditions.

Adopted Grades

For Steel Turning:	AC805P, AC810P, AC820P, AC830P
For Cast Iron Turning:	AC405K, AC415K, AC420K
For Stainless Steel Turning:	AC610M, AC630M
For Milling:	ACP100, ACK200

New Super ZX Coat / Super ZX Coat — PVD



Utilising our proprietary thin layer coating technology and advanced nanotechnology, Sumitomo Electric Hardmetal has developed NEW Super ZX Coat and Super ZX Coat, coatings that consist of approximately 1.000 alternating, nanometre-level-thin (1 nanometre = 1 billionth of a metre) layers.

- Coating hardness increased by 40% and starting temperature for start of oxidization increased by 200°C compared to conventional grades.
- At least 1,5x improvement in high-speed and high-efficiency cutting compared to conventional grades
- Achieving more than double the tool life of conventional grades under conventional cutting conditions.

Adopted Grades

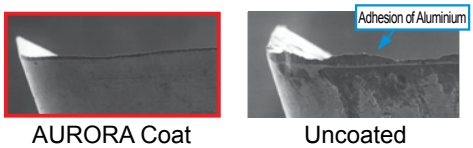
For Turning:	AC510U, AC520U, AC530U, AC503U
For Milling:	ACK300, ACP200, ACP300

AURORA Coat (DLC : Diamond Like Carbon) — PVD

Using our proprietary PVD process tech nology, we have developed a hydrogen-free DLC coating that is extremely hard and smooth.



- ADC12 Comparison of Cutting Edge Adhesion After Cutting



Work Material : ADC12
Cutting Conditions: v_c : 300m/min
f_t : 0,15mm/t
d_{oc}= w_{oc} : 5mm, Dry

- Second only to diamond in terms of hardness, this smooth coating has a low coefficient of friction and provides excellent adhesion resistance to deliver better-quality machined surfaces.
- Can be used for high-speed, high-efficiency cutting of aluminium alloys, copper alloys, resins, and more.

Adopted Grades

For Milling	DL1000
For Endmilling	DL1000,DL1200
For Drilling	DL1300,DL1500

Characteristic Values

For Turning (CVD)

Class	Grade	Hardness (HRA)	TRS (GPa)	Coating Type	Coating Thickness (μm)	Characteristics	Old Grades
P Steel	AC805P	91,0	2,2	Super FF Coat	20	A new P05 grade with Super FF ultra-thick alumina coating for excellent crater wear resistance under high speed cutting.	—
	AC810P	91,0	2,2	Super FF Coat	18	A P10 grade with excellent wear resistance that features stability and longer tool life. Utilises a special carbide substrate with Super FF Coat for high to medium speed cutting.	AC700G
	AC820P	90,1	2,2	Super FF Coat	14	A P20 grade that features stability and longer tool life. Employs special carbide substrate and Super FF Coat to improve on P20 wear and fracture resistance.	AC2000
	AC830P	89,4	2,6	Super FF Coat	8	Stable long-life grade employs special tough, carbide substrate and Super FF Coat. Improves on P30 grade fracture resistance and approaches P20 grade in terms of wear resistance.	AC3000
	AC630M	89,5	2,7	Super FF Coat	5	Superior performance in continuous and light cutting, and other low-speed applications that require sharp edges.	AC230
M Stainless Steel	AC610M	91,0	2,2	Super FF Coat	5	A high efficiency M10 grade featuring improved wear resistance during stainless steel cutting. Employs special, ultra-hard substrate and thin Super FF Coat.	—
	New AC6030M	89,5	2,7	Absotech Platinum	5	The first recommended grade for general machining of stainless steel that drastically reduces the occurrence of abnormal damage in stainless steel machining and achieves long and stable tool life by employing a new coating: Absotech Platinum.	—
	AC630M	89,5	2,7	Super FF Coat	5	A general purpose grade featuring improved wear and fracture resistance during stainless steel cutting. Utilises a special tough carbide substrate with a thin Super FF Coat.	AC304
K Cast Iron	AC405K	92,0	2,4	Super FF Coat	18	Employs an ultra-hard substrate and ultra-hard Super FF Coat to provide excellent resistance to wear and plastic deformation. Suitable for high-speed continuous cutting of cast iron.	AC410K
	AC415K	91,1	2,5	Super FF Coat	18	Employs a special dedicated ultra-hard substrate that is also suitable for interrupted cutting and ultra-hard Super FF Coat to provide stability and long tool life in a wide range of processes. First recommended grade for cast iron turning.	AC410K
	AC420K	91,1	2,5	Super FF Coat	12	A new, extremely versatile grade that can be used for rough, interrupted cutting of ductile and grey cast iron. Employs special, ultra-hard carbide substrate and Super FF Coat to provide stability and long tool life.	AC700G
	AC820P	90,1	2,2	Super FF Coat	14	A grade suited to heavy interrupted cutting of ductile cast iron.	AC2000

For Milling (CVD)

Class	Grade	Hardness (HRA)	TRS (GPa)	Coating Type	Coating Thickness (μm)	Characteristics	Old Grades
P Steel	ACP100	89,3	3,1	Super FF Coat	6	A grade that employs a tough carbide substrate and thin-layer Super FF Coat to provide superior thermal crack and wear resistance in high-speed milling of steel.	AC230
M Stainless Steel	New ACM200	89,8	3,4	Super FF Coat	6	A grade ideal for hardened steel machining that provides excellent wear and heat resistance by employing a newly-developed ultra-hard carbide and Super FF Coat.	AC230
K Cast Iron	ACK200	91,7	2,5	Super FF Coat	6	A grade that employs a tough carbide substrate and thin-layer Super FF Coat to provide superior thermal crack and wear resistance for high-speed milling.	AC211

Characteristic Values

For Turning (PVD)

Class	Grade	Hardness (HRA)	TRS (GPa)	Coating Type	Coating Thickness (μm)	Characteristics	Old Grades
P Steel	New **T1500Z** (Cermet)	92,0	2,2	Brilliant Coat*	3	Brilliant Coat* PVD coating gives excellent lubricity for higher quality machining. General-purpose coated cermet grade that can maintain high-quality machined surfaces and also gives excellent wear resistance.	T2000Z
	T3000Z (Cermet)	91,3	2,4	ZX Coat	3	An ultra-reliable coating grade with tough cermet substrate.	—
	AC530U	91,4	3,3	Super ZX Coat	3	For interrupted and general steel cutting. Utilizing the super multi-layered PVD coating of nanometre thick TiAlN and AlCrN layers, coupled with a fine-grained super tough substrate for excellent fracture resistance.	ACZ310
	AC520U	91,7	3,0	Super ZX Coat	3	Interrupted machining and stainless steel machining. Utilizing the super multi-layered PVD coating of nanometre thick TiAlN and AlCrN layers, coupled with a super tough substrate for excellent fracture resistance.	EH520Z EH20Z
M Stainless Steel	New **AC6040M**	91,6	3,8	Absotech Bronze	3	The first recommended grade for interrupted machining of stainless steel that drastically improves the reliability in unstable machining thanks to the excellent adhesion and peel-off resistance of the new Absotech Bronze PVD coating, as well as the improved fracture resistance of the exclusive ultra-hard carbide substrate.	AC530U
	AC530U	91,4	3,3	Super ZX Coat	3	Heavy interrupted machining and stainless steel machining. Utilizing the super multi-layered PVD coating of nanometre thick TiAlN and AlCrN layers, coupled with a fine-grained super tough substrate for excellent fracture resistance.	ACZ310
K Cast Iron	**AC510U**	92,6	2,6	Super ZX Coat	3	General to interrupted machining of cast iron and ductile cast iron. Utilizing the super multi-layered PVD coating of nanometre thick TiAlN and AlCrN layers, coupled with a fine-grained super tough substrate for excellent fracture resistance.	EH510Z EH10Z
S Exotic Alloy	**AC510U**	92,6	2,6	Super ZX Coat	3	Finishing to medium cutting of exotic alloys. Utilizing the super multi-layered PVD coating of nanometre thick TiAlN and AlCrN layers. Superior wear and heat resistance, and stable, long tool life.	EH510Z EH10Z
	AC520U	91,7	3,0	Super ZX Coat	3	Medium to rough cutting of exotic alloys. Utilizing the super multi-layered PVD coating of nanometre thick TiAlN and AlCrN layers. Superior wear and heat resistance, and stable, long tool life even in interrupted cutting.	EH520Z EH20Z
Small Product Machining	**ACZ150**	91,4	3,3	ZX Coat	1	For small tools, and high-precision finishing to general finishing applications. TiN ultra-thin coating and fine-grained, super tough substrate combine to give good edge sharpness and superior cut finish.	—

For Milling (PVD)

Class	Grade	Hardness (HRA)	TRS (GPa)	Main Coating Components	Coating Thickness (μm)	Characteristics	Old Grades
P Steel	**ACP200**	89,5	3,2	(New) Super ZX Coat	3	For general machining of general and die steel. Employs PVD coating consisting of multiple nanometre-thin layers. A general grade that achieves a good balance between fracture resistance and wear resistance when combined with an exclusive tough substrate.	ACZ330
	ACP300	89,3	3,1	(New) Super ZX Coat	3	For interrupted machining and stainless steel machining. Employs PVD coating consisting of multiple nanometre-thin layers. Provides excellent fracture resistance when combined with an ultra-tough substrate.	ACZ350
M Stainless Steel	New **ACM100**	91,4	3,3	(New) Super ZX Coat	3	A grade that provides excellent wear resistance by employing an ultra-hard fine-grained carbide and New Super ZX Coating.	ACZ310
	New **ACM300**	89,8	3,4	(New) Super ZX Coat	3	The first recommended grade for stainless steel machining that achieves a good balance between wear resistance and fracture resistance by employing a newly-developed ultra-hard carbide and New Super ZX Coating.	—
K Cast Iron	**ACK300**	91,4	3,3	(New) Super ZX Coat	3	For general and interrupted machining of cast iron and ductile cast iron. Employs PVD coating consisting of multiple nanometre-thin layers.Provides excellent fracture resistance when combined with a fine-grained tough substrate.	ACZ310
N Non-ferrous Metal	**DL1000**	92,9	2,1	AURORA Coat (DLC Coat)	0,5	For machining of non-ferrous metals including aluminum and copper alloy as well as resin. Coated with DLC, which provides a low friction coefficient and excellent adhesion resistance.	—

*There may be minor differences in the colour tone/lustre of Brilliant Coat grades due to the interference of light. Such differences have no effect on performance.



Various grades and expanded lineup of catalogue items meet a wide range of finishing needs.

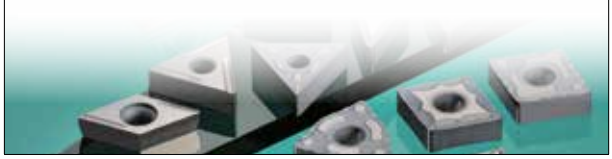
Lineup includes wear-resistant T1000A, general purpose T1500A, general purpose coated cermet T1500Z and tough T3000Z.
Significantly expanded lineup of catalogue items for a wide variety of finishing applications.

Characteristics

Uncoated Cermet

New **T1000A** High Speed Finishing Grade

High speed finishing grade with excellent wear resistance.
- Improved wear and fracture resistance.
- Solid solution hard phase reduces reaction with steel.
- Perfect for high-speed continuous finishing of steel, cast iron and powdered metal.



T1500A New General Purpose Grade

General purpose cermet grade that provides both wear and fracture resistance with better qualitiy finished surfaces.
- Mixing hard phases of different functionality, grain size and compositions improves balance of wear and fracture resistance.
- Rduces adhesion of work material for beautiful finished surfaces.



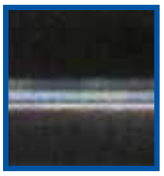
Coated Cermet

New **T1500Z** New General Purpose Grade

General purpose coated cermet grade that employs new Brillant Coat* PVD coating with excellent lubricity.
- Excellent wear resistance provides long tool life.
- Rduces adhesion of work material for beautiful finished surfaces.



Surface Finish Comparison



T1500Z



Conventional Coated Cermet

Work Material: St 34-2
Insert: CNMG 120408 NLU
Cutting Conditions: v_c=100m/min
f=0,15mm/rev
d_{oc}=1,0mm, Wet

Excellent Wear Resistance
Glossy Finished Surfaces
Reduced Blemishes

Characteristic Values

For Turning

Class	Grade	Hardness (HRA)	TRS (GPa)	Coating Type	Coating Thickness (μm)	Characteristics	Old Grades
P Steel	T1000A	93,3	1,8	—	—	Uncoated cermet grade with excellent wear resistance that provides good cost efficiency. Demonstrates excellent wear resistance in continuous finishing applications, and stable finishing of cast iron and sintered alloy as well as steel.	T110A
	T1500A	92,0	2,2	—	—	A general purpose grade that employs a substrate with improved balance of fracture and wear resistance to deliver superior finished surfaces in a wide variety of cutting conditions.	T1200A
	T1500Z	92,0	2,2	PVD Brilliant Coat*	3	Brilliant Coat's* new PVD coating gives excellent lubricity for higher quality machining. General-purpose coated cermet grade that can maintain high-quality machined surfaces and also gives excellent wear resistance.	T2000Z
	T3000Z	91,3	2,4	PVD ZX Coat	3	An ultra-reliable coated grade with tough cermet substrate.	—
K Cast Iron	T1000A	93,3	1,8	—	—	Exclusive uncoated cermet grade with excellent cost efficiency suitable for cast iron finishing, which requires high hardness.	T110A

For Milling

Class	Grade	Hardness (HRA)	TRS (GPa)	Coating Type	Coating Thickness (μm)	Characteristics	Old Grades
P Steel	T1500A	92,0	2,2	—	—	A general-purpose grade that employs a substrate with an improved balance between fracture and wear resistance to deliver superior finished surfaces in a wide variety of cutting conditions.	T1200A
M Stainless Steel	T250A	91,4	2,1	—	—	Tough cermet grade with enhanced crack advancement resistance.	—

*There may be minor differences in the colour tone/lustre of Brilliant Coat grades due to the interference of light. Such differences have no effect on performance.

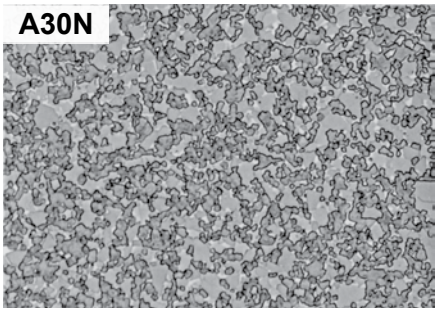
WC (Tungsten Carbide)
„Igetalloy“

Igetalloy carbides have a solid history and a big variety of grades to suit many different applications. They are widely used and appreciated for their superior performance.

The Igetalloy line-up consists of carbide cutting tools that are available in a variety of different structures and compositions, each differing in terms of WC grain size and containing varying amounts of CO binder and TiC, TaC, and other double carbide components. The wide selection enables excellent wear resistance and toughness with a variety of work materials and cutting conditions.

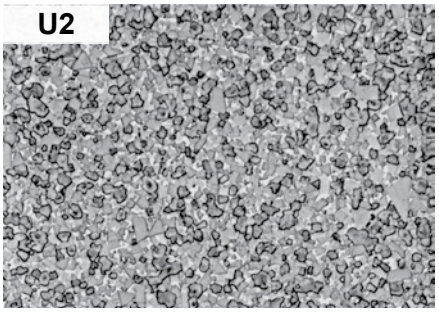
● For Steel

A30N



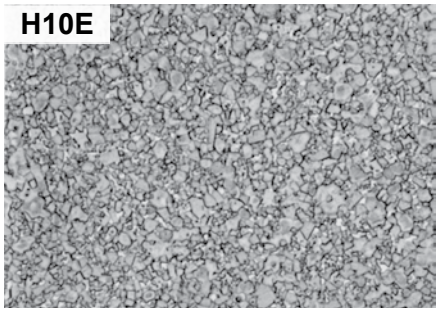
● For Stainless Steel

U2



● For Cast Iron

H10E



Characteristic Values

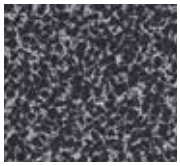
Application	Grade	Hardness (HRA)	TRS (GPa)	Young's Modulus (GPa)	Thermal Conductivity (W/m·°C)	Compressive Strength (GPa)	Linear-Thermal Expansion Coefficient (X 10^{-6}/°C)
P Steel	**ST10P**	92,1	1,9	470	25	4,9	6,2
	ST20E	91,8	1,9	550	42	4,8	5,2
	A30	91,3	2,1	520	—	—	5,2
	A30N	91,2	2,2	520	—	—	—
	ST40E	90,4	2,6	—	75	—	—
M Stainless Steel	**U10E**	92,4	1,8	460	—	5,9	—
	EH510	92,6	2,6	—	—	—	—
	U2	91,5	2,2	—	88	—	—
	EH520	91,7	3,0	—	—	—	—
	A30	91,3	2,1	520	—	—	5,2
	A30N	91,0	2,4	—	—	—	—
K Cast Iron	**BL130**	94,3	2,9	—	—	—	—
	H2	93,2	1,8	600	105	6,1	4,4
	H1	92,9	2,1	650	109	6,1	4,7
	EH10	92,4	3,4	640	105	—	4,5
	EH510	92,6	2,6	—	—	—	—
	H10E	92,3	2,0	—	67	—	—
	EH20	91,3	3,5	620	105	—	4,5
	EH520	91,7	3,0	—	—	—	—
	G10E	91,1	2,2	620	105	5,7	—
N Non-ferrous Metal	**H1**	92,9	2,1	650	109	6,1	4,7
S Exotic Alloy	**EH510**	92,6	2,6	—	—	—	—
	EH520	91,7	3,0	—	—	—	—



High hardness and heat resistance for cutting high hardness steel and hard cast iron. Long tool life with high-speed finishing of grey cast iron.

In 1977, Sumitomo Electric Hardmetal successfully developed a revolutionary CBN sintered tool - SUMIBORON. The main component in SUMIBORON is Cubic Boron Nitride with a special ceramic binder sintered under super high pressure and temperature. As compared to other conventional tool materials, CBN has higher hardness and excellent heat resistance.
With these distinct characteristics, SUMIBORON can perform machining of hardened steel, high hardness cast iron and exotic metals where previously only grinding was done. Furthermore, excellent efficiency and longer tool life can also be achieved from high speed machining of cast irons.

Characteristics

Classifications	Structure	CBN Content	Hardness (GPa)	Grades	Application	Characteristics
Mainly CBN grains fused together		High ↕ Low	44 ↕ 21	BN700 BN7000 BN7500 BNS800	Carbide Chilled cast iron Ni-Hard cast iron Heat-resistant alloy, Cast iron Sintered ferrous alloy	High carbon content. Structure consists of strongly fused CBN grains. Suited to cutting cast iron, heat-resistant alloy, ultra-hard alloy, and other hard materials.
Mainly CBN grains held together with a binder				BN500,* BNC500,* BN1000, BN2000, BN350,* BNX10, BNX20, BNX25, BNC2010, BNC2020 BNC100, BNC160, BNC200, BNC300	Alloy steel Case hardened steel Carbon tool steels Bearing steel, Die steel Ductile cast iron	CBN grains are fused together strongly with a special ceramic binder. Strong CBN binding force gives superior wear resistance and toughness when cutting hardened steel and cast iron.

*BN500 and BNC500 can also be used with cast iron, while BN350 can also be used with sintered ferrous alloys.

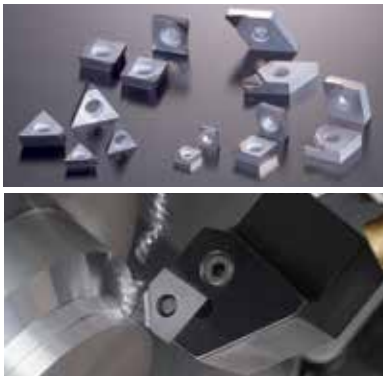
Grade Range Map

Class	Series	Finishing ~ Light Cutting		Medium Cutting	Rough ~ Heavy Cutting
H Hardened Steel	Classification	H01	H10	H20	H30
	Coated SUMIBORON	New BNC2010 BNC100	New BNC2020 BNC160 BNC200		BNC300
	Uncoted SUMIBORON	BNX10,BN1000	BN2000	BNX20	BNX25,BN350
Sintered Components	Classification	01	10	20	30
	Uncoted SUMIBORON		BN7500	BN700, BN7000	
K Cast Iron	Classification	K01	K10	K20	K30
	Coated SUMIBORON	BNC500			
	Uncoted SUMIBORON		BN7000,BN700 BN7500	BNS800	

SUMIBORON

Characteristic Values

Class	Grade	Binder	Carbon Content (%)	Grain Size (μm)	Hardness HV (GPa)	TRS (GPa)	Main Coating Components	Coating Thickness (μm)	Characteristics
H Hardened Steel	New BNC2010	TiCN	50 ~ 55	2	30 ~ 32	1,10 ~ 1,20	TiCN multi-layered	1,5	Improves the wear resistance of coating and substrate and stably achieves excellent surface roughness.
	New BNC2020	TiN	70 ~ 75	5	34 ~ 36	1,20 ~ 1,30	TiAlN multi-layered	1,5	Provides long tool life in general and high-efficincy cutting thanks to tough substrate coated with a highly wear-resistant and highly adhesive layer.
	BNC100	TiN	40 ~ 45	1	29 ~ 32	1,05 ~ 1,15	TiAlN	1	Highly wear resistant coating makes this grade suited for high speed finishing.
	BNC160	TiN	60 ~ 65	3	31 ~ 33	1,10 ~ 1,20	TiAlN/TiCN	2	Stable, high precision finishing of hardened steel.
	BNC200	TiN	65 ~ 70	4	34 ~ 36	1,15 ~ 1,25	TiAlN/TiCN	2	Tough substrate with high wear resistant coating provide longer tool life.
	BNC300	TiN	60 ~ 65	1	33 ~ 35	1,15 ~ 1,25	TiAlN	2	Suited for finishing when there is a combination of continuous and interrupted cutting.
	BNX10	TiCN	40 ~ 45	3	27 ~ 31	0,80 ~ 0,90	–	–	Optimum wear resistance. Suited to continuous, high-speed cutting.
	BN1000	TiCN	40 ~ 45	1	27 ~ 31	0,90 ~ 1,00	–	–	Ultimate wear and fracture resistance. Suited to high-speed cutting.
	BNX20	TiN	55 ~ 60	3	31 ~ 33	0,95 ~ 1,10	–	–	Crater resistant grade, suitable for high efficiency cutting under high temperature conditions.
	BNX25	TiN	65 ~ 70	4	29 ~ 31	1,00 ~ 1,10	–	–	Excellent fracture resistance during high speed cutting. Suited to high speed interrupted cutting of hardened steel.
	BN2000	TiN	50 ~ 55	2	31 ~ 34	1,05 ~ 1,15	–	–	A general purpose grade for hardened steel that provides a high degree of fracture and wear resistance.
	BN350	TiN	60 ~ 65	1	33 ~ 35	1,20 ~ 1,30	–	–	High cutting edge strength. suited to heavy interrupted cutting.
Sintered Components	BN7500	Co Compound	90 ~ 95	1	41 ~ 44	1,40 ~ 1,50	–	–	Maintains optimum cutting edge sharpness. Suited for finishing of sintered alloy.
	BN700	Co Compound	90 ~ 95	2	40 ~ 43	1,20 ~ 1,30	–	–	Maintains good wear and fracture resistance in rough cutting of sintered components.
	BN7000	Co Compound	90 ~ 95	2	41 ~ 44	1,30 ~ 1,40	–	–	Improved wear and fracture resistance in rough cutting of sintered components.
K Cast Iron	BN700	Co Compound	90 ~ 95	2	40 ~ 43	1,20 ~ 1,30	–	–	Maintains good wear and fracture resistance in rough cutting of cast iron and exotic alloy.
	BN7000	Co Compound	90 ~ 95	2	41 ~ 44	1,30 ~ 1,40	–	–	Improved wear and fracture resistance in rough cutting of cast iron and exotic alloy.
	BNS800	Al Alloy	85 ~ 90	8	39 ~ 42	0,95 ~ 1,10	–	–	100% solid CBN structure with good thermal impact resistance.
	BN500	TiC	65 ~ 70	6	32 ~ 34	1,00 ~ 1,10	–	–	Optimized for cast iron cutting. Maintains good wear and fracture resistance.
	BNC500	TiC	60 ~ 65	4	32 ~ 34	1,00 ~ 1,10	TiAlN	2	Substrate with excellent wear resistance and coating makes this grade suited for hard-to-cut cast iron.

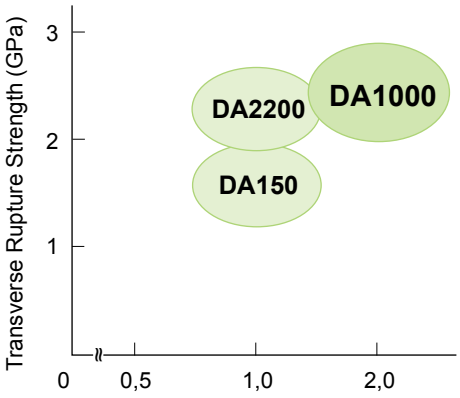


Excellent wear resistance, longer tool life, and high-speed, high-efficiency, high-precision cutting of non-ferrous metals and non-metals.

SUMIDIA is a polycrystalline diamond material made from sintered diamond powder that was first created using our proprietary technology in 1978.
SUMIDIA's superior wear resistance achieves longer tool life, high speed, high efficiency and high precision in non-metal cutting and non-ferrous metal applications including aluminium, copper, magnesium and zinc alloys.

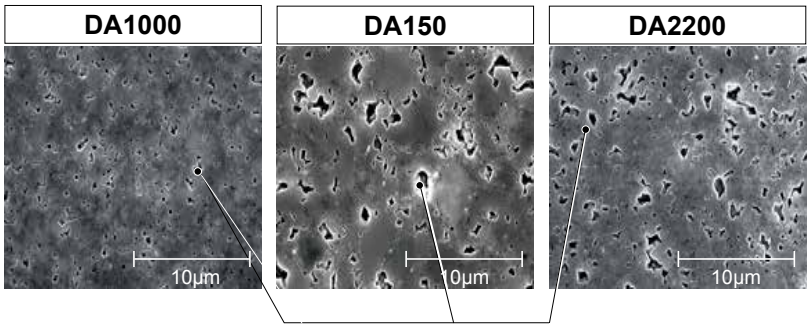
Characteristics DA1000

The DA1000 utilises Sumitomo Electric Hardmetal's proprietary sintering technology to achieve a high-density sintered material made of ultra-fine diamond particles that has superior wear and fracture resistance and longer tool life.



Wear Resistance Comparison
(With DA2200 as "1")

Polycrystalline Diamond Subjected to Acid Treatment



Holes formed when binder is dissolved during acid treatment

Grade Range Map

Class	Series	Finishing ~ Light Cutting		Medium Cutting	Rough ~ Heavy Cutting
	Classification	N01	N10	N20	N30
N Non-ferrous Metal	PCD (sintered)		DA150		
		DA1000			
			DA2200		

Characteristic Values

Class	Grade	Binder	Carbon Content (%)	Grain Size (μm)	Hardness HV (GPa)	TRS (GPa)	Characteristics
N Non-ferrous Metal	**DA1000**	Co	90 ~ 95	~ 0,5	110 ~ 120	≈ 2,60	High density sintered material made of ultra-fine diamond particles that demonstrates optimum wear and fracture resistance, and edge sharpness.
	DA2200	Co	85 ~ 90	0,5	90 ~ 100	≈ 2,45	Sintered material made of ultra-fine diamond particles that demonstrates optimum wear and fracture resistance, and edge sharpness.
	DA150	Co	85 ~ 90	5	100 ~ 120	≈ 1,95	Sintered material made of fine diamond particles that provides a good balance of workability and wear resistance.

Grade Comparision Chart

■ Coated Carbide

Application	Class	Grade	Sumitomo Electric	Mitsubishi	Tungaloy	Kyocera	Hitachi	Sandvik	Kennametal	Dijet	Valenite	SECO Tools Japan	WALTER	ISCAR
Turning	P Steel	P05	**AC805P AC810P**	UE6105	T9105	CA510 CA5505	HG8010	GC4205	KCP05 KC9105	JC110V	VP5515 VP1510	TP0500	WPP05	IC8005 IC428
		P10	**AC810P AC820P**	UE6110	T9115	CA515 CA5515	HG8010	GC4215 GC4315	KCP10 KC9110	JC110V JC215V	SV310 SV315 SV515	TP1500	WPP10S WPP10	IC8150 IC9015
		P20	**AC820P**	MC6025 UE6020	T9125	CA525 CA5525	IP2000 HG8025 GM25	GC4225 GC4325	KCP25 KC9125	JC215V	SV315 SV325 VP5525	TP2500	WPP20S WPP20	IC8250 IC9015
		P30	**AC830P AC630M**	UE6035 VP15TF	T9135	CA530 CA5535	IP3000 GM8035	GC4235	KCP30 KC9140	JC215V JC325V	VP5535 SV325 SV230	TP3500	WPP30S WPP30	IC8350 IC8025
		P40	**AC830P AC630M**	UE6035 UH6400	T9135	PR660	IP3000 GM8035	GC4235	KC9140	JC325V JC450V	SV235 V1N VP5535	TP3500	WTN53	IC8350 IC8025
	M Stainless Steel	M10 S10	**AC610M AC510U**	MC7015 US905 VP05RT VP10RT US7020	T9115 AH110 AH905	CA6515 PR915 PR1025 PR1215 PR1225	IP050S IP100S	GC2015 GC1105 GC1115	KCM15 KC5510 KCU10	JC605X JC5003 JC110V	SV310 SV315 VC929	TP1500 TS2000	WSM10	IC807 IC8025 IC907
		M20 S20	**AC6030M AC610M AC520U**	MC7025 US7020 VP20MF UP20M MP9015	T6120 T6020 T9125 AH630 AH120 AH725	CA6525 PR930 PR915 PR1025 PR1125 PR1215	IP100S HG8025	GC2025 GC1125	KCM25 KC5525 KCU25 KC5020	JC110V JC5015 JC8015 JC525X	VPS525 VC901 SV230	TP2500 TM2000 TS2500	WSM20	IC808 IC8080 IC908
	S Exotic Alloy	M30	**AC6030M AC6040M AC630M AC830P AC530U**	MC7025 MC7035 US735 VP15TF VP20MF	AH725 T6130 T6030 AH630 AH645	CA6525 PR1125	GM8035 GX30	GC2035	KCM35 KC9240	JC5015 JC8015 JC525X	VC901 V1N	TP3500 TM4000	WSM30	IC8080 IC830
		M40	**AC6040M AC530U**	MC7035 US735 VP15TF	AH645	PR1125	GX30	GC235			V1N	TM4000		IC830 IC928
	K Cast Iron	K05	**AC405K**	MC5005 UC5105 UC5115	T5105 T5115	CA4505 CA4010	HG3305 HX3305	GC3205	KCK05	JC105V JC050W	SV405 SV510	TK1000 TK1001	WAK10 WKK10S	IC5005
		K10	**AC415K**	MC5005 MC5015 UC5105 UC5115	T5115 T5125	CA4505 CA4515 CA4115	HX3305 HG3305 HG3315 HX3315	GC3210	KCK15	JC105V	SV410 SV515	TK1000 TK1001	WAK10 WAK20 WKK10S WKK20S	IC5010 IC5100
		K20	**AC420K**	MC5015 UC5115 VP15TF UE6110	T5125 T9125	CA4515 CA4120 CA4115	HX3315 HG3315 HG8010	GC3215	KCK20	JC215V	SV415 SV515	TK2000 TK2001	WAK20 WAK30 WKK20S	IC8150
Milling	P Steel	P10	**ACP100**	FH7020 F7030	T3130 T3030		JP4005 JP4020	GC4220 GC4230	KC715M KC930M KC935M	JC8003 JC730	V1N	T250M T350M MP1500 MP2500	WKP25 WKP25S WPP20 WKP35S	IC4100 IC4050 IC520M DT7150
		P20	**ACP200**	VP15TF VP20RT	AH9030 AH120 AH725	PR1525 PR1225 PR830	JS4045 GX2140	GC1010 GC1025 GC2040 GC4240	KTPK20 KCPM20	JC6235 JC5040 JC8015 JC5015 JC5118	VC935	MP3000 F25M F30M	WSM20	IC808 IC810 IC380
		P30	**ACP300**	VP30RT	AH3035 AH130 AH140 SH730	PR1525 PR1230	JS4060 JX1045 JX1060 CY150 CY250	GC1030 GC2030	KCPK30 KCMP30 KC725 KC730 KC735	JC5040 JC8050		MM4500 F40M	WSM30 WSM35 WSP45S WSP45	IC830 IC928 IC330
	M Stainless Steel	M10	**ACM100 ACK300**			PR1025 PR1225	JX1020 CY9020 JP4020	GC1025 GC1030	KC522M					
		M20	**ACM200**	F7030 VP15TF VP20RT	GH330 AH330 AH120 AH130	PR1525 PR1025 PR1225	JX1015 CY150 CY15	GC2030	KC730M KC525M	JC5015 JC5030 JC5040		F25M F30M	WSM35 WSM35	IC908 IC928
		M30	**ACM300**	F7030 VP30RT MP7030	AH130 AH140	CA6535 PR1535	JX1045 JX1060 GX2160	GC2040	KC994M KC725M	JC5015 JC5030 JC5040	VC935	F30M F40M	WSM35 WXM35	IC328 IC330 IC830
	K Cast Iron	K20	**ACK200**	F5010 F5020 MC5020	T1115	PR905	JP4020	GC3220 GC3020 GC3040 K15W K20D K20W	KCK15 KCK20 KC915M KC930M KC935M	JV608X JC600 JC605W JC610 JC8003	VN5	T150M MK1500 MK3000	WAK15 WKK25 WKP35S	IC5100 DT7150
		K30	**ACK300**	VP15TF VP20RT	AH725 AH120 AH110 AH330 GH110 GH130	PR1510 PR1210	GX2140 JS4045 JX1045 CY150 CY250	GC1010 GC1020 GC1025 GC1030	KTPK20 KCPK30 KC510M KC520M KC525M	JC6235 JC5003 JC5015 JC5080 JC8015	VC928	MK2050 MK2000 MH1000	WKP35S WPP20	IC830 IC810 IC908 IC910 IC928 IC950

Grade Comparision Chart

■ Cermet

Application	Class		Sumitomo Electric	Mitsubishi	Tungaloy	Kyocera	Hitachi	Sandvik	Kennametal	Dijet	Valenite	SECO Tools Japan	WALTER	ISCAR
Turning	P Steel	P10	**T1000A**	NX2525 AP25N★	GT720★ NS520	TN30 PV30★ TN6010 PV7010★	CZ25★	CT5015	KT125 HTX KT1120	LN10 CX50	VC605			IC20N IC520N
		P20	**T1500A** **T1500Z★** **T2000Z★**	AP25N★ NX2525 NX3035	NS530 GT530★ NS730 NS9530 GT9530★ GT730★	TN60 TN6020 PV60★ PV7020★ PV7025★	CH550	GC1525★	KT6215 KT315★ KT175 KT5020★	CX50 CX75	VC610	CM CMP C15M TP1020		IC30N IC530N
		P30	**T3000Z★**	NX3035 MP3025★		PV7025★ PV90★				CX90 CX99				
	K Cast Iron	K10	**T1000A**	AP25N★ NX2525	GT720★ NS520	TN30 PV30★ TN6010 PV7005★ PV7010★		CT5015	KT125 HTX	LN10 CX50	VC605			
Milling	P Steel		**T250A**	NX4545 VP45N★	NS540 NS740	TC60M TN100M	MZ1000★ MZ2000★ MZ3000★	CT530	KT530M★	CX90	VC630	C15M		IC30N

★ denotes coated cermet

■ Uncoated Carbide

Class	Grade	Sumitomo Electric	Mitsubishi	Tungaloy	Kyocera	Hitachi	Sandvik	Kennametal	Dijet	SECO Tools Japan	ISCAR
P Steel	P10	**ST10P**				WS10	S1P		SRT		
	P20	**ST20E**	UTi20T	UX30		EX35	SMA	K125M	SRT		IC70 IC50M
	P30	**A30** **A30N**	UTi20T	UX30	PW30	EX40	SM30		DX30		IC54 IC28
	P40	**ST40E**				EX45	S6		SR30		IC54 IC28
M Stainless Steel	M10	**U10E** **EH510**				WA10B	H10A	KU10 K313 K68 KYSM10	UMN	890	IC07 IC08 IC20
	M20	**U2** **EH520**	UTi20T	UX30			H13A	K313 K68	DX25 UMS	HX 883	IC07 IC08 IC20
	M30	**A30** **A30N**	UTi20T	UX30			H10F SM30		UMS UM40		IC28
K Cast Iron	K01	**H2** **H1**	HTi05T			WH01 WH05		KU10,K68 K313 K115M	KG03		IB50 IB85 IS8
	K10	**H1** **EH10** **EH510**	HTi10	TH10	KW10 GW15	WH10	H13A	KU10, K313 K68,K115M K110M KY3500	KG10 KT9 CR1	890	IB50, IB85 IB55, IB90 IC20, IS8
	K20	**G10E** **EH20** **EH520**	UTi20T	UX30	GW25	WH20	H13A	KMF KY3500 KYHS10	KT9 KG20 CR1	890 883 HX	IC20 IS8
	K30	**G10E**	UTi20T			WH30		KY3500	KG30	883	
S Exotic Alloy		**EH510** **EH520**	RT9005 RT9010 MT9015 TF15	TH10 KS20	SW05, SW10 SW25, KW10 GW15	WH10	H10A H10F H13A	KU10, K313 K68, KMF K110M, K1025 KYHS10	KG10 KG20	HX H25	ID5, IB85 IC20, IC07 IC08, IC28
Fine-grained Carbide		**F0**	SF10,MF07 MF10	F,MD1508 MD08F		NM08			FB05,FB10 FZ05		IC07
		F1,AFU **XF1**	HTi10 MF20	M,MD10 MD05F,MD07F	FW30	NM15	6UF,8UF PN90,H6FF		FZ10,FB15 FZ15	890	IC07
		AF0,AF1 **SF2**	TF15 MF30	EM10,MD20 MD15		BRM20 EF20N	12UF		FB20,FZ15 FB15	890 883	IC08
		A1 **CC**		UM		NM25	N6F H10F		FZ20 FB20	883	IC08

Grade Comparision Chart

■ CBN

Class	Grade	Sumitomo Electric	Mitsubishi	Tungaloy	Kyocera	Hitachi	Sandvik	Kennametal	Dijet	SECO Tools Japan
K Cast Iron	K01	**BNC500 BN7000 BN500**	MB710	BX930 BX870 BX910	KBN60M		CB7525 CB7925	KB1340	JBN795	
	K10	**BN700 BN7000 BN7500**	MB710 MB730	BX470 BX480 BX950	KBN65B KBN60M KBN900	BH200	CB7925 CB7525	KB1645 KB9610	JBN330	CBN200,CBN300 CBN300P,CBN400C
	K20	**BN700 BN7000 BNS800**	MB730 MBS140 BC5030	BXC90 BX90S	KBN900	BH250				CBN200,CBN300 CBN300P,CBN400C
	K30	**BNS800**	MBS140 BC5030	BX90S BXC90				KB9640 KB1340		CBN500
N Non-ferrous Metal	N01	**BN700 BN7000**						KD120 PB100		
S Exotic Alloy	S01	**BN700 BN7000**	MB730	BX470 BX840 BX950	KBN65B KBN70M			KB5630 KB1340		
H Hardened Steel	H01	**BNC2010 BNC2020 BNC100 BN1000 BN2000 BNX10**	MBC010 MB810	BXM10 BX310	KBN05M PT600M	BH100		KB5610		CBN10 CBN100 CBN60K
	H10	**BNC2010 BNC2020 BNC160 BNC200 BN2000**	MBC020 BC8020 MB820	BXM10 BX330	KBN25M	BH150	CB7015	KB5610 KB5625	JBN300	CBN10,CBN150 CBN100,CBN60K CBN160C
	H20	**BNC2020 BNC200 BNX20**	MBC020 MB8020 MB825	BXC50 BX360	KBN35M KBN900	BH250	CB7025 CB20	KB5625 KB5630	JBN245	CBN150 CBN160C
	H30	**BNC300 BN350 BNX25**	MB835 BC8020	BX380			CB7525	KB5630		

■ PCD

Class	Grade	Sumitomo Electric	Mitsubishi	Tungaloy	Kyocera	Sandvik	Kennametal	Dijet	SECO Tools Japan
N Non-ferrous Metal	N01	**DA150 DA1000**	MD205	DX180 DX160	KPD001	CD05 CD10	KD1400	JDA30 JDA735	
	N10	**DA150 DA1000 DA2200**	MD205 MD220	DX140	KPD001 KPD010 KPD230	CD1810	KD100 KD1410 KDF310 KD1415		PCD05 PCD10
	N20	**DA1000 DA2200**	MD220 MD230	DX120	KPD230		KD1400 KD1425	JDA10 JDA715	PCD05 PCD20
	N30	**DA1000 DA2200**	MD230	DX110			KD1400		PCD05 PCD30 PCD30M

Cutting Conditions

Remarks:
- Mentioned cutting conditions are considered for an approach angle of 90°~ 95° and usage coolant.
- The conditions should be adjusted in accordance to the machine stability and workpiece conditions.

■ Recommended Cutting Conditions for Main Grades

ISO	Material	Hardness Brinell	Coated Carbide							
			AC405K	AC415K	AC420K	AC805P	AC810P	AC820P	AC830P	AC530U
			Feed Rate f (mm/rev)							
			0,2 - **0,4** - 0,6	0,2 - **0,4** - 0,6	0,2 - **0,4** - 0,6	0,2 - **0,4** - 0,6	0,2 - **0,4** - 0,6	0,2 - **0,4** - 0,6	0,2 - **0,4** - 0,6	0,2 - **0,4** - 0,6
			Cutting Speed v_c (m/min)							
P Steel	unalloyed steel, <0,15%C, annealed	125				400	380	320	270	230
	„ , <0,45%C, annealed	190				350	330	270	230	200
	„ , <0,45%C, tempered	250				300	280	210	205	180
	low alloyed steel,annealed	180				320	300	250	210	200
	„ ,tempered	275				280	260	200	160	120
	„ ,tempered	300					220	160	120	
	„ ,tempered	350					200	120	90	
	high alloyed and tool steel, annealed	200					220	170	150	
	„ , tempered	325					130	90	70	
M Stainless Steel	stainless steel, ferritic/martensitic, annealed	200								160
	martensitic, tempered	240								120
	austenitic, plunged	180								140
K Cast Iron	lamellar cast iron, pearlitic	180	350	300	300					160
	„ , pearlitic(martensitic)	260	280	250	230					120
	nodular cast iron, ferritic	160	300	285	250					160
	nodular cast iron, perlitic	250	250	200	180					100
	malleable cast iron, ferritic	130	260	250	250					180
	malleable cast iron, perlitic	230	200	195	190					120
S Exotic Alloy	heat resistant alloys, Fe basis	200								
	heat resistant alloys, Ni or Co basis	250								
	heat resistant alloys, Ni or Co basis	350								
	pure Titanium	400								
	Titanium alloys	950								

■ Recommended Cutting Conditions for Main Grades

ISO	Material	Hardness Brinell	Coated Carbide					Coated Cermet		
			AC610M	AC6030M	AC6040M	AC510U	AC520U	T1500Z	T3000Z	
			Feed Rate f (mm/rev)							
			0,2 - **0,4** - 0,6	0,2 - **0,4** - 0,6	0,2 - **0,4** - 0,6	0,2 - **0,4** - 0,6	0,2 - **0,4** - 0,6	0,15 - **0,2** - 0,25	0,15 - **0,2** - 0,25	
			Cutting Speed v_c (m/min)							
P Steel	unalloyed steel, <0,15%C, annealed	125						300	250	
	„ , <0,45%C, annealed	190						260	220	
	„ , <0,45%C, tempered	250						240	180	
	low alloyed steel,annealed	180						240	200	
	„ ,tempered	275						220	180	
	„ ,tempered	300						180	140	
	„ ,tempered	350								
	high alloyed and tool steel, annealed	200								
	„ , tempered	325								
M Stainless Steel	stainless steel, ferritic/martensitic, annealed	200	205	180	150					
	martensitic, tempered	240	145	140	120					
	austenitic, plunged	180	180	90	60					
K Cast Iron	lamellar cast iron, pearlitic	180								
	„ , pearlitic(martensitic)	260								
	nodular cast iron, ferritic	160								
	nodular cast iron, perlitic	250								
	malleable cast iron, ferritic	130								
	malleable cast iron, perlitic	230								
S Exotic Alloy	heat resistant alloys, Fe basis	200				100	60			
	heat resistant alloys, Ni or Co basis	250				60	40			
	heat resistant alloys, Ni or Co basis	350				40	25			
	pure Titanium	400								
	Titanium alloys	950				70	50			

Grade Properties Chart

■ Properties of Basic Materials

Material		Specific Gravity	Micro Vickers Hardness (GPa)	Young's Modulus (GPa)	Thermal Conductivity Coefficient (W/m·°C)	Linear-Thermal Expansion Coefficient (x 10^{-6}/°C)	Melting Point (°C)
Tungsten Carbide	**WC**	15,6	21	690	126	5,1	2.900
Titanium Carbide	**TiC**	4,94	31	450	17	7,6	3.200
Tantalum Carbide	**TaC**	14,5	18	280	21	6,6	3.800
Niobium Carbide	**NbC**	8,2	20	340	17	6,8	3.500
Titanium Nitrate	**TiN**	5,43	20	260	29	9,2	2.900
Aluminium Oxide	**Al_2O_3**	3,98	29	410	29	8,5	2.050
Silicon Nitride	**Si_3N_4**	3,17	25	310	29	3,0	>1.900 (Disintegrate)
Cubic Boron Nitride	**CBN**	3,48	44	700	1.300	4,7	–
Carbon	**C**	3,52	>90	970	2.100	3,1	–
Cobalt	**Co**	8,9	–	100 ~ 180	69	12,3	1.495
Nickel	**Ni**	8,9	–	200	92	13,3	1.495
Carbide	**WC- 5% Co**	15,0	18	630	79	5,0	–
	WC-10 Co	14,6	14	580	75	5,0	–
	WC-20% Co	13,5	10	530	67	6,0	–
High Speed Steel		8,7	8	210	17	11,0	–

Indexable Inserts for Turning

Negative / Positive Inserts

C1 ~ C54

C





ISO **Inserts Identification Table** ..... C2 - 3
Chipbreaker for Exotic Alloys and Stainless Steel Turning **NEG / NEF** ..... C4 - 5
Chipbreaker for Stainless Steel Turning **NEM** New C6
Positive M Class Chipbreaker **NFB / NLB** New C7
Chipbreaker for Steel Turning **(M) NSI** C8
Comparison Chart **Chipbreaker** C9
Selection **Chipbreaker Application Table** ..... C10 - 15

Negative Inserts **C / 80° Diamond Type (With Hole)** C16-20
D / 55° Diamond Type (With Hole) C21-26
S / Square Type (With Hole) C27-31
S / Square Type (Without Hole) C31
T / Triangle Type (With Hole) C32-38
T-REX Insert C36
V / 35° Diamond Type (With Hole) C39-40
W / Polygon Type (With Hole) C41-44

Positive Inserts **C / 80° Diamond Type (With Hole)** C45-50
D / 55° Diamond Type (With Hole) C51-53
R / Round Type (With Hole) C54
S / Square Type (With Hole) C55-56
S / Square Type (Without Hole) C57
T / Triangle Type (With Hole) C58-63
T / Triangle Type (Without Hole) C64-65
V / 35° Diamond Type (With Hole) C66-69
W / Polygon Type (With Hole) C70-71

Stock marking chart

- ● : Eurostock item
- ○ : Japanstock item
- ▲ : To be replaced by new item

[—]: We cannot produce

Note:
Stocking policy may change without prior notice, please consult our sales representative for actual stock situation.

Inserts Identification Table

C N M G

① Insert Shape — Chart 1
② Relief Angle — Chart 2
③ Tolerance — Chart 3
④ Insert Type — Chart 4

Chart 1: Insert Shape

Symbol	Insert Shape		Angle
C		Diamond	80°
D			55°
E			75°
F			50°
V			35°
R		Round	—
S		Square	90°
T		Triangle	60°
W		Trigon	80°
A		Parallelogram	85°
B			82°
K			55°
H		Hexagonal	120°
O		Octogonal	135°
P		Pentagonal	108°
L		Rectangular	90°
M		Rhombic	86°

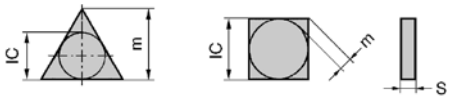
Chart 2: Relief Angle

Symbol	Relief Angle
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P*	11°
O	Others

* Inserts with a 10° relief angle are sometimes considered as "P"

Chart 3: Tolerance (mm)

Symbol	Nose Height	Inscribed Circle	Thickness
A	± 0,005	± 0,025	± 0,025
F	± 0,005	± 0,013	± 0,025
C	± 0,013	± 0,025	± 0,025
H	± 0,013	± 0,013	± 0,025
E	± 0,025	± 0,025	± 0,025
G	± 0,025	± 0,025	± 0,13
J*	± 0,005	± 0,05~± 0,15	± 0,025
K*	± 0,013	± 0,05~± 0,15	± 0,025
L*	± 0,025	± 0,05~± 0,15	± 0,025
M*	± 0,08~± 0,2	± 0,05~± 0,15	± 0,13
N*	± 0,08~± 0,2	± 0,05~± 0,15	± 0,025
U*	± 0,13~± 0,38	± 0,08~± 0,25	± 0,13



The height "m" on sharp corner.

Chart 4: Insert Hole or Breaker

Symbol	Hole	Hole Style	Chip Breaker	Shape	Symbol	Hole	Hole Style	Chip Breaker	Shape
N	No Hole	—	Nil		A	With Hole	Straight Hole	Nil	
R			One Face		M			One Face	
F			Both Faces		G			Both Faces	
W	With Hole	Straight hole with top end counter-sink (40°~60°)	Nil		B	With Hole	Straight hole with top end counter-sink (70°~90°)	Nil	
T			One Face		H			One Face	
Q	With Hole	Straight hole with top end counter-sink (40°~60°)	Nil		C	With Hole	Straight hole with top end counter-sink (70°~90°)	Nil	
U			Both Faces		J			Both Faces	
					X	—	—	—	Special

● Tolerance of Nose Height (M-Class)

Inscribed Circle	Triangle	Square	80° Diamond	55° Diamond	35° Diamond	Round
6,35	± 0,08	± 0,08	± 0,08	± 0,11	—	—
9,525	± 0,08	± 0,08	± 0,08	± 0,11	± 0,16	
12,70	± 0,13	± 0,13	± 0,13	± 0,15		
15,875	± 0,15	± 0,15	± 0,15	± 0,18		
19,05	± 0,15	± 0,15	± 0,15	± 0,18		
25,40	± 0,18	± 0,18	± 0,18			
31,75	—	± 0,20				

● Tolerance of Inscribed Circle (M-Class)

Inscribed Circle	Triangle	Square	80° Diamond	55° Diamond	35° Diamond	Round
6,35	± 0,05	± 0,05	± 0,05	± 0,05	—	—
9,525	± 0,05	± 0,05	± 0,05	± 0,05	± 0,05	± 0,05
12,70	± 0,08	± 0,08	± 0,08	± 0,08	—	± 0,08
15,875	± 0,10	± 0,10	± 0,10	± 0,10	—	± 0,10
19,05	± 0,10	± 0,10	± 0,10	± 0,10	—	± 0,10
25,40	± 0,13	± 0,13	± 0,13	—	—	± 0,10
31,75	—	± 0,15	—	—	—	± 0,12

Inserts Identification Table

12 04 08 N - GE

⑤ **Insert Size** — Chart 5

⑥ **Thickness** — Chart 6

⑦ **Corner Radius** — Chart 7

⑧ **Feed Direction** — Chart 8

⑨ **Chip Breaker** — Chart 9

Picture of insert shown as example
(ISO Cat, No,)



Chart 5: Cutting Edge Length (mm)

Shape	Symbol	Cutting Edge	Inscribed Circle	Shape	Symbol	Cutting Edge	Inscribed Circle	Shape	Symbol	Cutting Edge	Inscribed Circle
C	03	3,55	3,50	D	07	7,7	6,35	W	03	3,8	5,56
	04	4,97	4,30		09	9,7	7,94		04	4,3	6,35
	06	6,4	6,35		11	11,6	9,525		05	5,4	7,94
	08	8,0	7,94		15	15,5	12,70		06	6,5	9,525
	09	9,7	9,525		19	19,4	15,875		08	8,7	12,70
	12	12,9	12,70						10	10,9	15,875
	16	16,1	15,875	V	08	8,3	4,76				
	19	19,3	19,05		09	9,7	5,56				
	25	25,8	25,4		11	11,1	6,35				
					16	16,6	9,525				
					22	22,1	12,7				
S	06	6,35	6,35	T	06	6,9	3,97	R	08	8,0	8,0
	S7	7,14	7,14		08	8,2	4,76		10	10,0	10,0
	07	7,94	7,94		09	9,6	5,56		12	12,0	12,0
	09	9,525	9,525		11	11,0	6,35		12	12,70	12,70
	12	12,70	12,70		16	16,5	9,525		15	15,875	15,875
	15	15,875	15,875		22	22,0	12,70		16	16,0	16,0
	19	19,05	19,05		27	27,5	15,875		19	19,05	19,05
	25	25,40	25,40		33	33,0	19,05		25	25,0	25,0
	31	31,75	31,75						25	25,40	25,40

Chart 6: Thickness

Symbol	Thickness (mm)
X1	*
01	1,59
02	2,38
T2	2,78
03	3,18
T3	3,97
04	4,76
05	5,56
06	6,35
07	7,94
09	9,52

(*):
CCET03X1 Insert thickness: 1,40
CCET04X1 Insert thickness: 1,80

Chart 7: Nose Radius

Symbol	Nose Radius (mm)
00	Sharp Point
01	0,1
015	0,15
02	0,2
04	0,4
08	0,8
12	1,2
16	1,6
24	2,4
32	3,2
M0	Round Insert (Metric)
00	Round Insert (Imperial)

An "M" after the nose radius indicates a negative tolerance

Example:
CCG T09T302 **M** NSI AC520U

Chart 8: Feed Direction

Symbol	Direction
R	Right-hand
L	Left-hand
N	Neutral

Chart 9: Chip Breaker

Symbol	Process	Bumpy Type	Standard	Handed
F□	Fine Finishing to Finishing	FA, FL, FB, FC FK, FP		FT, FX, FZ FY, FW
S□ L□	Light Cut	SE, SEW, SI, SC, SF, SP, SU, SX LU, LUW, LB		SD SDW ST
G□ U□	General	GE, GU, GUW UG, UP US, UX	GZ UZ	UM
M□	Rough	MP, MU, MX, ME	MC	MM HM
H□	Heavy	HG, HP, HF	HU HW	

Other specials	
Wide Chipbreaker	W
For Countersink	C
For Round insert	RD, RP, RX, RH
For Exotic Alloy	EF, EG, EX
For Aluminium	AG, LD, GD
For Hardened Steel	FV, LV
For Carburized Layer Removal	SV
For Stainless Steel	EF, EG, EM

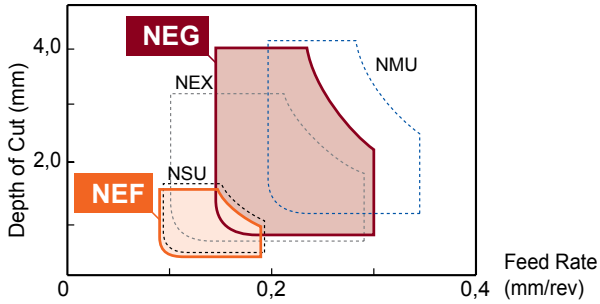
Chipbreaker
NEG Type / NEF Type

For Exotic Alloys and Stainless Steel Turning

■ General Features

NEG/NEF type chipbreaker for exotic alloy machining can be used for Titanium alloys, heat-resistant alloys and a variety of other exotic alloys.
They deliver excellent wear resistance and superior chip management. These chipbreakers can solve quality problems caused by the unstable tool life and poor chip control provided by conventional chipbreakers for exotic alloys.

■ Application Range

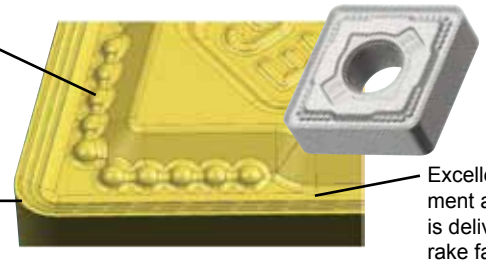


■ NEG Chipbreaker for Roughing

Provides excellent wear resistance and chip control from general-purpose machining to roughing applications. Reduces damage to insert and eliminates trouble from chips specific to exotic alloys. Also demonstrates very high versatility.

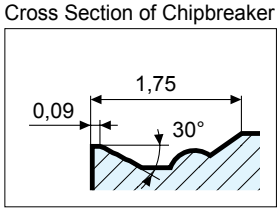
Crater wear advancement is prevented by the round bumps, whilst maintaining excellent control.

The cutting edge maintains the strength slowing the progress of crater wear.



Excellent chip management and wear prevention is delivered by the special rake face design.

Cross Section of Chipbreaker



● Cutting Performance – NEG Type

Heat Resistant Alloy

Chipbreaker type: NEG (AC510U)



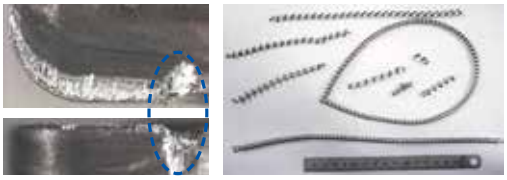
Suppresses the chipping of peripheral cutting edge and notch wear. Excellent chip management.

Work Material: Inconel 718

Insert: CNMG120412

Cutting Data:
v_c = 40m/min
d_{oc} = 2,5mm
f = 0,2mm/rev
Wet
T_c = 7min

Conventional tool (S10)



Notch wear / poor chip control

Titanium Alloy

Chipbreaker type: NEG (AC510U)



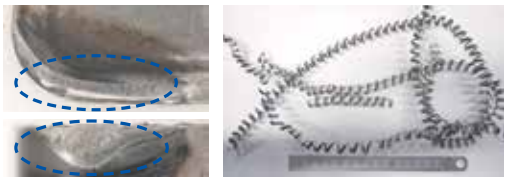
Suppresses crater wear and flank wear. Excellent chip management.

Work Material: Ti-6Al-4V

Insert: CNMG120412

Cutting Data:
v_c = 65m/min
d_{oc} = 2,5mm
f = 0,2mm/rev
Wet
T_c = 8min

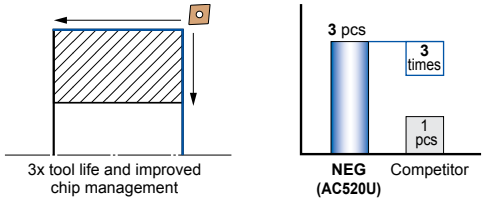
Conventional tool (S10)



Crater wear / flank wear / poor chip control

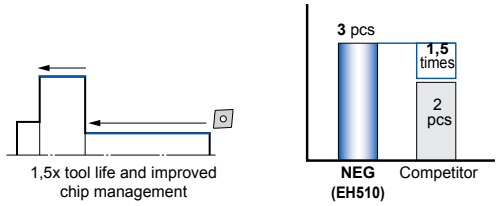
● Application Example – NEG Type

Inconel 718, machine component



Insert: CNMG120408 NEG (AC520U)
Cutting Data: v_c=50m/min, d_{oc}=1,5mm, f=0,3mm/rev, Wet

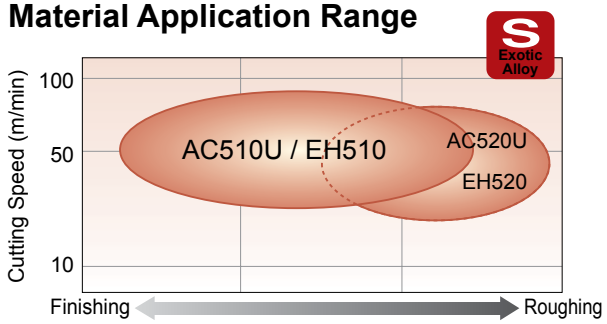
Pure Titanium (Ti grade 3), machine component

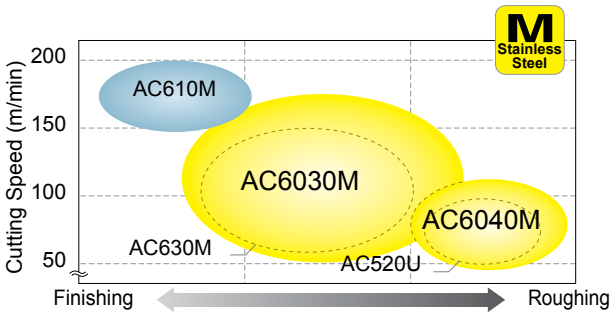


Insert: CNMG120408 NEG (EH510)
Cutting Data: v_c=80~100m/min, d_{oc}=1,0mm, f=0,25mm/rev, Wet

Chipbreaker
NEG Type / NEF Type

■ Material Application Range



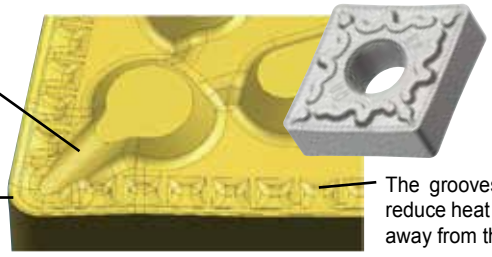


■ NEF Chipbreaker for Finishing

The NEF chipbreaker reduces chip curl diameter in finishing applications.
Provides extremely good chip management not fluctuated by the material in use.

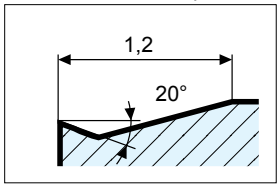
Main chipbreaker that enables good chip control even at low depths of cut.

Sharp edge with 20° rake angle reduces wear.



The grooves on the rake face reduce heat and assist chip flow away from the workpiece.

Cross Section of Chipbreaker



● Cutting Performance – NEF Type

Heat Resistant Alloy

Chipbreaker type: NEF (AC510U)

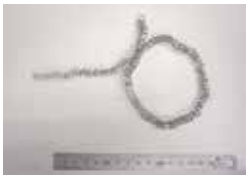


Improvements in chip control and chip removal management based on small curled chips.

Work Material:
Inconel 718

Insert:
CNMG120408

Cutting Data:
v_c = 55m/min
d_{oc} = 0,3mm
f = 0,15mm/rev
Wet
T_c = 8min

Conventional tool (S10)	Competitor's product (S10)
	

There is a problem in the length and the diameter of chips.

Titanium Alloy

Chipbreaker type: NEF (AC510U)



Improvements in chip control and chip removal management based on small curled chips.

Work Material:
Ti-6Al-4V

Insert:
CNMG120408

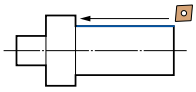
Cutting Data:
v_c = 80m/min
d_{oc} = 0,5mm
f = 0,2mm/rev
Wet
T_c = 25min

Conventional tool (S10)	Competitor's product (S10)
	

There is a problem in the length and the diameter of chips.

● Application Example – NEF Type

Inconel 718, shaft component



Great improvement in chip management. Keeps workpieces free of damage. It is possible to omit final polishing process.



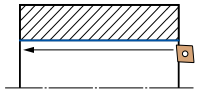
NEF (AC510U)



Conventional tool

Insert: CNMG120408 NEF (AC510U)
Cutting Data: v_c=45m/min, d_{oc}=0,25mm, f=0,1mm/rev, Wet

Duplex stainless steel cover



Improvements in chip management. Suppress damage to finished surface with no entanglement of chips.



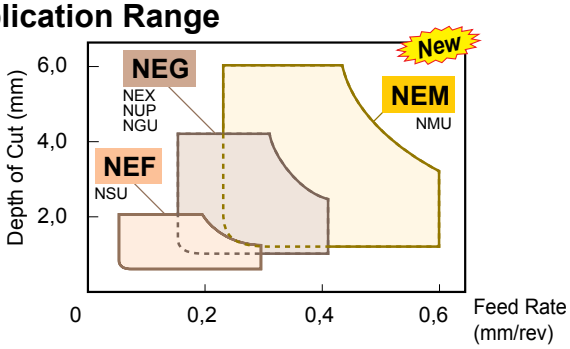
NEF (AC510U)

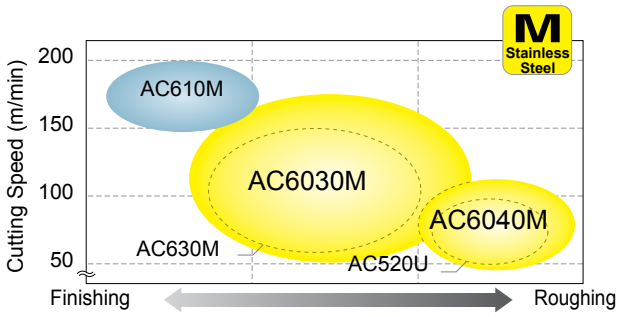


Conventional tool

Insert: CNMG120408 NEF (AC510U)
Cutting Data: v_c=55m/min, d_{oc}=0,3mm, f=0,125mm/rev, Wet

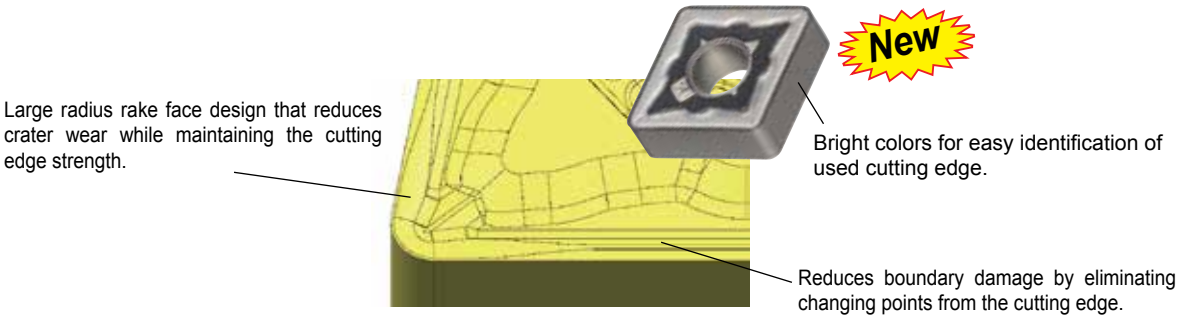
■ Application Range



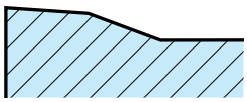
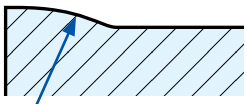


■ NEM Chipbreaker for Rough Cutting

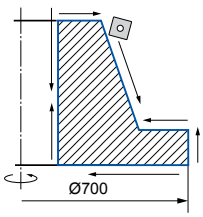
The NEM chipbreaker achieves excellent fracture and crater resistance and ensures extremely stable machining.

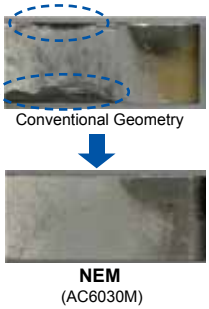


● Reduction of Damage

	Reduction of Boundary Damage		Reduction of Crater Wear	
	Cutting Edge	Boundary Wear Comparison	Cross Section	Crater Wear Comparison
Conventional Geometry				
NEM Type				
	The NEM chipbreaker has no changing points on the cutting edge, so boundary damage is reduced.		The NEM chipbreaker smoothly evacuates chips thanks to its large radius rake face design, so crater wear is reduced.	

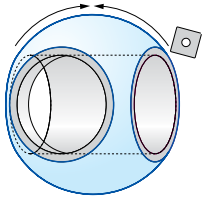
● Application Example

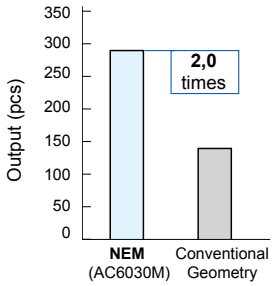




Reduces breakage out of the cutting edge and ensures stable machining.

Work Material:	X5CrMo17 12 2
Insert:	SNMG190616NEM (AC6030M)
Cutting Conditions:	v_c=70m/min, f=0,5mm/rev, a_p=3,0~8,0mm, Wet

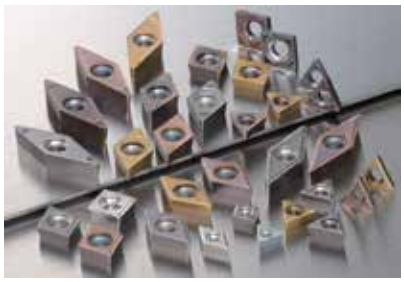




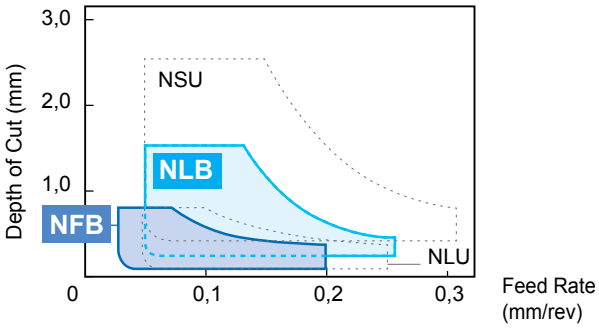
Reduces crater wear and provides long tool life.

Work Material:	X5CrNiS18 10
Insert:	SNMG120408NEM (AC6030M)
Cutting Conditions:	v_c=100m/min, f=0,32mm/rev, a_p=2,0~2,5mm, Wet

Chipbreaker
NFB Type / NLB Type



■ Application Range



■ NFB Chipbreaker for Finishing

■ NLB Chipbreaker for Light Cutting

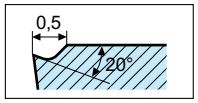
The NFB type for finishing and the NLB type for light cutting have been added to the chipbreaker series for low carbon and general steel machining in addition to the already present NLU type for finishing and NSU type for light cutting.
The NFB and NLB type chipbreakers improve chip control in finishing of low carbon and general steel.

New

Ridge reduces edge breakage

High rake breaker wall impoves chip breaking performance

Variable rake angle in nose radius increases chip strain and improves chip breaking performance

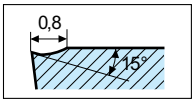


Cross Section of Chipbreaker

New

Strengthened edge reduces unexpected breakage

Special breaker ridge shape achieves stable chip control

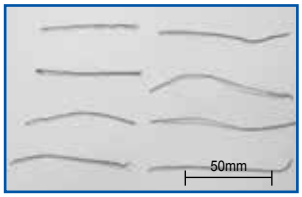


Cross Section of Chipbreaker

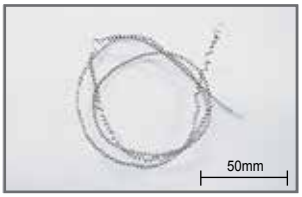
● Performance

Chip Control

Achieves stable chip control at small cutting depth and low feed.



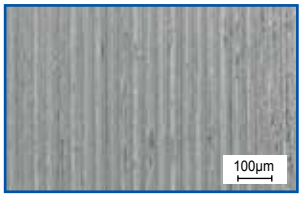
NFB Type Chipbreaker (T1500A)



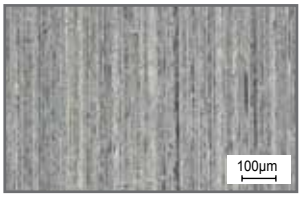
Competitor's Product

Work Material:	Pipe (H240LA), Ø30 Boring
Insert:	TPMT 110304 NFB (T1500A)
Cutting Conditions:	v_c=100m/min, f=0,12mm/rev, a_p=0,1mm, Wet

Comparison of Surface Roughness of Finished Surfaces



NFB Type Chipbreaker (T1500A)



Competitor's Product

Work Material:	Pipe (H240LA), Ø100Boring
Insert:	TPMT 110304 NFB (T1500A)
Cutting Conditions:	v_c=200m/min, f=0,07mm/rev, a_p=0,1mm, Wet

● Performance

Chip Control ①

Achieves stable chip control in light cutting.



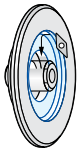
NLB Type Chipbreaker (T1500A)



Competitor's Product

Work Material:	Pipe (H240LA), Ø30 Boring
Insert:	TPMT 110304 NLB (T1500A)
Cutting Conditions:	v_c=200m/min, f=0,15mm/rev, a_p=0,5mm, Wet

Chip Control ②

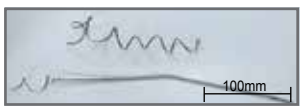


Doubles the tool life by improving chip control and reducing blemishes on machined surfaces.

NLB Type Chipbreaker (T1500A)



Competitor's Product



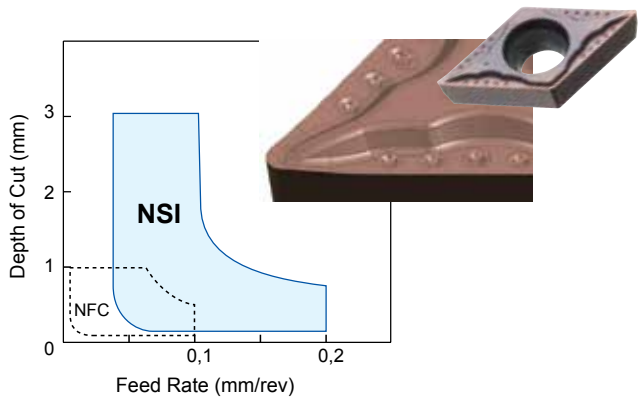
Work Material:	Hub (C45)
Insert:	VBMT 160408 NLB (T1500A)
Cutting Conditions:	v_c=240m/min, f=0,25~0,28mm/rev, a_p=0,6mm, Wet

(M) NSI Type

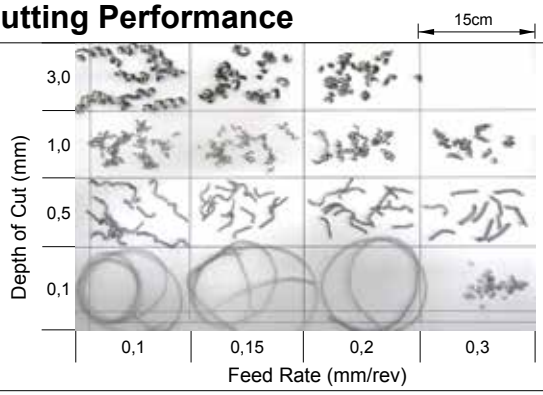
Nose radius with minus tolerance (**M**)

Example: DCGT 11T304**M** NSI

■ Application Range



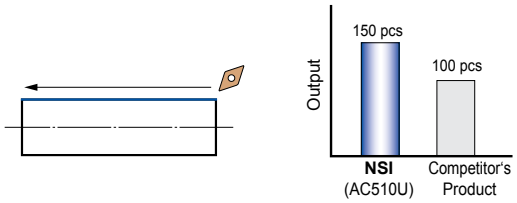
■ Cutting Performance



Work Material: X5CrNiMo17122
Insert: DCGT11T304M NSI, Cutting Conditions: v_c=100m/min

■ Application Examples

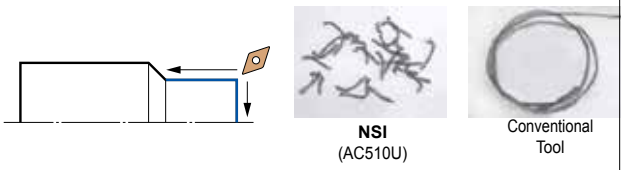
Inconel 718, machine component external turning



1,5 x higher tool life. Improved chip management.

Insert: DCGT11T302M NSI (AC510U)
Cutting Conditions: v_c=35m/min, f=0,08mm/rev, d_{oc} =0,8mm, Wet

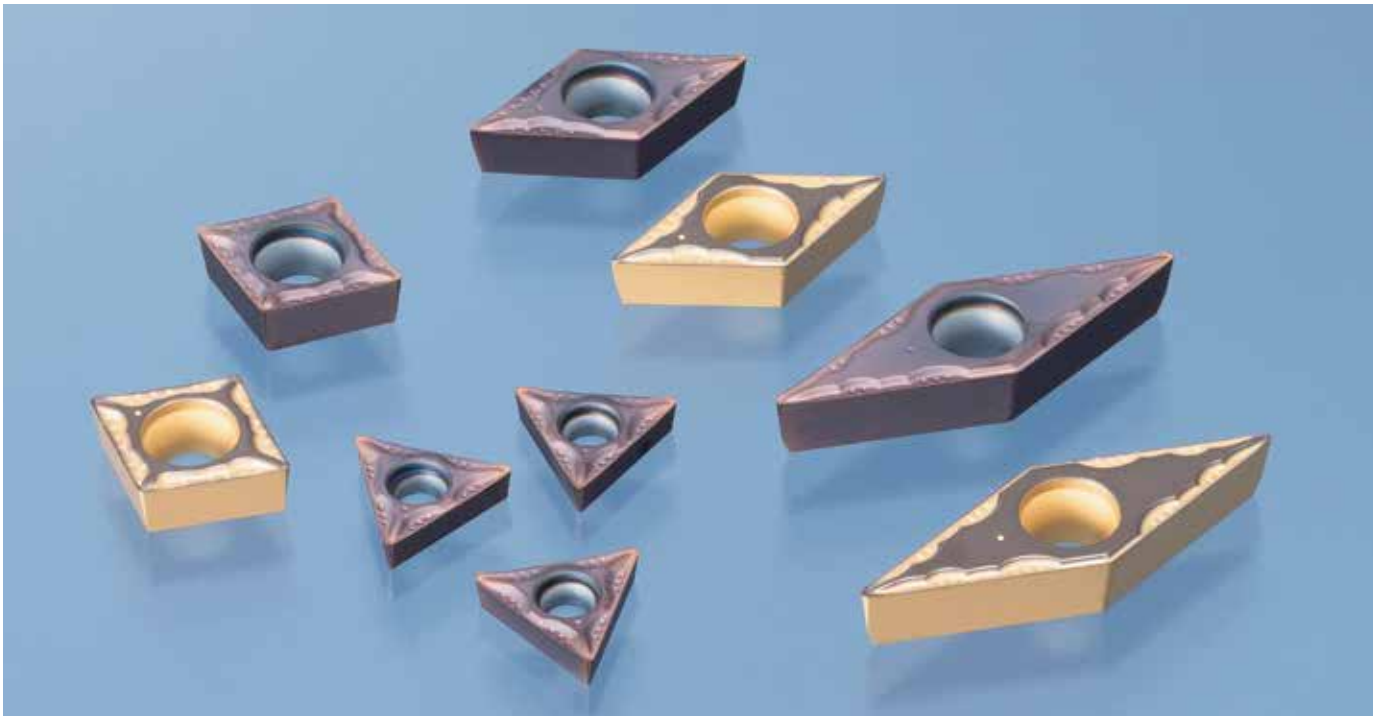
X5CrNi1810, Shaft component external turning & facing



Improved chip management. Suppressing cutting edge adhesion to ensure a stable, long tool life.

Insert: DCGT11T304M NSI (AC520U)
Cutting Conditions: v_c=100m/min, f=0,08mm/rev, d_{oc} =0,5mm, W et

– Sharp designed cutting edge with low-cutting force
– Better chip control in wide range DOC for bar feeder machine
– Combination of high rake edge design and G-class precision offers superior cutting performance
– Suitable for medical parts and high precision machining



Chipbreaker Comparison

■ Negative Type

Class	Application	Sumitomo Electric	Mitsubishi	Tungaloy	Kyocera	Hitachi	Sandvik	Kennametal	SECO Tools apan	WALTER	ISCAR
P Steel	Fine Finishing	**FA**	FH	TF	GP		QF	FF	FF1		SF
		FL	FS,FY	NS,ZF	XP,XF	FE				FP5	
	Finishing	**LU**	SA,SY	NM, SS	XQ,CQ	BE	LC	FN		NF3	
		SU	SH	TS,TSF,11	HQ, PP	CE,B,BH	XF,MF		MF2		NF,TF
	Wiper Edge	**LUW**		AFW	WP		WL,WP				
		SEW	SW	ASW	WQ		WF,WMX	FW	W-MF2	NF	WF
	Finishing to Light Cut	**SE, SX**	LP	AS,ZM,27	CJ,XS	AB,CT	PF,KF	LF	MF5	MP3,NS6	F3P
	Medium Cut	**GU** (UG)	MA,MV	TM,37	HS,PS	AH	XM,QM	P,MG	M3		GN, HT,HTW
		GE, UX	MH,MP	DM,CM	CS,GS,PQ,PT	AE,AY	PM,SM,KM	MN		MP5,NM4,NM6	
	Wiper Edge	**GUW**	MW				WM	MW	W-M3	NM	HTW,WG
	Roughing	**MU, ME**	GH	TH	HT,GT,PH	RE,AR	MG-PR,XMR,KR	RP	M5,MR7	NM7,NM9,RP5	M3P,NR
		MX	HAS,MT	CH				RN			
	Heavy Cut	**HG**	HA,HZ,HX,HBS	THS,TU,57	PX,HX	TE,UE	MM-PR,QR	RM,MR	R4,R5,R6	NR6,NRF	NM,HR
		HP	HH,HXD	65			HR,SR	RH	R7	NR8	
		HU,HW	HV,HDS			H					
		HF	HCS	TUS		HX,HE	MR		RR9	NRR	R3P,T3P
M Stainless Steel	Finishing	**SU**	LM,SH	SS	MQ,GU	SE,MP	MF	FP,FS,LF	MF2	NF4	
	Light to Medium Cut	**EX**	GM,MS	SF,SA	SU,MS,MU	PV	23	MS	MF1,M1		TF,VL
		GU		SM	HU	DE	MM	MP	MF3,M3	NM4	M3M,PP
	Roughing	**HM**	ES,1M,2M	S	ST					NR4	
		EM, MU	GH,RM	SH	TK		MR		M5,MR3		
S Exotic Alloy	Finishing	**EF**	LS,FJ				SF			NFT	
	Medium Cut	**EG, EX**	MJ,MS	HMM,SA			SM			NMT	
	Roughing	**MU**	GJ,RS				SMR			NRT	
K Cast Iron	Light Cut	**UZ**	LK,MA,MK,SW	CM,CF	Standard	V,VA	KF	UN	M5	NM5	GN
	Medium Cut	**GZ** (UX)	GH,Standard	Standard,CH,33	ZS,GC	Y,RE	KM,KR	UM	MR7		
H Hardened Steel	Finishing	FV									
	Light Cut	LV									
	Carburized Layer Removal	SV									

■ Positive Type

Class	Application	Sumitomo Electric	Mitsubishi	Tungaloy	Kyocera	Hitachi	Sandvik	Kennametal	SECO Tools apan	WALTER	ISCAR
P Steel	Finishing	**FC**	FJ,AM	01	CF,GF		UM		GT-F1	PF5	
		LU (FP, FK)	FV,SQ	PSF,PF,23	GP,XP	JQ,MP	PF,UF,MF,KF	11,UF	FF1	PF4	PF
	Wiper Edge	**LUW**	SW				WF	FW	W-F1	PF	WF
M Stainless Steel		**SDW**					WK				
	Finishing to Light Cut	**SI**	SMG	JS	CK						
K Cast Iron	Light Cut	**SU** (SK, SF)	SV,MQ	PSS,PS,24	HQ,XQ,GK	JE	PM,UM,MM,PM	LF	F1	PS5	SM,14
		SC			MF,GQ						
	Medium Cut	**MU**	MV	PM			PR,UR,MR,KR	MF	F2	PM5	17,19
N Non-ferrous Metal	Finishing	**AG**	AZ	AL,PP	AH,A3		AL	HP	AL	PM2	AS,AF
	Finishing to Light Cut	**LD, GD**									
H Hardened Steel	Finishing	**FV**									
	Light Cut	**LV**									

Chipbreaker Application

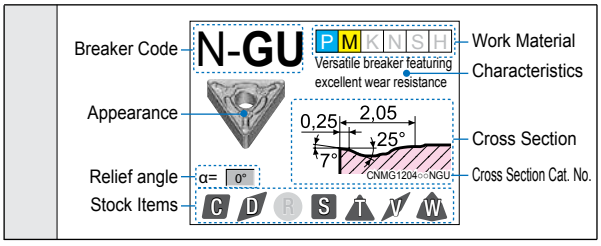
Bumpy Breaker | Standard Breaker | Handed Breaker
Break Master (CBN/PCD) | For Chamfering

Negative Type — Finishing to Medium Cutting

Fine Finishing

N-FA — P M K N S H
Profile breaker perfect for fine finishing
1,0 | 20° | α= 0° | CNMG1204○○NFA
C D R S T V W

N-FL — P M K N S H
Optimal breaker for chip management on iron sheeting
1,0 | 10° | α= 0° | CNMG1204○○NFL
C D R S T V W



Finishing

N-LU — P M K N S H
Effective chip management for fluctuating cut depths and copying
1,5 | 1,0 | 10° | CNMG1204○○NLU
C D R S T V W

N-SP — P M K N S H
Shows excellent cutting performance in finishing to light cutting
1,3 | 13° | α= 0° | CNMG1204○○NSP
C D R S T V W

N-SU — P M K N S H
Effective in high-speed fine finishing
1,3 | 13° | α= 0° | CNMG1204○○NSU
C D R S T V W

N-SE — P M K N S H
Finishing breaker reduces tool wear on rake face. Effective even for high efficiency machining.
0,1 | 1,5 | 17° | 5° | α= 0° | CNMG1204○○NSE
C D R S T V W

N-EF — P M K N S H
Chipbreaker for exotic alloy finishing with excellent chip management
1,2 | 20° | α= 0° | CNMG1204○○NEF
C D R S T V W

NLU-W — P M K N S H
High performance finishing breaker with wiper edge
Wiper
1,5 | 1,0 | 10° | α= 0° | CNMG1204○○NLUW
C D R S T V W

NSE-W — P M K N S H
New high feed finishing breaker with wiper edge
Wiper
0,13 | 1,9 | 17° | 5° | α= 0° | CNMG1204○○NSEW
C D R S T V W

L/R-FX — P M K N S H
Parallel breaker with superior sharp edge
1,5 | 14° | α= 0° | TNGG1604○○L/RFX
T

L/R-FY — P M K N S H
Wide type breaker with sharp edge
New
2,5 | 15° | α= 0° | TNGG1604○○L/RFY
T

L/R-FT — P M K N S H
Arc-shaped ground type finishing breaker
0,15 | 1,35 | α= 0° | TNGG1103○○L/RFT
T

Light to Medium

N-SJ — P M K N S H
Standard breaker with excellent cutting edge strength
0,18 | 1,2 | α= 0° | SNMG1204○○NSJ
S

L/R-ST — P M K N S H
Arc-shaped ground type breaker for light cutting
0,15 | 1,65 | α= 0° | TNGG1603○○L/RST
T

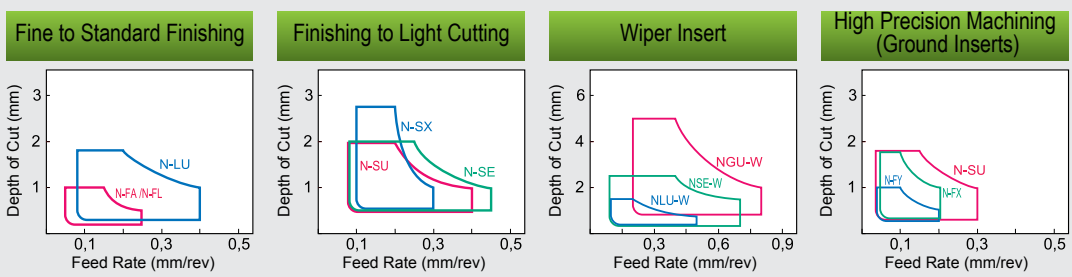
N-EX — P M K N S H
Standard breaker designed especially for use with exotic alloys
2,0 | 16° | α= 0° | CNMG1204○○NEX
C D R S T V W

N-UP — P M K N S H
Double positive edge for optimal stainless steel cutting
2,1 | 10° | α= 0° | CNMG1204○○NUP
C D R S T V W

N-SX — P M K N S H
Perform copying and raise steps
1,35 | 0,2 | 15° | 3° | α= 0° | CNMG1204○○NSX
C D R S T V W

Work Material: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metal | S Exotic Alloy | H Hardened Steel

Chipbreaker Application Range (Insert IC up to Ø 12,7mm)

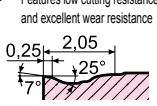


Indicated chipbreaker application ranges and shapes are representative values only. Actual values may change according to the actual catalogue number. For details, refer to stock pages (from Chapter B onward).

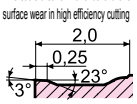
Chipbreaker Application

Negative Type — Medium to Rough Cutting

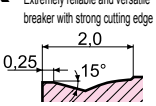
Medium

N-GU — P M K N S H
Features low cutting resistance and excellent wear resistance


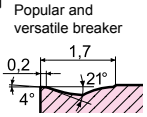
α= 0° — CNMG1204○○NGU
C D R S T V W

N-GE — P M K N S H
A versatile breaker with excellent rake surface wear in high efficiency cutting


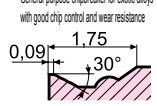
α= 0° — CNMG1204○○NGE
C D R S T V W

N-UX — P M K N S H
Extremely reliable and versatile breaker with strong cutting edge


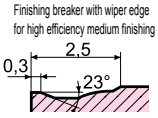
α= 0° — CNMG1204○○NUX
C D R S T V W

N-UG — P M K N S H
Popular and versatile breaker


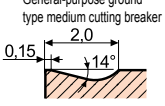
α= 0° — CNMG1204○○NUG
C D R S T V W

N-EG — P M K N S H
General-purpose chipbreaker for exotic alloys with good chip control and wear resistance


α= 0° — CNMG1204○○NEG
C D R S T V W

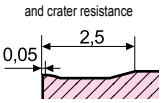
NGU-W — P M K N S H
Finishing breaker with wiper edge for high efficiency medium finishing


Wiper
α= 0° — CNMG1204○○NGUW
C D R S T V W

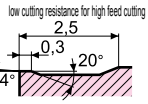
L/R-UM — P M K N S H — New
General-purpose ground type medium cutting breaker


α= 0° — SNMG1204○○L/RUM
C D R S T V W

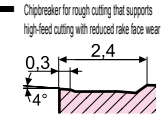
Medium to Rough

N-EM — P M K N S H — New
Achieves excellent fracture and crater resistance


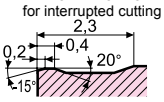
α= 0° — CNMG1204○○NEM
C D R S T V W

N-MU — P M K N S H
Economical, double-sided breaker with low cutting resistance for high feed cutting


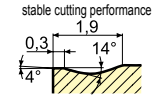
α= 0° — CNMG1204○○NMU
C D R S T V W

N-ME — P M K N S H
Chipbreaker for rough cutting that supports high-feed cutting with reduced rake face wear


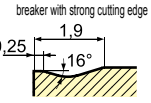
α= 0° — CNMG1204○○NME
C D R S T V W

N-MX — P M K N S H
Strong cutting edge for interrupted cutting


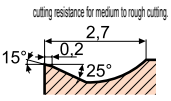
α= 0° — CNMG1204○○NMX
C D R S T V W

N-UZ — P M K N S H
Standard breaker with stable cutting performance


α= 0° — CNMG1204○○NUZ
C D R S T V W

N-GZ — P M K N S H
Extremely reliable standard breaker with strong cutting edge


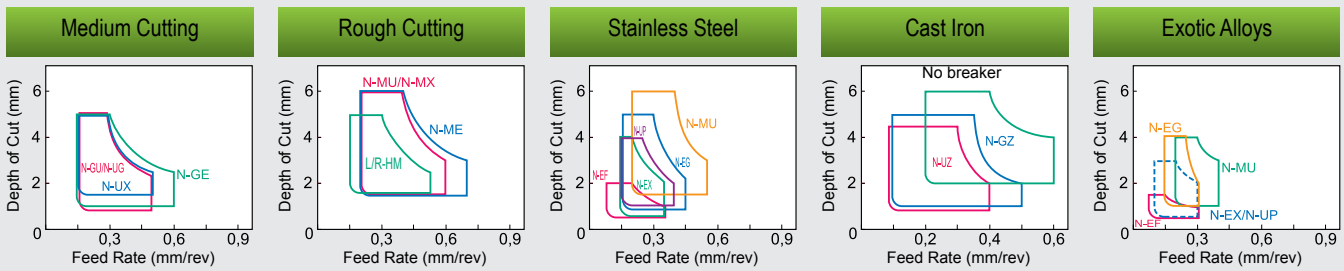
α= 0° — CNMG1204○○NGZ
C D R S T V W

L/R-HM — P M K N S H — New
Wide, M class, handed breaker with low cutting resistance for medium to rough cutting.


α= 0° — TNMG1604○○L/RHM
C D R S T V W

Work Material: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metal | S Exotic Alloy | H Hardened Steel

Chipbreaker Application Range (Insert IC up to Ø 12,7mm)



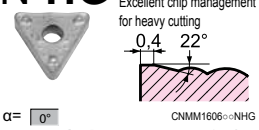
Indicated chipbreaker application ranges and shapes are representative values only. Actual values may change according to the actual catalogue number. For details, refer to stock pages (from Chapter B onward).

Chipbreaker Application

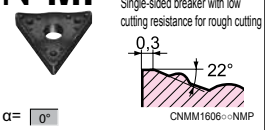
Bumpy Breaker | Standard Breaker | Handed Breaker
SUMIBORON Break Master | For Chamfering

Negative Type — Rough Cutting

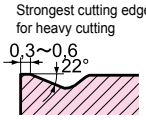
Rough to Heavy

N-HG
P M K N S H
Excellent chip management for heavy cutting


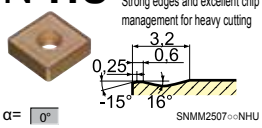
α= 0°
CNMM1606○○NHG
C D R S T W

N-MP
P M K N S H
Single-sided breaker with low cutting resistance for rough cutting


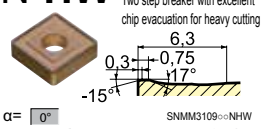
α= 0°
CNMM1606○○NMP
C D R S T W

N-HP
P M K N S H
Strongest cutting edge for heavy cutting


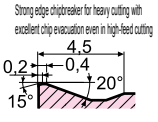
α= 0°
CNMM1606○○NHP
C D R S T W

N-HU
P M K N S H
Strong edges and excellent chip management for heavy cutting


α= 0°
SNMM2507○○NHU
C D R S T W

N-HW
P M K N S H
Two step breaker with excellent chip evacuation for heavy cutting


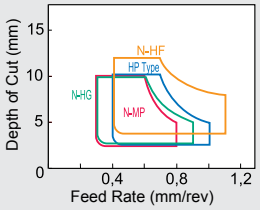
α= 0°
SNMM3109○○NHW
C D R S T W

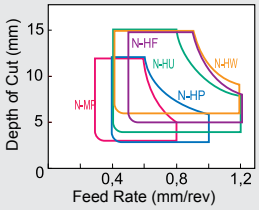
N-HF
P M K N S H
Strong edge chipbreaker for heavy cutting with excellent chip evacuation even in high-feed cutting


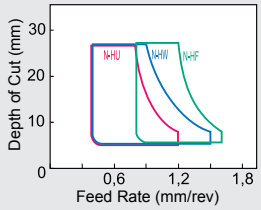
α= 0°
SNMM1906○○NHF
C D R S T W

Work Material: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metal | S Exotic Alloy | H Hardened Steel

Chipbreaker Application Range

Rough to Heavy (IC Ø15,875 to 19,05mm)


Rough to Heavy (IC Ø25,4mm)


Rough to Heavy (IC Ø31mm)


Indicated chipbreaker application ranges and shapes are representative values only. Actual values may change according to the actual catalogue number. For details, refer to stock pages (from Chapter B onward).

Chipbreaker Application

Positive Type — Medium to Rough Cutting

Finish to Light

N-FB — P M K N S H
Finishing chipbreaker for soft steel providing excellent chip control and surface finish quality
New
0,5 | 20°
α= 5° 7° 11°
CCMT09T3○○NFB
C D R S T V W

N-LU — P M K N S H
Chip management significantly improved in fine finishing
0,8 | 15°
α= 5° 7° 11°
CCMT09T3○○NLU
C D R S T V W

NLU-W — P M K N S H
High performance finishing breaker with wiper edge
Wiper
1,5 | 10°
α= 7° 11°
CCMT09T3○○NLUW
C D R S T V W

N-FP — P M K N S H
Provides good chip control in fine finishing
1,40 | 10°
α= 7°
CCMT09T3○○NFP
C D R S T V W

N-FK — P M K N S H
Finishing breaker with sharp edge and good chip control
1,1
α= 11°
TPMT1604○○NFK
C D R S T V W

Light to Medium

N-LB — P M K N S H
Light-cutting breaker with sharp edge and good chip control
New
0,8 | 15°
α= 5° 7° 11°
CCMT09T3○○NLB
C D R S T V W

N-SU — P M K N S H
General-purpose breaker with sharp edge
1,45 | 8°
α= 7° 11°
TPMT1103○○NSU
C D R S T V W

N-US — P M K N S H
Breaker for small diameter boring bars
1,95 | 10°
α= 11°
CPMH0903○○NSU
C D R S

N-MU — P M K N S H
Long lifetime breaker with low cutting resistance
0,35 | 0,1 | 1,8 | 4° | 20°
α= 7° 11°
TPMT1604○○NMU
C D R S T

N-SF — P M K N S H
Very reliable breaker with sharp edge
0,2 | 1,6 | 14°
α= 11°
TPMT1604○○NSF
C D R S T

Positive Type — G class W/Ground Chipbreaker

Finish to Light

L/R-FX — P M K N S H
Parallel breaker with sharp edge
0,9 | 15°
α= 5° 7° 11°
TPGT1103○○L/RFX
C D R S T V W

L/R-W — P M K N S H
Wide type finishing breaker
0,15 | 1,0 | 10°
α= 5° 11°
TPGR1103○○L/RW
C D R S T V W

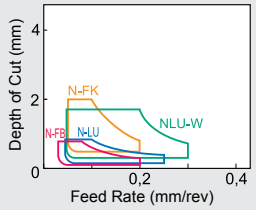
L/R-SD — P M K N S H
Stepped parallel ground type
0,9
α= 7° 11°
TPGT1103○○L/RNSD
C D R S T V W

L/R-SDW — P M K N S H
Parallel ground type with high performance wiper edge
Wiper
0,9
α= 11°
TPGX1103○○L/RSDW
C D R S T V W

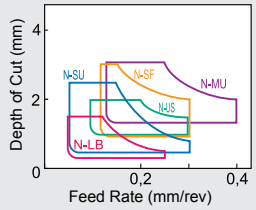
Work Material: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metal | S Exotic Alloy | H Hardened Steel

Chipbreaker Application Range

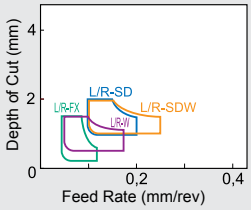
M Class Finishing to Light Cutting



M Class Light to Medium Cutting



G Class w / Ground Chipbreaker



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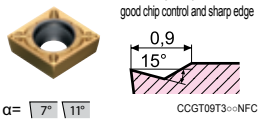
Chipbreaker Application

Bumpy Breaker | Standard Breaker | Handed Breaker | SUMIBORON Break Master

Positive Type — G Class

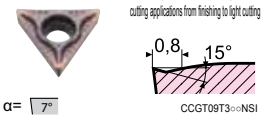
Finish to Light

N-FC* — P M K N S H
Peripheral grinding 3D breaker with good chip control and sharp edge



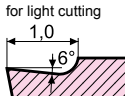
α= 7° 11°
CCGT09T3○○NFC
C D R S T V W

N-SI* — P M K N S H
Sharper-edge breaker for a wide range of cutting applications from finishing to light cutting



α= 7°
CCGT09T3○○NSI
C D R S T V W

N-SC* — P M K N S H
Two step breaker for light cutting



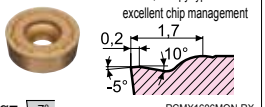
α= 7°
TCGT1103○○NSC
C D R S T V W

* Remarks:
N-FC, N-SI and N-SC have minus tolerance indicated by "M" after the nose radius.
Example:
DCGT 11T302 **M** NSI AC520U

Positive Type — Round Inserts

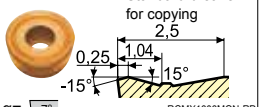
Round

N-RX — P M K N S H
Round, bumpy type insert with excellent chip management



α= 7°
RCMX1606MON-RX
C D R S T V W

N-RP — P M K N S H
Standard breaker for copying

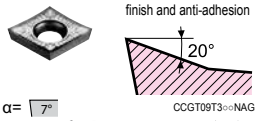


α= 7°
RCMX1606MON-RP
C D R S T V W

Positive Type — For Al - Alloy Machining

Finishing

N-AG — P M K N S H
Al breaker for mirror finish and anti-adhesion

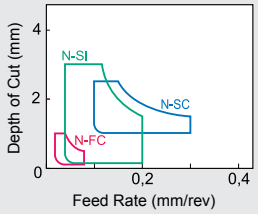


α= 7°
CCGT09T3○○NAG
C D R S T V W

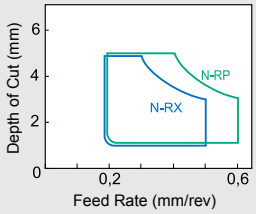
Work Material: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metal | S Exotic Alloy | H Hardened Steel

Chipbreaker Application Range

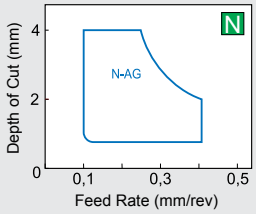
G Class Chipbreakers



Round Insers (IC up to Ø 12,7mm)



For Aluminium Alloy Machining



Indicated chipbreaker application ranges and shapes are representative values only. Actual values may change according to the actual catalogue number. For details, refer to stock pages (from Chapter B onward).

Bumpy Breaker | Standard Breaker | Handed Breaker

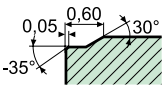
SUMIBORON Insert — CBN

Finish to Light

N-LV

P M K N S H

Significantly improved chip control during hardened steel finishing



Break Master

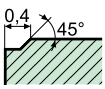
α= 0° 7°

C D R S T V W

N-FV

P M K N S H

Significantly improved chip control during hardened steel finishing



Break Master

α= 0° 7°

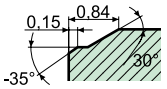
C D R S T V W

Carburized Layer Removal

N-SV

P M K N S H

Significantly improved chip management with carburized layer removal



Break Master

α= 0°

C D R S T V W

SUMIDIA Insert — PCD

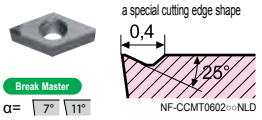
Finish to Light

New

N-LD

P M K N S H

Ideal for finishing of Al by utilizing a special cutting edge shape



Break Master

α= 7° 11°

NF-CCMT0602○○NLD

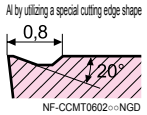
C D R S T V W

New

N-GD

P M K N S H

Ideal for finishing to general machining of Al by utilizing a special cutting edge shape



Break Master

α= 7° 11°

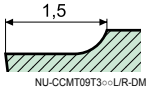
NF-CCMT0602○○NGD

C D R S T V W

L/R-DM

P M K N S H

Perfect for highspeed finishing of aluminium alloy



Break Master

α= 7° 11°

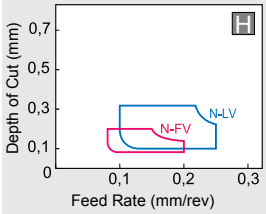
NU-CCMT09T3○○L/R-DM

C D R S T V W

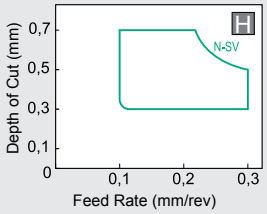
Work Material: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metal | S Exotic Alloy | H Hardened Steel

Chipbreaker Application Range

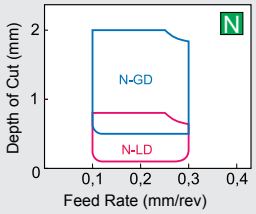
SUMIBORON (Heavy Steel Machining) (IC up to Ø 12,7mm)



SUMIBORON (Carburized Layer Removal) (IC up to Ø 12,7mm)

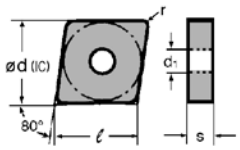


SUMIDIA (For Aluminium Alloy Machining)



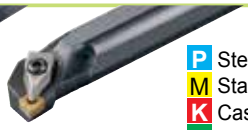
Indicated chipbreaker application ranges and shapes are representative values only. Actual values may change according to the actual catalogue number. For details, refer to stock pages (from Chapter B onward).

80° Diamond Type | 0° Relief | With Insert Hole



Dimensions (mm)				
CNMG	ℓ	ød (IC)	s	d_1
0903..	9,7	9,525	3,18	3,81
12	12,9	12,7	4,76	5,16


⇨ D12, D18 D41


⇨ E8

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

CNMG ●●●●●● ■-■■

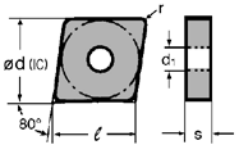
● M-Class Double Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P	AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	Carbide Coated M	AC6030M	AC6040M	Carbide Coated PM	AC610M	AC630M	Carbide Coated K	AC405K	AC415K	AC420K	AC900G	Carbide ZX-Coated KS	AC510U	Carbide ZX-Coated MS	AC520U	Carbide ZX-Coated PM	AC530U	Cermet P	T1500Z	T2000Z	T3000Z	Cermet Uncoated P	T1000A	T1500A	Carbide Uncoated K	G10E	Carbide Uncoated S	EH510	EH520	Carbide N	H1
Fine Finishing	NFA	CNMG 120402 NFA	0,2																									●	▲	●		●	●							
		CNMG 120404 NFA	0,4																									●	▲	●		●	●							
		CNMG 120408 NFA	0,8																									●	▲	●		●	●							
Fine Finishing	NFL	CNMG 120404 NFL	0,4				○		▲															○				●	▲	●		●	●							
		CNMG 120408 NFL	0,8				○		▲															○				●	▲	●		●	●							
Finishing	NLU	CNMG 090304 NLU	0,4		●	●																					○		○		○								
		CNMG 090308 NLU	0,8		○	●																					○		○		○								
		CNMG 120402 NLU	0,2																								○		○		○	○							
		CNMG 120404 NLU	0,4		●	●			▲												▲						●	▲	●		○	○							
		CNMG 120408 NLU	0,8		●	●			▲												▲						●	▲	●		○	○							
		CNMG 120412 NLU	1,2		●	●			▲												▲						●	▲	●			○							
Finishing	NLU-W	CNMG 120404 NLU-W	0,4		●	●								●	●		●	●			▲						●	▲	●			○							
		CNMG 120408 NLU-W	0,8		●	●								●	●		●	●			▲						●	▲	●			○							
		CNMG 120412 NLU-W	1,2		●	●											●	●			▲						○		○			○							
Finishing	NEF	CNMG 120404 NEF	0,4									●	●		●								●	●												●	●		
		CNMG 120408 NEF	0,8									●	●		●								●	●												●	●		
Finishing	NSU	CNMG 090304 NSU	0,4		●	●									●	●																							
		CNMG 090308 NSU	0,8		●	●									●	●																							
		CNMG 120402 NSU	0,2									●	●												○		○		○		○	○							
		CNMG 120404 NSU	0,4		●	●	▲	▲	▲			●	●		●	●					▲	●	●			●	▲	●		●	●							
		CNMG 120408 NSU	0,8		●	●	▲	▲	▲			●	●		●	●					▲	●	●			●	▲	●		●	●							
		CNMG 120412 NSU	1,2		●	●	▲	▲				●	●		●	●					▲	●	●			●	▲	●		●	●							
Finishing	NSE / NSE-W	CNMG 120404 NSE	0,4		●	●	○																				○				○	○							
		CNMG 120408 NSE	0,8	●	●	●	○																				○				○	○							
		CNMG 120412 NSE	1,2	●	●	●	○																																
		CNMG 120404 NSE-W	0,4		●	●																					○					○							
		CNMG 120408 NSE-W	0,8	●	●	●																					○					○							
		CNMG 120412 NSE-W	1,2	●	●	●																																	
Finishing	NSX	CNMG 120404 NSX	0,4																								○		○			○							
		CNMG 120408 NSX	0,8																								○		○			○							

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

C DIAMOND TYPE
INSERTS FOR TURNING

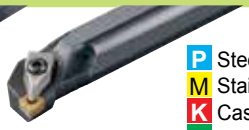
80° Diamond Type | 0° Relief | With Insert Hole



Dimensions (mm)				
CN_ _	ℓ	ød (IC)	s	d_1
0903..	9,7	9,525	3,18	3,81
12	12,9	12,7	4,76	5,16
16	16,1	15,875	6,35	6,35
19	19,3	19,05	6,35	7,94



⇨ D12, D18
D41



⇨ E8

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

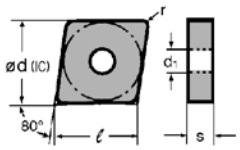
CNMG ●●●●●● ■-■■

● M-Class Double Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P AC805P	Carbide Coated P AC810P	Carbide Coated P AC820P	Carbide Coated P AC830P	Carbide Coated M AC2000	Carbide Coated M AC3000	Carbide Coated M AC6030M	Carbide Coated M AC6040M	Carbide Coated P/M AC610M	Carbide Coated P/M AC630M	Carbide Coated K AC405K	Carbide Coated K AC415K	Carbide Coated K AC420K	Carbide Coated K AC900G	Carbide ZX-Coated K/S AC510U	Carbide ZX-Coated M/S AC520U	Carbide ZX-Coated P/M AC530U	Cermet Uncoated P T1500Z	Cermet Uncoated P T2000Z	Cermet Uncoated P T3000Z	Cermet Uncoated P T1000A	Cermet Uncoated P T1500A	Carbide Uncoated K G10E	Carbide Uncoated S EH510	Carbide Uncoated S EH520	Carbide Uncoated N H1
Medium Cut	"Standard" NGU / "Wiper" W type NGU-W; Depth of cut (mm) 0–6; Feed rate (mm/rev) 0,2–0,8	CNMG 090304 NGU	0,4		●	●	○																						
		CNMG 090308 NGU	0,8		●	●	○																						
		CNMG 120404 NGU	0,4		●	●	●	▲		●	●	●	●				▲		○		○				○				
		CNMG 120408 NGU	0,8	●	●	●	●	▲	▲	●	●	●	●				▲		○		○				○				
		CNMG 120412 NGU	1,2	●	●	●	●	▲	▲	●	●	●	●				▲		○										
		CNMG 120416 NGU	1,6			●	●																						
		CNMG 160608 NGU	0,8		●	●	●	▲	▲			●	●				▲												
		CNMG 160612 NGU	1,2		●	●	●	▲	▲			●	●				▲												
		CNMG 160616 NGU	1,6		●	●	●	▲	▲			●	●				▲												
		CNMG 120408 NGU-W	0,8	●	●	●		▲				●	●	●	●		▲												
		CNMG 120412 NGU-W	1,2	●	●	●		▲				●	●	●	●		▲												
Medium Cut	NGE; Depth of cut (mm) 0–6; Feed rate (mm/rev) 0,2–0,6	CNMG 120404 NGE	0,4		●	●	●																						
		CNMG 120408 NGE	0,8	●	●	●	●																						
		CNMG 120412 NGE	1,2	●	●	●	●																						
		CNMG 120416 NGE	1,6	●	●																								
		CNMG 160612 NGE	1,2		●	●	●																						
		CNMG 160616 NGE	1,6		●	●	●																						
		CNMG 190612 NGE	1,2		●																								
		CNMG 190616 NGE	1,6		●																								
Medium Cut	NUG; Depth of cut (mm) 0–6; Feed rate (mm/rev) 0,2–0,6	CNMG 120404 NUG	0,4					▲	▲																				
		CNMG 120408 NUG	0,8					▲	▲																				
		CNMG 120412 NUG	1,2					▲	▲																				
		CNMG 120416 NUG	1,6					▲	▲																				
		CNMG 160612 NUG	1,2																										
		CNMG 160616 NUG	1,6					▲																					
		CNMG 160624 NUG	2,4					▲																					
		CNMG 190608 NUG	0,8					▲																					
Medium Cut	NEG; Depth of cut (mm) 0–4; Feed rate (mm/rev) 0,2–0,6	CNMG 120408 NEG	0,8							●	●		●					●	●								●	●	
		CNMG 120412 NEG	1,2							●	●		●					●	●								●	●	
		CNMG 160612 NEG	1,2							●			●					●	●								●	●	
		CNMG 190612 NEG	1,2							●																			
		CNMG 190616 NEG	1,6							●																			
Medium Cut	NEX; Depth of cut (mm) 0–4; Feed rate (mm/rev) 0,2–0,6	CNMG 120404 NEX	0,4							●	●	●	●					●	●										
		CNMG 120408 NEX	0,8							●	●	●	●					●	●										
		CNMG 120412 NEX	1,2							●	●	●	●					●	●										
		CNMG 160612 NEX	1,2															●	●										
		CNMG 190612 NEX	1,2															●	●										
Medium Cut	NUP; Depth of cut (mm) 0–4; Feed rate (mm/rev) 0,2–0,6	CNMG 120404 NUP	0,4			●	●	▲	▲	●	●	●	●					●	●										
		CNMG 120408 NUP	0,8			●	●	▲	▲	●	●	●	●					●	●										
		CNMG 120412 NUP	1,2			●	●	▲	▲	●	●	●	●					●	●										
		CNMG 160612 NUP	1,2				●	▲	▲				●																
		CNMG 190612 NUP	1,2			●	●	▲	▲				●																
Medium Cut	New; NEM; Depth of cut (mm) 0–6; Feed rate (mm/rev) 0,2–0,6	CNMG 120408 NEM	0,8							●	●																		
		CNMG 120412 NEM	1,2							●	●																		
		CNMG 120416 NEM	1,6							●	●																		
		CNMG 160612 NEM	1,2							●	●																		
		CNMG 160616 NEM	1,6							●	●																		
		CNMG 190612 NEM	1,2							●	●																		
		CNMG 190616 NEM	1,6							●	●																		

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

80° Diamond Type | 0° Relief | With Insert Hole



Dimensions (mm)				
CNMG	ℓ	ød (IC)	s	d_1
12	12,9	12,7	4,76	5,16
16	16,1	15,875	6,35	6,35
19	19,3	19,05	6,35	7,94



⇨ D12, D18
D41

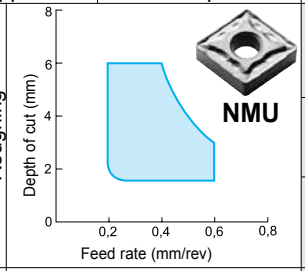
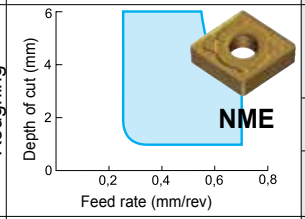
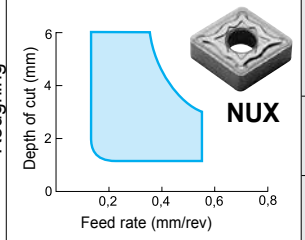
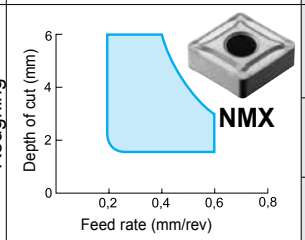
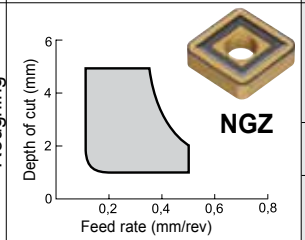
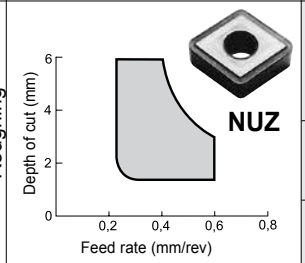


⇨ E8

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

CNMG ●●●●●● ■-■■

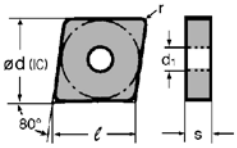
● M-Class Double Sided Bumpy Chipbreaker

				Carbide													Cermet				Carbide			
				Coated												ZX-Coated			Uncoated					
				P				M		P M	K				K S	M S	P M	P			K	S	N	
Application	Shape	ISO Cat. No.	r	AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	AC6030M	AC6040M	AC610M	AC630M	AC405K	AC415K	AC420K	AC900G	AC510U	AC520U	AC530U	T1500Z	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
Roughing	 NMU	CNMG 120408 NMU	0,8		●	●	●	▲	▲			●	●				▲	●	●									
		CNMG 120412 NMU	1,2		●	●	●	▲	▲			●	●				▲	●	●									
		CNMG 120416 NMU	1,6		●	●	●	▲	▲								▲	●	●									
		CNMG 160608 NMU	0,8		●	●	●	▲	▲			●	●				▲											
		CNMG 160612 NMU	1,2		●	●	●	▲	▲			●	●				▲	●	●									
		CNMG 160616 NMU	1,6		●	●	●	▲	▲			●	●				▲	●	●									
		CNMG 190608 NMU	0,8				●																					
		CNMG 190612 NMU	1,2		○	●	●	▲	▲			●	●					●	●									
		CNMG 190616 NMU	1,6			●	●	▲	▲			●	●					●	●									
Roughing	 NME	CNMG 120408 NME	0,8	●	●	●	●																					
		CNMG 120412 NME	1,2	●	●	●	●																					
		CNMG 120416 NME	1,6	●																								
		CNMG 160612 NME	1,2		●	●	●																					
		CNMG 160616 NME	1,6		●	●	●																					
		CNMG 190616 NME	1,6		●	●	●																					
Roughing	 NUX	CNMG 120404 NUX	0,4			●	●	▲	▲																			
		CNMG 120408 NUX	0,8		●	●	●	▲	▲																			
		CNMG 120412 NUX	1,2		●	●	●	▲	▲																			
		CNMG 120416 NUX	1,6		●	●	●	▲																				
		CNMG 160608 NUX	0,8		●	●	●	▲									▲											
		CNMG 160612 NUX	1,2		●	●	●	▲								●												
		CNMG 160616 NUX	1,6		●	●	●	▲								●												
		CNMG 190608 NUX	0,8				●																					
		CNMG 190612 NUX	1,2			●	●																					
		CNMG 190616 NUX	1,6			●	●																					
Roughing	 NMX	CNMG 120408 NMX	0,8			●	●	▲	▲																			
		CNMG 120412 NMX	1,2			●	●	▲	▲																			
		CNMG 120416 NMX	1,6			●	●	▲	▲																			
		CNMG 160608 NMX	0,8			●																						
		CNMG 160612 NMX	1,2			●	●	▲	▲																			
		CNMG 160616 NMX	1,6			●	●	▲	▲																			
		CNMG 190612 NMX	1,2			●	●	▲																				
		CNMG 190616 NMX	1,6			●	●	▲																				
Roughing	 NGZ	CNMG 120404 NGZ	0,4											●	●													
		CNMG 120408 NGZ	0,8											●	●	●												
		CNMG 120412 NGZ	1,2											●	●	●												
		CNMG 120416 NGZ	1,6											●	●	●												
		CNMG 160612 NGZ	1,2											●	●													
		CNMG 160616 NGZ	1,6											●	●													
		CNMG 190612 NGZ	1,2											●	●													
		CNMG 190616 NGZ	1,6											●	●													
Roughing	 NUZ	CNMG 120404 NUZ	0,4											●	●													
		CNMG 120408 NUZ	0,8											●	●	●	▲											
		CNMG 120412 NUZ	1,2											●	●	●	▲											
		CNMG 120416 NUZ	1,6											●	●	●	▲											
		CNMG 160612 NUZ	1,2											●	●	●	▲											
		CNMG 160616 NUZ	1,6											●	●	●	▲											
		CNMG 190612 NUZ	1,2											●	●	●												
		CNMG 190616 NUZ	1,6											●	●	●												

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

C DIAMOND TYPE
INSERTS FOR TURNING

80° Diamond Type | 0° Relief | With Insert Hole



Dimensions (mm)				
CNMM	ℓ	ød (IC)	s	d_1
12	12,9	12,7	4,76	5,16
16	16,1	15,875	6,35	6,35
19	19,3	19,05	6,35	7,94
2507..	25,8	25,4	7,94	9,2
2509..	25,8	25,4	9,52	9,2

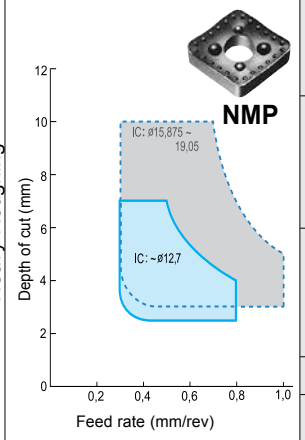
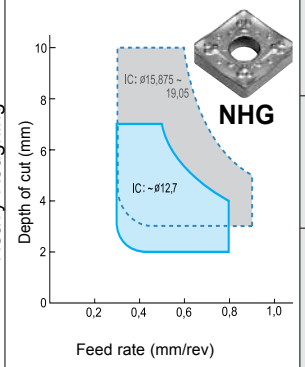
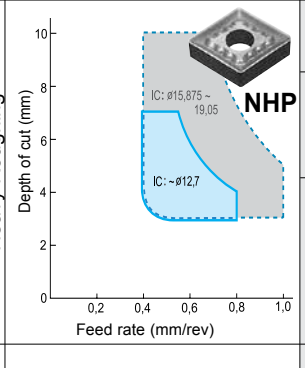
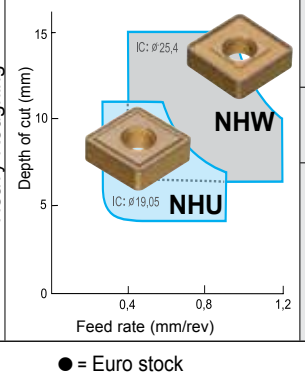


⇨ D12, D18 ⇨ E8

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

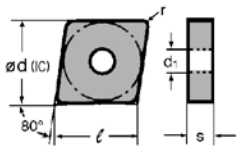
CNMM ●●●●●● ■-■■

● M-Class One Sided Bumpy Chipbreaker

				Carbide														Cermet					Carbide			
				Coated												ZX-Coated			Uncoated								
				P				M			K					P					K	S	N			
Application	Shape	ISO Cat. No.	r	AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	AC6030M	AC6040M	AC610M	AC630M	AC405K	AC415K	AC420K	AC900G	AC510U	AC520U	AC530U	T1500Z	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
Heavy Roughing	 NMP	CNMM 120408 NMP	0,8		●	●	●	▲	▲	●			●					○										
		CNMM 120412 NMP	1,2		●	●	●	▲	▲	●			●					○										
		CNMM 120416 NMP	1,6		○	●	●	▲	▲	●			●					○										
		CNMM 160608 NMP	0,8			●	●	▲	▲				●					○										
		CNMM 160612 NMP	1,2		●	●	●	▲	▲				●					○										
		CNMM 160616 NMP	1,6		●	●	●	▲	▲				●					○										
		CNMM 160624 NMP	2,4			●		▲																				
		CNMM 190608 NMP	0,8			●	●			○								○										
		CNMM 190612 NMP	1,2		○	●	●	▲	▲	●			●					○										
		CNMM 190616 NMP	1,6		○	●	●	▲	▲	●			●					○										
		CNMM 190624 NMP	2,4		○	●	●	▲	▲	○								○										
		CNMM 250724 NMP	2,4			○																						
		CNMM 250924 NMP	2,4			○																						
Heavy Roughing	 NHG	CNMM 120408 NHG	0,8		●	●	●	▲	▲			●	●				▲											
		CNMM 120412 NHG	1,2		●	●	●	▲	▲			●	●				▲											
		CNMM 120416 NHG	1,6					▲				○	●															
		CNMM 160608 NHG	0,8		●			▲	▲			○	●				▲											
		CNMM 160612 NHG	1,2		●	●	●	▲	▲			●	●				▲											
		CNMM 160616 NHG	1,6		●	●	●	▲	▲			●	●				▲											
		CNMM 160624 NHG	2,4					▲									▲											
		CNMM 190612 NHG	1,2		●	●	●	▲	▲			●	●				▲											
		CNMM 190616 NHG	1,6		●	●	●	▲	▲			●	●				▲											
		CNMM 190624 NHG	2,4		○	●	●	▲	▲								▲											
Heavy Roughing	 NHP	CNMM 120408 NHP	0,8			●	●	▲	▲																			
		CNMM 120412 NHP	1,2			●	●																					
		CNMM 160608 NHP	0,8				●		▲																			
		CNMM 160612 NHP	1,2				●		▲																			
		CNMM 160616 NHP	1,6				●		▲																			
		CNMM 190608 NHP	0,8				●																					
		CNMM 190612 NHP	1,2			●	●		▲																			
		CNMM 190616 NHP	1,6			●	●		▲																			
		CNMM 190624 NHP	2,4			●	●		▲																			
Heavy Roughing	 NHW NHU	CNMM 190616 NHU	1,6		●								●				▲											
		CNMM 250924 NHU	2,4		●								●				▲											
		CNMM 250924 NHW	2,4										●															

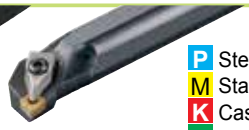
● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

80° Diamond Type | 0° Relief | With Insert Hole



Dimensions (mm)				
CN__	ℓ	ød (IC)	s	d_1
12	12,9	12,7	4,76	5,16
16	16,1	15,875	6,35	6,35
19	19,3	19,05	6,35	7,94


⇨ D12, D18


⇨ E8

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

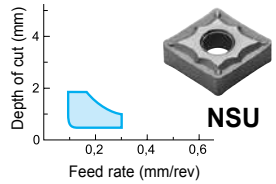
CNMA / CNMX

● Flat and One Side Handed Inserts

Application	Shape	ISO Cat. No.	r	Carbide Coated P						Carbide Coated M				Carbide Coated P,M	Carbide Coated K				Carbide ZX-Coated K,S			Carbide ZX-Coated P,M	Cermet Uncoated P				Carbide Uncoated K			Carbide Uncoated N
				AC805P	AC810P	**AC820P**	AC830P	AC2000	AC3000	AC6030M	AC6040M	AC610M	AC630M	**AC405K**	**AC415K**	AC420K	AC900G	AC510U	AC520U	AC530U	**T1500Z**	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
Roughing		**CNMA 120404**	0,4											●	●	●	▲									●			
		CNMA 120408	0,8											●	●	●	▲									●			
		CNMA 120412	1,2											●	●	●	▲												
		CNMA 120416	1,6											●	●	●	▲												
		CNMA 160612	1,2											●	●	●	▲												
		CNMA 160616	1,6											●	●	●	▲												
		CNMA 190612	1,2											●	●	●													
		CNMA 190616	1,6											●	●	●													
Heavy Roughing		**CNMX 120408 L**	0,8			●		▲																					
		**CNMX 120408 R**	0,8			●		▲																					

CNGG ●●●●●● ■-■■

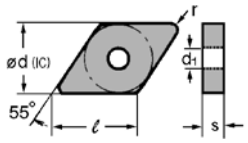
● G-Class Double Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P						Carbide Coated M				Carbide Coated P,M	Carbide Coated K				Carbide ZX-Coated K,S			Carbide ZX-Coated P,M	Cermet Uncoated P				Carbide Uncoated K			Carbide Uncoated H
				AC805P	AC810P	**AC820P**	AC830P	AC2000	AC3000	AC6030M	AC6040M	**AC610M**	AC630M	**AC405K**	AC415K	AC420K	AC900G	AC510U	AC520U	AC530U	**T1500Z**	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
Finishing		**CNGG 120402 NSU**	0,2																		○		○	○	○				
		CNGG 120404 NSU	0,4																		○		○	○	○				
		CNGG 120408 NSU	0,8																		○			○	○				

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

D DIAMOND TYPE
INSERTS FOR TURNING

55° Diamond Type | 0° Relief | With Insert Hole



Dimensions (mm)				
DNMG	ℓ	ød (IC)	s	d_1
1104--	11,6	9,525	4,76	3,81
1504--	15,5	12,7	4,76	5,16
1506--	15,5	12,7	6,35	5,16

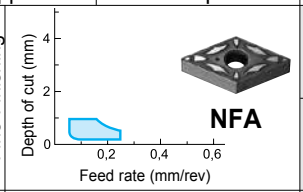
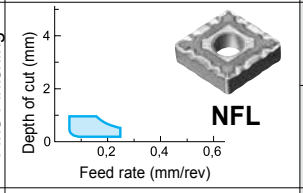
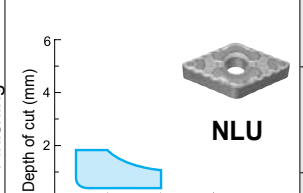
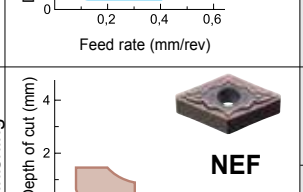
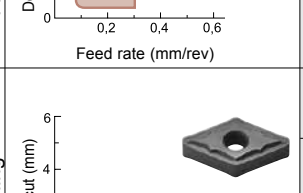
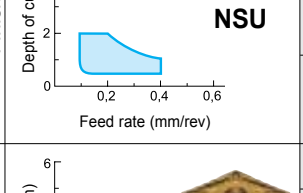
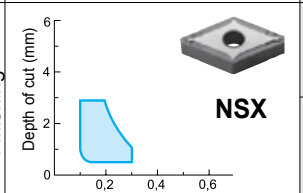


⇨ D13, D19 D41 ⇨ E9

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

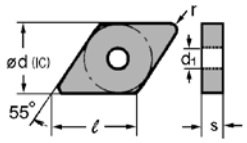
DNMG ●●●●●● ■-■■

● M-Class Double Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated M	Carbide Coated M	Carbide Coated PM	Carbide Coated PM	Carbide Coated K	Carbide Coated K	Carbide Coated K	Carbide Coated K	ZX-Coated KS	ZX-Coated MS	ZX-Coated PM	Cermet Uncoated P	Cermet Uncoated P	Cermet Uncoated P	Cermet Uncoated P	Cermet Uncoated P	Carbide Uncoated K	Carbide Uncoated S	Carbide Uncoated S	Carbide Uncoated N
				AC805P	AC810P	**AC820P**	AC830P	AC2000	AC3000	AC6030M	AC6040M	AC610M	AC630M	**AC405K**	**AC415K**	AC420K	AC900G	AC510U	AC520U	AC530U	**T1500Z**	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
Fine Finishing	 NFA	**DNMG 150404 NFA**	0,4																○		○	○	○				
		DNMG 150408 NFA	0,8																○		○	○	○				
		DNMG 150604 NFA	0,4																●	▲		●	●				
		DNMG 150608 NFA	0,8																●	▲		●	●				
Fine Finishing	 NFL	**DNMG 150404 NFL**	0,4			○							○								○		○	○				
		DNMG 150408 NFL	0,8			○							○								○		○	○				
		DNMG 150604 NFL	0,4			○		▲													●	▲	●					
		DNMG 150608 NFL	0,8			○															●	▲	●					
Finishing	 NLU	**DNMG 110404 NLU**	0,4		●	●		▲					○				▲				●	▲			○			
		DNMG 110408 NLU	0,8		●	●		▲					○				▲				●	▲			○			
		DNMG 150402 NLU	0,2										○								○		○	○	○			
		DNMG 150404 NLU	0,4		○	○							○							○	○		○	○	○			
		DNMG 150408 NLU	0,8		○	○							○							○	○		○	○	○			
		DNMG 150412 NLU	1,2		○	○							○							○	○		○		○			
		DNMG 150604 NLU	0,4		●	●		▲									▲				●	▲						
		DNMG 150608 NLU	0,8		●	●											▲				●	▲						
		DNMG 150612 NLU	1,2		●	●		▲									▲				●	▲						
Finishing	 NEF	**DNMG 150404 NEF**	0,4							○	○		●					●	●							●	●	
		DNMG 150408 NEF	0,8							○	○		●					●	●							●	●	
		DNMG 150412 NEF	1,2							○																		
		DNMG 150604 NEF	0,4							●	●		●					●	●							●	●	
		DNMG 150608 NEF	0,8							●	●		●					●	●							●	●	
		DNMG 150612 NEF	1,2							●																		
Finishing	 NSU	**DNMG 110404 NSU**	0,4		●	●		▲				●	●				▲	●	●									
		DNMG 110408 NSU	0,8		●	●		▲				●	●				▲	●	●									
		DNMG 150402 NSU	0,2							○	○		○						○	○	○		○	○	○			
		DNMG 150404 NSU	0,4			○	○			○	○		○					○	○	○	○		○	○	○			
		DNMG 150408 NSU	0,8			○	○			○	○		○					○	○	○	○		○	○	○			
		DNMG 150412 NSU	1,2			○				○			○								○		○	○	○			
		DNMG 150604 NSU	0,4		●	●	○	▲	▲	●	●	●	●				▲	●	●		●	▲		●	●			
		DNMG 150608 NSU	0,8		●	●	○	▲	▲	●	●	●	●				▲	●	●		●	▲		●	●			
		DNMG 150612 NSU	1,2		●	●	○	▲	▲								▲		●		●	▲		●	●			
Finishing	 NSE	**DNMG 110408 NSE**	0,8	●																								
		DNMG 150404 NSE	0,4		○	○	○														○			○	○			
		DNMG 150408 NSE	0,8		○	○	○														○			○	○			
		DNMG 150412 NSE	1,2		○	○	○														○			○	○			
		DNMG 150604 NSE	0,4	●	●	●																		○				
		DNMG 150608 NSE	0,8	●	●	●																		○				
		DNMG 150612 NSE	1,2	●	●	●																						
Finishing	 NSX	**DNMG 150404 NSX**	0,4																○		○		○				
		DNMG 150408 NSX	0,8																○		○		○				
		DNMG 150604 NSX	0,4																○				○				
		DNMG 150608 NSX	0,8																○				○				

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

55° Diamond Type | 0° Relief | With Insert Hole



Dimensions (mm)				
DNMG	ℓ	ød (IC)	s	d_1
1104--	11,6	9,525	4,76	3,81
1504--	15,5	12,7	4,76	5,16
1506--	15,5	12,7	6,35	5,16

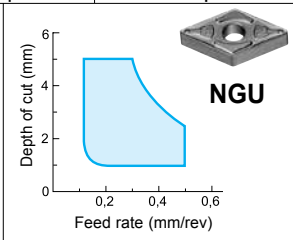
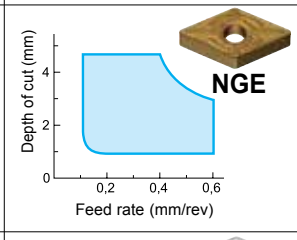
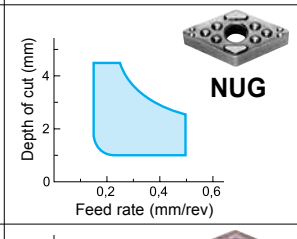
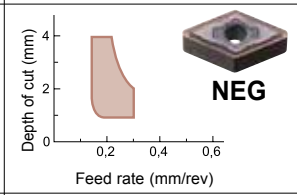
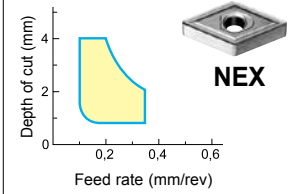
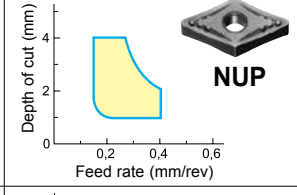
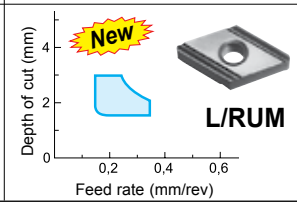


⇨ D13, D19 D41 ⇨ E9

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

DNMG ●●●●●● ■-■■

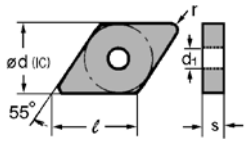
● M-Class Double Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated M	Carbide Coated M	Carbide Coated P/M	Carbide Coated K	Carbide Coated K	Carbide Coated K	Carbide Coated K	Carbide ZX-Coated K/S	Carbide ZX-Coated M/S	Carbide ZX-Coated P/M	Cermet P	Cermet P	Cermet P	Carbide Uncoated K	Carbide Uncoated K	Carbide Uncoated S	Carbide Uncoated S	Carbide Uncoated N
				AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	AC6030M	AC6040M	AC610M	AC630M	AC405K	AC415K	AC420K	AC900G	AC510U	AC520U	AC530U	T1500Z	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
Medium Cut	 NGU	DNMG 110404 NGU	0,4		●	●	○	▲		●		●	●				▲											
		DNMG 110408 NGU	0,8	●	●	●	○	▲		●		●	●				▲											
		DNMG 110412 NGU	1,2		●	●		▲				●	●				▲											
		DNMG 150404 NGU	0,4		○	○	○			○	○	○	○					○	○		○				○			
		DNMG 150408 NGU	0,8		○	○	○			○	○	○	○					○	○		○				○			
		DNMG 150412 NGU	1,2		○	○	○			○		○	○					○	○		○				○			
		DNMG 150604 NGU	0,4		●	●	●	▲		●	●	●	●				▲											
		DNMG 150608 NGU	0,8	●	●	●	●	▲		●	●	●	●				▲											
		DNMG 150612 NGU	1,2	●	●	●	●	▲		●		●	●				▲											
Medium Cut	 NGE	DNMG 150404 NGE	0,4			○	○																					
		DNMG 150408 NGE	0,8			○	○																					
		DNMG 150412 NGE	1,2			○	○																					
		DNMG 150604 NGE	0,4		●	●	●																					
		DNMG 150608 NGE	0,8	●	●	●	●																					
		DNMG 150612 NGE	1,2	●	●	●	●																					
		DNMG 150616 NGE	1,6	●	●	●	○																					
Medium Cut	 NUG	DNMG 110404 NUG	0,4					▲																				
		DNMG 110408 NUG	0,8					▲																				
		DNMG 150604 NUG	0,4					▲																				
		DNMG 150608 NUG	0,8					▲																				
		DNMG 150612 NUG	1,2					▲																				
		DNMG 150616 NUG	1,6					▲																				
Medium Cut	 NEG	DNMG 150404 NEG	0,4							○	○															●	●	
		DNMG 150408 NEG	0,8							○	○		●					●	●							●	●	
		DNMG 150412 NEG	1,2							○	○		●					●	●							●	●	
		DNMG 150604 NEG	0,4							●	●																	
		DNMG 150608 NEG	0,8							●	●		●					●	●							●	●	
		DNMG 150612 NEG	1,2							●	●		●					●	●							●	●	
Medium Cut	 NEX	DNMG 110404 NEX	0,4									●	●					●	●									
		DNMG 110408 NEX	0,8									●	●					●	●									
		DNMG 150404 NEX	0,4							○	○																	
		DNMG 150408 NEX	0,8							○	○																	
		DNMG 150412 NEX	1,2							○																		
		DNMG 150604 NEX	0,4							●	●	●	●					●	●									
		DNMG 150608 NEX	0,8							●	●	●	●					●	●									
		DNMG 150612 NEX	1,2							●		●	●					●	●									
Medium Cut	 NUP	DNMG 150404 NUP	0,4			○	○			○	○	○	○						○	○								
		DNMG 150408 NUP	0,8			○	○			○	○	○	○						○	○								
		DNMG 150412 NUP	1,2			○	○			○		○	○						○	○								
		DNMG 150604 NUP	0,4			●	●	▲	▲	●	●	●	●						●	●								
		DNMG 150608 NUP	0,8			●	●	▲	▲	●	●	●	●						●	●								
		DNMG 150612 NUP	1,2				●						●						●	●								
Medium Cut	 L/RUM	DNMG 150404 LUM	0,4																		○				○			
		DNMG 150408 LUM	0,8																		○				○			
		DNMG 150404 RUM	0,4																		○				○			
		DNMG 150408 RUM	0,8																		○				○			

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

D DIAMOND TYPE
INSERTS FOR TURNING

55° Diamond Type | 0° Relief | With Insert Hole



Dimensions (mm)				
DNMG	ℓ	ød (IC)	s	d_1
1504--	15,5	12,7	4,76	5,16
1506--	15,5	12,7	6,35	5,16



⇨ D13, D19 D41 ⇨ E9

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

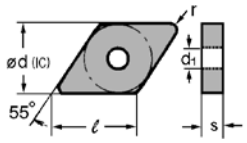
DNMG ●●●●●● ■-■■

● M-Class Double Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P AC805P	AC810P	AC820P	AC830P	Coated M AC2000	AC3000	AC6030M	AC6040M	Coated P/M AC610M	AC630M	Coated K AC405K	AC415K	AC420K	AC900G	ZX-Coated K/S AC510U	AC520U	ZX-Coated P/M AC530U	Uncoated P T1500Z	T2000Z	T3000Z	T1000A	T1500A	Cermet K G10E	Cermet S EH510	EH520	Carbide N H1
Roughing	NMU	DNMG 150404 NMU	0,4		○							○	○																
		DNMG 150408 NMU	0,8		○	○	○						○					○	○										
		DNMG 150412 NMU	1,2		○	○	○											○	○										
		DNMG 150416 NMU	1,6			○	○												○										
		DNMG 150608 NMU	0,8		●	●	●	▲	▲			●					▲												
		DNMG 150612 NMU	1,2		●	●	●	▲	▲			●					▲												
		DNMG 150616 NMU	1,6		●	●		▲				●					▲												
Roughing	NEM	DNMG 150408 NEM	0,8							○	○																		
		DNMG 150412 NEM	1,2							○	○																		
		DNMG 150416 NEM	1,6							○	○																		
		DNMG 150608 NEM	0,8							●	●																		
		DNMG 150612 NEM	1,2							●	●																		
Roughing	NME	DNMG 150608 NME	0,8	●	●	●	●																						
		DNMG 150612 NME	1,2	●	●	●	●																						
		DNMG 150616 NME	1,6	●	●	●	●																						
Roughing	L/RHM	DNMG 150404 LHM	0,4							○																			
		DNMG 150408 LHM	0,8							○																			
		DNMG 150404 RHM	0,4							○																			
		DNMG 150408 RHM	0,8							○																			
Roughing	NUX	DNMG 110408 NUX	0,8				○	▲	▲																				
		DNMG 150404 NUX	0,4		○	○	○																						
		DNMG 150408 NUX	0,8		○	○	○																						
		DNMG 150412 NUX	1,2		○	○	○																						
		DNMG 150604 NUX	0,4			●	●	▲																					
		DNMG 150608 NUX	0,8		○	●	●	▲																					
		DNMG 150612 NUX	1,2		○	●	●	▲																					
		DNMG 150616 NUX	1,6			●		▲																					
Roughing	NMX	DNMG 150408 NMX	0,8			○	○																						
		DNMG 150412 NMX	1,2			○	○																						
		DNMG 150608 NMX	0,8			●																							
		DNMG 150612 NMX	1,2			●																							
Roughing	NGZ	DNMG 150604 NGZ	0,4												●														
		DNMG 150608 NGZ	0,8											●	●	●													
		DNMG 150612 NGZ	1,2											●	●	●													
Roughing	NUZ	DNMG 150608 NUZ	0,8											●	●	●													
		DNMG 150612 NUZ	1,2											●	●	●													

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

55° Diamond Type | 0° Relief | With Insert Hole



Dimensions (mm)				
DN__	ℓ	ød (IC)	s	d_1
1504--	15,5	12,7	4,76	5,16
1506--	15,5	12,7	6,35	5,16

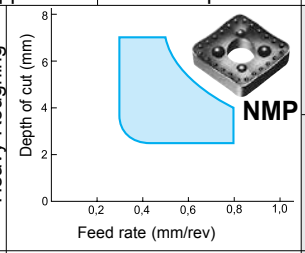
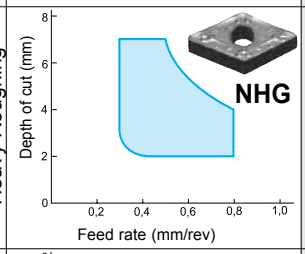
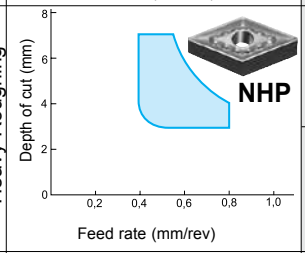


⇨ D13, D19 ⇨ E9

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

DNMM ●●●●●● ■-■■

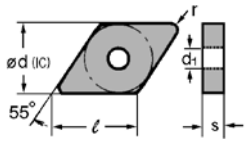
● M-Class One Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P	Carbide Coated M	Carbide Coated P/M	Carbide Coated K	Carbide ZX-Coated K/S	Carbide ZX-Coated M/S	Carbide ZX-Coated P/M	Cermet P	Carbide Uncoated K	Carbide Uncoated S	Carbide Uncoated N
				AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	AC6030M	AC6040M	AC610M	AC630M	AC405K	AC415K	AC420K	AC900G	AC510U	AC520U	AC530U	T1500Z	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
Heavy Roughing	 NMP	**DNMM 150404 NMP**	0,4			○	○																					
		DNMM 150408 NMP	0,8		○	○	○																					
		DNMM 150412 NMP	1,2		○	○	○																					
		DNMM 150604 NMP	0,4			●	●	▲	▲																			
		DNMM 150608 NMP	0,8		●	●	●	▲	▲				●															
		DNMM 150612 NMP	1,2		●	●	●	▲	▲				●															
		DNMM 150616 NMP	1,6		○	●	●	▲	▲				●															
Heavy Roughing	 NHG	**DNMM 150604 NHG**	0,4		●	●		▲									▲											
		DNMM 150608 NHG	0,8		●	●	●	▲	▲			○	●				▲											
		DNMM 150612 NHG	1,2		●	●	●	▲	▲			○	●				▲											
		DNMM 150616 NHG	1,6		●	●	●	▲	▲			○	●				▲											
Heavy Roughing	 NHP	**DNMM 150404 NHP**	0,4				○																					
		DNMM 150408 NHP	0,8				○																					
		DNMM 150412 NHP	1,2				○																					
		DNMM 150608 NHP	0,8			●	●																					
		DNMM 150612 NHP	1,2			●	●																					

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

D DIAMOND TYPE
INSERTS FOR TURNING

55° Diamond Type | 0° Relief | With Insert Hole



Dimensions (mm)				
DN_ _	ℓ	ød (IC)	s	d_1
1504--	15,5	12,7	4,76	5,16
1506--	15,5	12,7	6,35	5,16

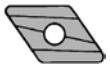
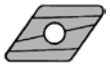


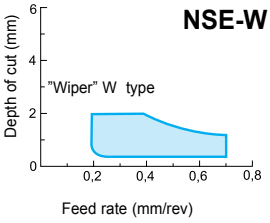
⇨ D13, D19 ⇨ E9

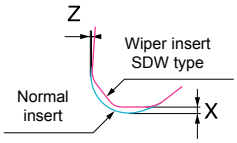
- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

DNMA / DNMX

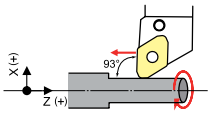
●Flat Inserts and One Side Handed Inserts
& M-Class Double Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide / Coated: AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	AC6030M	AC6040M	AC610M	AC630M	AC405K	AC415K	AC420K	AC900G	Carbide / ZX-Coated: AC510U	AC520U	AC530U	Cermet / Uncoated: T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide / Uncoated: G10E	EH510	EH520	H1
Roughing		**DNMA 150608** **DNMA 150612**	0,8 1,2											● ●	● ●	● ●														
		**DNMX 150608 L**	0,8			●		▲																					
		**DNMX 150608 R**	0,8			●																							
Finishing	 NSE-W	**DNMX 150404 NSE-W** **DNMX 150408 NSE-W**	0,4 0,8																		❍ ❍				❍ ❍				
		DNMX 150604 NSE-W **DNMX 150608 NSE-W** **DNMX 150612 NSE-W**	0,4 0,8 1,2		● ● ●	● ● ●																							





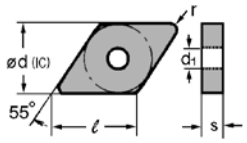
(Note) The cutting point position of the SDW type does not follow the ISO standard.
Wenn using on a boring holder with a 93° approach angle, there is a need to revise the cutting point position (refer to right table) relative to using standard inserts.



r	Compensation (mm) X (Diam. change)	Z
0,4	-0,14 (Ø : -0,28)	-0,02
0,8	-0,14 (Ø : -0,28)	-0,02
1,2	-0,1 (Ø : -0,2)	-0,03

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

55° Diamond Type | 0° Relief | With Insert Hole



Dimensions (mm)				
DN__	ℓ	ød (IC)	s	d_1
1104 --	11,6	9,525	4,76	3,81
1504--	15,5	12,7	4,76	5,16

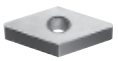


⇨ D13, D19 ⇨ E9

P Steel
M Stainless Steel
K Cast Iron
N Non-Ferrous Metals
S Super Alloy
H Hardened Steel

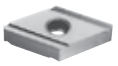
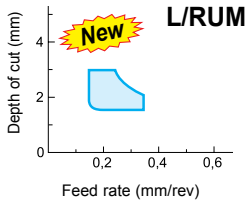
DNGA ●●●●●●

● G-Class One Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P						Carbide Coated M			Carbide Coated P,M		Carbide Coated K			Carbide ZX-Coated K,S		Carbide ZX-Coated P,M	Cermet ZX-Coated P			Carbide Uncoated K		Carbide Uncoated S		Carbide Uncoated N
				AC805P	AC810P	**AC820P**	AC830P	AC2000	AC3000	AC6030M	AC6040M	AC610M	AC630M	**AC405K**	**AC415K**	AC420K	AC900G	AC510U	AC520U	AC530U	**T1500Z**	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
Medium Cut		**DNGA 150404**	0,4																				❍	❍				
		DNGA 150408	0,8																				❍	❍				

DNGG ●●●●●● ■-■■

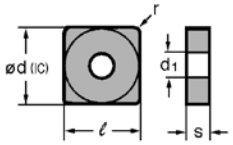
● G-Class Double Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P						Carbide Coated M			Carbide Coated P,M		Carbide Coated K			Carbide ZX-Coated K,S		Carbide ZX-Coated P,M	Cermet ZX-Coated P			Carbide Uncoated K		Carbide Uncoated S		Carbide Uncoated H
				AC805P	AC810P	**AC820P**	AC830P	AC2000	AC3000	AC6030M	AC6040M	**AC610M**	AC630M	**AC405K**	AC415K	AC420K	AC900G	AC510U	AC520U	AC530U	**T1500Z**	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
Finishing	 NSU	**DNGG 150402 NSU**	0,2																		❍		❍	❍	❍				
		DNGG 150404 NSU	0,4																		❍		❍	❍	❍				
		DNGG 150408 NSU	0,8																		❍		❍	❍	❍				
Medium Cut	  L/RUM	**DNGG 110404 LUM**	0,4																		❍			❍	❍				
		DNGG 110408 LUM	0,8																		❍			❍	❍				
		DNGG 150404 LUM	0,4																		❍			❍	❍				
		DNGG 150408 LUM	0,8																		❍			❍	❍				
		DNGG 110404 RUM	0,4																		❍			❍	❍				
		DNGG 110408 RUM	0,8																		❍			❍	❍				
		DNGG 150404 RUM	0,4																		❍			❍	❍				
		DNGG 150408 RUM	0,8																		❍			❍	❍				

● = Euro stock
❍ = Stock item in Japan
▲ = To be replaced by new item

S SQUARE TYPE
INSERTS FOR TURNING

90° Square Type | 0° Relief | With Insert Hole



Dimensions (mm)				
SNMG	ℓ	ød (IC)	s	d_1
09	9,525	9,525	3,18	3,81
12	12,7	12,7	4,76	5,16


⇨ D14, D20~21
D41


⇨ E10

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

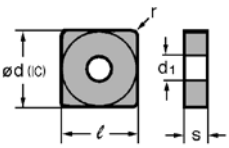
SNMG ●●●●●● ■-■■

● M-Class Double Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P	Carbide Coated M	Carbide Coated P/M	Carbide Coated K	Carbide ZX-Coated K/S	Carbide ZX-Coated M/S	Carbide ZX-Coated P/M	Cermet Uncoated P	Carbide Uncoated K	Carbide Uncoated S	Carbide Uncoated N
				AC805P	AC6030M	AC405K	AC510U	AC530U	T1500Z	G10E	EH510	H1
				AC810P	AC6040M	AC415K	AC520U		T2000Z		EH520	
				AC820P	AC610M	AC420K			T3000Z			
				AC830P	AC630M	AC900G			T1000A			
				AC2000					T1500A			
				AC3000								
Fine Finishing	NFL	**SNMG 120408 NFL**	0,8						○			
									○			
									○			
Finishing	NLU	**SNMG 120408 NLU**	0,8	○ ●	○				○			
		SNMG 120412 NLU	1,2	○ ●	○				○			
									○			
									○			
Finishing	NSU	**SNMG 120408 NSU**	0,8	● ● ○	● ●		● ●		○			
		SNMG 120412 NSU	1,2				● ●					
									○			
									○			
									○			
Finishing	NSE	**SNMG 120408 NSE**	0,8	● ● ○								
		SNMG 120412 NSE	1,2	● ● ○								
Finishing	NSJ	**SNMG 090304 NSJ**	0,4									
									○			
		SNMG 120404 NSJ	0,4									
									○			
Finishing	NSX	**SNMG 120404 NSX**	0,4						○			
		SNMG 120408 NSX	0,8						○			
									○			
									○			

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

90° Square Type | 0° Relief | With Insert Hole



Dimensions (mm)				
SNMG	ℓ	ød (IC)	s	d1
09	9,525	9,525	3,18	3,81
12	12,7	12,7	4,76	5,16
15	15,875	15,875	6,35	6,35
19	19,05	19,05	6,35	7,94

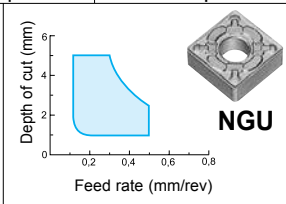
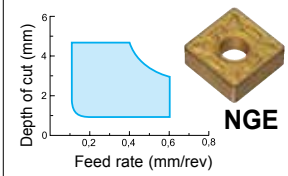
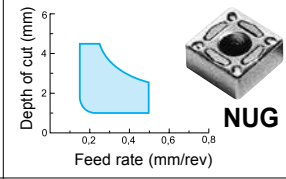
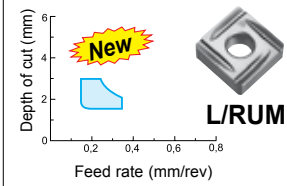
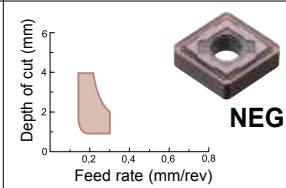
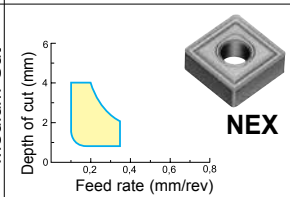
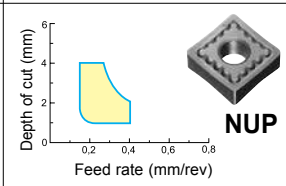
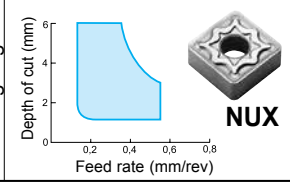

⇨ D14, D20~21 D41


⇨ E10

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

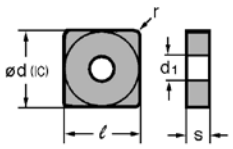
SNMG ●●●●●● ■-■■

● M-Class Double Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated M	Carbide Coated M	Carbide Coated M	Carbide Coated M	Carbide Coated P/M	Carbide Coated K	Carbide Coated K	Carbide Coated K	Carbide Coated K	Cermet ZX-Coated K/S	Cermet ZX-Coated M/S	Cermet ZX-Coated P/M	Cermet Uncoated P	Cermet Uncoated P	Cermet Uncoated P	Cermet Uncoated P	Carbide Uncoated K	Carbide Uncoated S	Carbide Uncoated S	Carbide Uncoated N
				AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	AC6030M	AC6040M	AC610M	AC630M	AC405K	AC415K	AC420K	AC900G	AC510U	AC520U	AC530U	T1500Z	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
Medium Cut	 NGU	SNMG 090304 NGU	0,4			❍																						
		SNMG 090308 NGU	0,8			❍	❍														❍				❍				
		SNMG 120404 NGU	0,4		●	●	●	▲		●	●	❍	❍				▲		❍		❍				❍				
		SNMG 120408 NGU	0,8		●	●	●	▲		●	●	●	●				▲		❍		❍				❍				
		SNMG 120412 NGU	1,2		●	●	●	▲		●	●	●	●				▲		❍										
		SNMG 120416 NGU	1,6			●	●					●	●				▲												
		SNMG 150612 NGU	1,2			❍	❍																						
Medium Cut	 NGE	SNMG 120408 NGE	0,8			●	●																						
		SNMG 120412 NGE	1,2			●	●																						
		SNMG 120416 NGE	1,6			●	●																						
Medium Cut	 NUG	SNMG 120408 NUG	0,8					▲	▲																				
		SNMG 120412 NUG	1,2					▲	▲																				
		SNMG 120416 NUG	1,6					▲	▲																				
Medium Cut	 L/RUM	SNMG 120404 LUM	0,4																					❍				
		SNMG 120408 LUM	0,8																					❍				
		SNMG 120412 LUM	1,2																					❍				
		SNMG 120404 RUM	0,4																					❍				
		SNMG 120408 RUM	0,8																					❍				
		SNMG 120412 RUM	1,2																					❍				
Medium Cut	 NEG	SNMG 120408 NEG	0,8							●	●		●					●	●							●	●	
		SNMG 120412 NEG	1,2							●	●		●					●	●							●	●	
		SNMG 150612 NEG	1,2							●																		
		SNMG 190612 NEG	1,2							●																		
		SNMG 190616 NEG	1,6							●																		
Medium Cut	 NEX	SNMG 120404 NEX	0,4							●	●							●	●									
		SNMG 120408 NEX	0,8							●	●	●	●					●	●									
		SNMG 120412 NEX	1,2							●	●	●	●					●	●									
		SNMG 150608 NEX	0,8															❍	❍									
		SNMG 150612 NEX	1,2															●	●									
		SNMG 190612 NEX	1,2															●	●									
		SNMG 190616 NEX	1,6															●	●									
Medium Cut	 NUP	SNMG 120404 NUP	0,4			●	●		▲	●			●					●	●									
		SNMG 120408 NUP	0,8			●	●		▲	●	●		●					●	●									
		SNMG 120412 NUP	1,2			●	●		▲	●	●		●					●	●									
Roughing	 NUX	SNMG 120408 NUX	0,8		●	●	●	▲																				
		SNMG 120412 NUX	1,2		●	●	●	▲																				
		SNMG 120416 NUX	1,6		●	●	●	▲																				
		SNMG 190612 NUX	1,2		❍	●	●																					
		SNMG 190616 NUX	1,6		❍	●	●																					

● = Euro stock
❍ = Stock item in Japan
▲ = To be replaced by new item

90° Square Type | 0° Relief | With Insert Hole



Dimensions (mm)				
SNMG	ℓ	ød (IC)	s	d_1
12	12,7	12,7	4,76	5,16
15	15,875	15,875	6,35	6,35
19	19,05	19,05	6,35	7,94

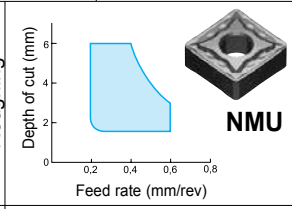
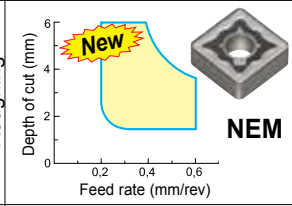
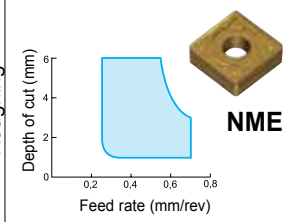
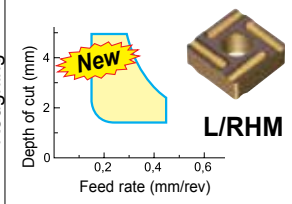
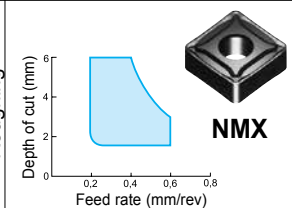
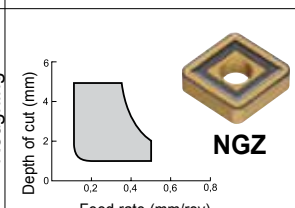
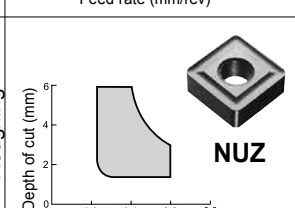

⇨ D14, D20~21
D41


⇨ E10

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

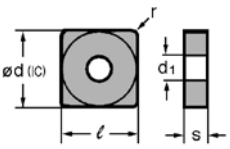
SNMG ●●●●●● ■-■■

● M-Class Double Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P AC805P	Carbide Coated P AC810P	Carbide Coated P **AC820P**	Carbide Coated P AC830P	Carbide Coated P AC2000	Carbide Coated P AC3000	Carbide Coated M AC6030M	Carbide Coated M AC6040M	Carbide Coated PM AC610M	Carbide Coated PM AC630M	Carbide Coated K **AC405K**	Carbide Coated K **AC415K**	Carbide Coated K AC420K	Carbide Coated K AC900G	ZX-Coated KS AC510U	ZX-Coated MS AC520U	ZX-Coated PM AC530U	Cermet P **T1500Z**	Cermet P T2000Z	Cermet P T3000Z	Cermet P T1000A	Cermet P T1500A	Carbide Uncoated K G10E	Carbide Uncoated S EH510	Carbide Uncoated S EH520	Carbide Uncoated N H1
Roughing	 NMU	**SNMG 120408 NMU**	0,8		●	●	●	▲	▲			●	●				▲	●	●										
		SNMG 120412 NMU	1,2		●	●	●	▲	▲			●	●				▲	●	●										
		SNMG 120416 NMU	1,6		●	●	●	▲	▲			●	●				▲	●	●										
		SNMG 150612 NMU	1,2		○	●	●	▲	▲			●	●					●	●										
		SNMG 150616 NMU	1,6		○	●	●	▲	▲			●	●					●	●										
		SNMG 190612 NMU	1,2		●	●	●	▲	▲			●	●					●	●										
		SNMG 190616 NMU	1,6		●	●	●	▲	▲			●	●					●	●										
Roughing	 NEM	**SNMG 120408 NEM**	0,8							●	●																		
		SNMG 120412 NEM	1,2							●	●																		
		SNMG 150612 NEM	1,2							●	●																		
		SNMG 150616 NEM	1,6							●	●																		
		SNMG 190612 NEM	1,2							●	●																		
		SNMG 190616 NEM	1,6							●	●																		
Roughing	 NME	**SNMG 120408 NME**	0,8		●	●	●																						
		SNMG 120412 NME	1,2		●	●	●																						
		SNMG 190616 NME	1,6		●	●	●																						
Roughing	 L/RHM	**SNMG 120408 LHM**	0,8							●																			
		SNMG 120408 RHM	0,8							●																			
Roughing	 NMX	**SNMG 120408 NMX**	0,8			●	●		▲																				
		SNMG 120412 NMX	1,2			●	●		▲																				
		SNMG 120416 NMX	1,6			●	●		▲																				
		SNMG 150612 NMX	1,2			●	●																						
		SNMG 150616 NMX	1,6			●	●																						
		SNMG 190612 NMX	1,2			●	●																						
		SNMG 190616 NMX	1,6			●	●																						
Roughing	 NGZ	**SNMG 120408 NGZ**	0,8											●	●	●													
		SNMG 120412 NGZ	1,2											●	●	●													
		SNMG 120416 NGZ	1,6											●	●	●													
		SNMG 150612 NGZ	1,2											●	●														
		SNMG 150616 NGZ	1,6											●	●														
		SNMG 190612 NGZ	1,2												●														
		SNMG 190616 NGZ	1,6												●														
Roughing	 NUZ	**SNMG 120408 NUZ**	0,8											●	●	●	▲												
		SNMG 120412 NUZ	1,2											●	●	●	▲												
		SNMG 120416 NUZ	1,6											●	●	●	▲												
		SNMG 150612 NUZ	1,2													●	▲												
		SNMG 150616 NUZ	1,6													●	▲												
		SNMG 190612 NUZ	1,2													●	▲												
		SNMG 190616 NUZ	1,6													●	▲												

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

90° Square Type | 0° Relief | With Insert Hole



SNMM	ℓ	ød (IC)	s	d1
12	12,7	12,7	4,76	5,16
15	15,875	15,875	6,35	6,35
19	19,05	19,05	6,35	7,94
2507..	25,4	25,4	7,94	9,2
2509..	25,4	25,4	9,52	9,2
3109..	31,75	31,75	9,52	8,8

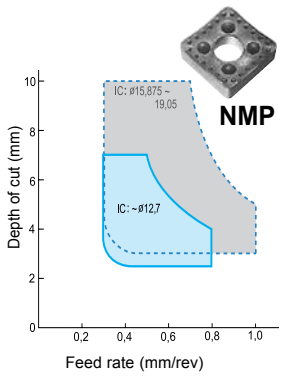
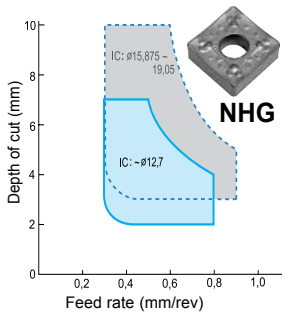
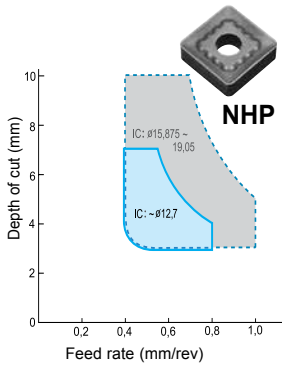
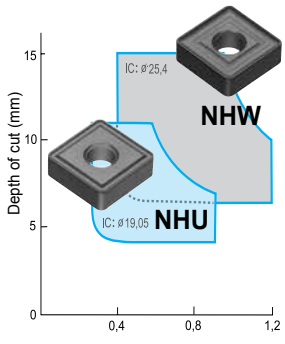

⇨ D14, D20~21


⇨ E10

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

SNMM ●●●●●● ■-■■

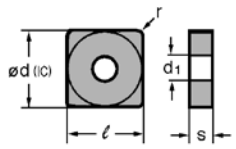
● M-Class One Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated M	Carbide Coated P/M	Carbide Coated K	Carbide ZX-Coated K/S	Carbide ZX-Coated M/S	Carbide ZX-Coated P/M	Cermet P	Cermet P	Cermet P	Carbide Uncoated K	Carbide Uncoated S	Carbide Uncoated S	Carbide Uncoated N
				AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	AC6030M	AC6040M	AC610M	AC630M	AC405K	AC415K	AC420K	AC900G	AC510U	AC520U	AC530U	T1500Z	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
Heavy Roughing	 NMP	SNMM 120408 NMP	0,8		●	●	●	▲	▲	●		●						○											
		SNMM 120412 NMP	1,2		○	●	●	▲	▲	●		●						○											
		SNMM 120416 NMP	1,6		○	●	●	▲	▲	●		●						○											
		SNMM 120420 NMP	2,0			●	●	▲	▲																				
		SNMM 150612 NMP	1,2		●	●	●	▲	▲				●																
		SNMM 150616 NMP	1,6		●	●	●	▲	▲				●																
		SNMM 190612 NMP	1,2		●	●	●	▲	▲	●			●					○											
		SNMM 190616 NMP	1,6		●	●	●	▲	▲	●			●					○											
		SNMM 190624 NMP	2,4			●	●	▲	▲																				
		SNMM 250724 NMP	2,4		○	○	●			○			○																
		SNMM 250924 NMP	2,4		○	○				○			○																
		SNMM 310924 NMP	2,4		○	○				○			○																
Heavy Roughing	 NHG	SNMM 120408 NHG	0,8		●	●	●	▲	▲			○	●				▲											
		SNMM 120412 NHG	1,2		●	●	●	▲	▲			○	●				▲											
		SNMM 120416 NHG	1,6		●	●	●	▲	▲			○	●				▲											
		SNMM 150612 NHG	1,2		●			▲	▲				●				▲											
		SNMM 150616 NHG	1,6		●	○		▲	▲				●				▲											
		SNMM 190612 NHG	1,2		○	●	●	▲	▲			○	●															
		SNMM 190616 NHG	1,6		○	●	●	▲	▲			●	●															
		SNMM 190624 NHG	2,4			●	●	▲	▲				○															
Heavy Roughing	 NHP	SNMM 120408 NHP	0,8			●	●		▲																			
		SNMM 120412 NHP	1,2			●	●		▲																			
		SNMM 120416 NHP	1,6				●																					
		SNMM 150612 NHP	1,2				●		▲																			
		SNMM 190612 NHP	1,2			●	●	▲	▲				○															
		SNMM 190616 NHP	1,6			●	●	▲	▲				○															
		SNMM 190624 NHP	2,4			●	●		▲																			
		SNMM 250724 NHP	2,4		○	○	●						○															
		SNMM 250924 NHP	2,4		○	○							○															
		SNMM 310924 NHP	2,4		○	○							○															
Heavy Roughing	 NHW / NHU	SNMM 190616 NHU	1,6		●								●				▲											
		SNMM 250724 NHU	2,4		●	○							●				▲											
		SNMM 250924 NHU	2,4		●	○							●				▲											
		SNMM 310924 NHU	2,4			○							○				▲											
		SNMM 190616 NHW	1,6		●								●				▲											
		SNMM 250724 NHW	2,4		●	○							●				▲											
		SNMM 250924 NHW	2,4		●	○							●				▲											
		SNMM 310924 NHW	2,4			○							○				▲											

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

S SQUARE TYPE
INSERTS FOR TURNING

90° Square Type — 0° Relief — With Insert Hole



Dimensions (mm)				
SN__	ℓ	ød (IC)	s	d1
09	9,525	9,525	3,18	3,81
12	12,7	12,7	4,76	5,16
19	19,05	19,05	6,35	7,94

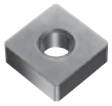

⇨ D14, D20-21
D25


⇨ E10

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

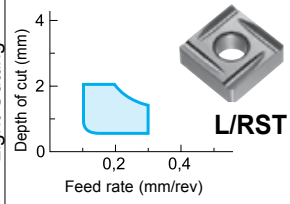
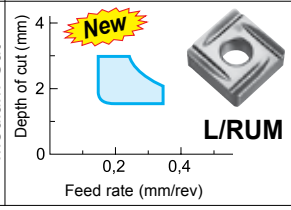
SNMA ●●●●●●

● G/M-Class No Chipbreaker

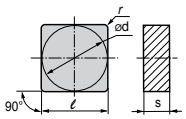
Application	Shape	ISO Cat. No.	r	Carbide Coated P: AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	Coated M: AC6030M	AC6040M	AC610M	AC630M	Coated K: AC405K	AC415K	AC420K	AC900G	ZX-Coated: AC510U	AC520U	AC530U	Cermet P: T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide K: G10E	Carbide S: EH510	EH520	Carbide H: H1
Roughing		**SNMA 120408**	0,8											●	●	●										●			
		SNMA 120412	1,2											●	●	●													
		SNMA 120416	1,6											●	●	●													
		SNMA 190612	1,2											●	●	●	▲												
		SNMA 190616	1,6											●	●	●	▲												
Medium Cut		**SNGA 120412**	1,2																					○					

SNGG ●●●●●● ■-■■

● G-Class Double Sided Bumpy Chipbreaker

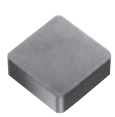
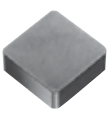
Application	Shape	ISO Cat. No.	r	Carbide Coated P: AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	Coated M: AC6030M	AC6040M	AC610M	AC630M	Coated K: AC405K	AC415K	AC420K	AC900G	ZX-Coated: AC510U	AC520U	AC530U	Cermet P: T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide K: G10E	Carbide S: EH510	EH520	Carbide H: H1
Light Cutting		**SNGG 090304 LST**	0,4																					○	○				
		SNGG 090308 LST	0,8																					○	○				
		SNGG 090304 RST	0,4																					○	○				
		SNGG 090308 RST	0,8																					○	○				
Medium Cut		**SNGG 120404 LUM**	0,4																					●	●				
		SNGG 120408 LUM	0,8																					●	●				
		SNGG 120404 RUM	0,4																					●	●				
		SNGG 120408 RUM	0,8																					●	●				
		SNGG 120412 RUM	1,2																					●	●				

90° Square Type — 0° Relief — Without Insert Hole



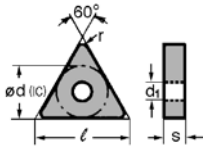
SNGN ●●●●●● ■-■■

● G/M-Class No Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P: AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	Coated M: AC6030M	AC6040M	AC610M	AC630M	Coated K: AC405K	AC415K	AC420K	AC900G	ZX-Coated: AC510U	AC520U	AC530U	Cermet P: T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide K: G10E	Carbide S: EH510	EH520	Carbide H: H1
Medium Cut		**SNGN 120408**	0,8																		○			○	○				
Medium Cut		**SNMN 120408**	0,8																		○			○	○				

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

60° Triangle Type | 0° Relief | With Insert Hole



Dimensions (mm)				
TNMG	ℓ	ød (IC)	s	d_1
1604--	16,5	9,525	4,76	3,81
2204 - -	22,0	12,7	4,76	5,16

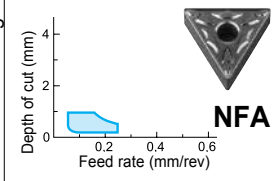
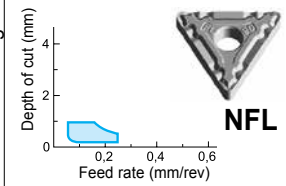
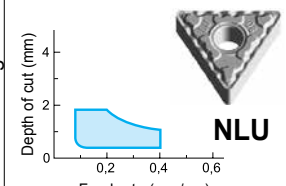
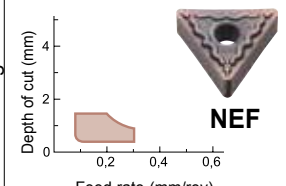
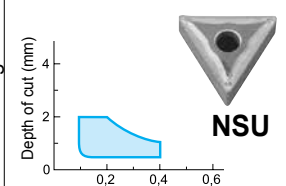
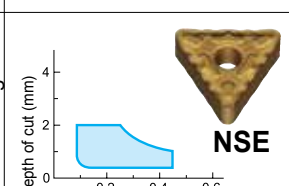
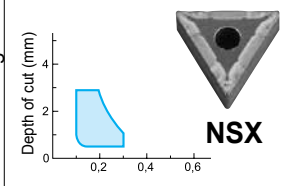


⇨ D15, D22~23 D42 ⇨ E12

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

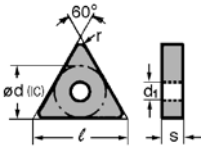
TNMG ●●●●●● ■-■■

● M-Class Double Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated M	Carbide Coated M	Carbide Coated P/M	Carbide Coated K	Carbide Coated K	Carbide Coated K	Carbide Coated K	Carbide ZX-Coated K/S	Carbide ZX-Coated M/S	Carbide ZX-Coated P/M	Cermet P	Cermet P	Cermet P	Cermet P	Carbide Uncoated K	Carbide Uncoated S	Carbide Uncoated S	Carbide Uncoated N
				AC805P	AC810P	**AC820P**	AC830P	AC2000	AC3000	AC6030M	AC6040M	AC610M	AC630M	**AC405K**	**AC415K**	AC420K	AC900G	AC510U	AC520U	AC530U	**T1500Z**	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
Fine Finishing	 NFA	**TNMG 160402 NFA**	0,2																		●		●	●	●				
		TNMG 160404 NFA	0,4																		●	▲	●	●	●				
		TNMG 160408 NFA	0,8																		●	▲	●	●	●				
Fine Finishing	 NFL	**TNMG 160404 NFL**	0,4			❍		▲					❍								●	▲	●	●	●				
		TNMG 160408 NFL	0,8			❍		▲					❍								●	▲	●	●	●				
Finishing	 NLU	**TNMG 160402 NLU**	0,2										❍								❍		❍	❍	❍				
		TNMG 160404 NLU	0,4		●	●		▲					❍				▲				●	▲	●	●	●				
		TNMG 160408 NLU	0,8		●	●		▲					❍				▲				●	▲	●	●	●				
		TNMG 160412 NLU	1,2		●	●		▲					❍				▲				●	▲	●		●				
Finishing	 NEF	**TNMG 160404 NEF**	0,4							●	●		●					●	●							●	●	
		TNMG 160408 NEF	0,8							●	●		●					●	●							●	●	
Finishing	 NSU	**TNMG 160402 NSU**	0,2							●	●		❍					❍			❍		❍	❍	❍				
		TNMG 160404 NSU	0,4		●	●	❍	▲	▲	●	●	●	●				▲	●	●		●	▲	●	●	●				
		TNMG 160408 NSU	0,8		●	●	❍	▲	▲	●	●	●	●				▲	●	●		●	▲	●	●	●				
		TNMG 160412 NSU	1,2		●	●		▲		●		●	●				▲	●	●		●	▲	●	●	●				
Finishing	 NSE	**TNMG 160404 NSE**	0,4		●	●	❍														❍			❍	❍				
		TNMG 160408 NSE	0,8	●	●	●	❍														❍			❍	❍				
		TNMG 160412 NSE	1,2	●	●	●	❍																						
		TNMG 220404 NSE	0,4		●	●	❍																						
		TNMG 220408 NSE	0,8		●	●	❍																						
Finishing	 NSX	**TNMG 160404 NSX**	0,4																		❍		❍		❍				
		TNMG 160408 NSX	0,8																		❍		❍		❍				

● = Euro stock
❍ = Stock item in Japan
▲ = To be replaced by new item

60° Triangle Type | 0° Relief | With Insert Hole



Dimensions (mm)				
TNMG	ℓ	ød (IC)	s	d_1
1604--	16,5	9,525	4,76	3,81
2204--	22,0	12,7	4,76	5,16



⇨ D15, D22~23 D42

⇨ E12

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

TNMG ●●●●●● ■-■■

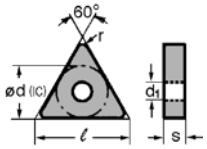
● M-Class Double Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P AC805P	AC810P	AC820P	AC830P	Coated M AC2000	AC3000	AC6030M	AC6040M	AC610M	Coated PM AC630M	Coated K AC405K	AC415K	AC420K	AC900G	ZX-Coated KS AC510U	ZX-Coated MS AC520U	ZX-Coated PM AC530U	Cermet P T1500Z	T2000Z	T3000Z	T1000A	T1500A	Uncoated K G10E	Uncoated S EH510	EH520	Carbide N H1
Medium Cut	NGU	TNMG 160404 NGU	0,4		●	●	●	▲		●	●	●	●				▲		❍		❍				❍				
		TNMG 160408 NGU	0,8		●	●	●	▲		●	●	●	●				▲		❍		❍				❍				
		TNMG 160412 NGU	1,2		●	●	●	▲		●	●	●	●				▲		❍										
		TNMG 160416 NGU	1,6			●	●																						
		TNMG 220404 NGU	0,4			❍	❍											❍	❍										
		TNMG 220408 NGU	0,8		●	❍	❍						●				▲												
		TNMG 220412 NGU	1,2		●	❍	❍						●				▲												
Medium Cut	NGE	TNMG 160404 NGE	0,4		●																								
		TNMG 160408 NGE	0,8	●	●	●	●																						
		TNMG 160412 NGE	1,2	●	●	●	●																						
		TNMG 220408 NGE	0,8		●	●	●																						
Medium Cut	NUG	TNMG 160404 NUG	0,4					▲	▲																				
		TNMG 160408 NUG	0,8					▲	▲																				
		TNMG 160412 NUG	1,2					▲	▲																				
		TNMG 160416 NUG	1,6					▲																					
		TNMG 220408 NUG	0,8					▲	▲																				
		TNMG 220412 NUG	1,2					▲	▲																				
		TNMG 220416 NUG	1,6					▲	▲																				
Medium Cut	L/RUM	TNMG 160404 LUM	0,4																		❍		❍	❍	❍				
		TNMG 160408 LUM	0,8																		❍		❍	❍	❍				
		TNMG 220404 LUM	0,4																						❍				
		TNMG 220408 LUM	0,8																						❍				
		TNMG 160404 RUM	0,4																		❍		❍	❍	❍				
		TNMG 160408 RUM	0,8																		❍		❍	❍	❍				
		TNMG 220404 RUM	0,4																						❍				
		TNMG 220408 RUM	0,8																						❍				
Medium Cut	NEG	TNMG 160408 NEG	0,8							●	●		●					●	●								●	●	
		TNMG 160412 NEG	1,2							●	●		●					●	●								●	●	
Medium Cut	NEX	TNMG 160404 NEX	0,4							●	●	●	●					●	●										
		TNMG 160408 NEX	0,8							●	●	●	●					●	●										
		TNMG 160412 NEX	1,2							●	●	●	●					●	●										
Medium Cut	NUP	TNMG 160404 NUP	0,4			●	●	▲	▲	●	●		●					●	●										
		TNMG 160408 NUP	0,8			●	●	▲	▲	●	●		●					●	●										
		TNMG 160412 NUP	1,2			●				●	●		●					●	●										
		TNMG 220408 NUP	0,8			❍	❍																						
		TNMG 220412 NUP	1,2			❍	❍																						
Roughing	NUX	TNMG 160404 NUX	0,4		❍	●	●	▲	▲																				
		TNMG 160408 NUX	0,8		❍	●	●	▲	▲																				
		TNMG 160412 NUX	1,2		❍	●	●	▲	▲																				
		TNMG 220408 NUX	0,8		❍	●	❍																						
		TNMG 220412 NUX	1,2		❍	●	❍																						

● = Euro stock
❍ = Stock item in Japan
▲ = To be replaced by new item

TNMG neg. Inserts for Roughing

60° Triangle Type | 0° Relief | With Insert Hole



Dimensions (mm)				
TNMG	ℓ	ød (IC)	s	d_1
1604--	16,5	9,525	4,76	3,81
2204--	22,0	12,7	4,76	5,16
2706--	27,5	15,875	6,35	6,35

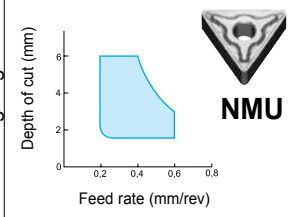
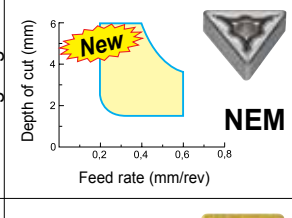
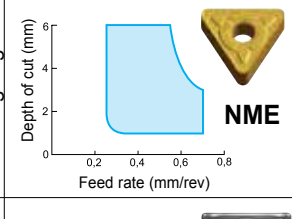
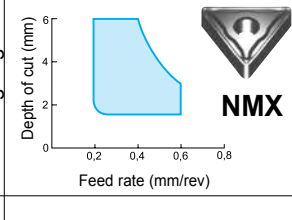
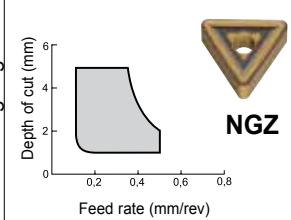
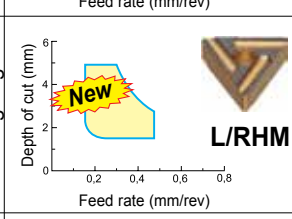
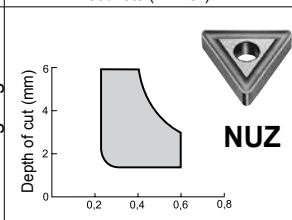


⇨ D15, D22~23 D42 ⇨ E12

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

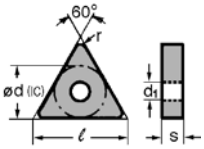
TNMG ●●●●●● ■-■■

● M-Class Double Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P AC805P	AC810P	AC820P	AC830P	Carbide Coated M AC2000	AC3000	AC6030M	AC6040M	Carbide Coated PM AC610M	AC630M	Carbide Coated K AC405K	AC415K	AC420K	AC900G	Carbide ZX-Coated KS AC510U	MS AC520U	PM AC530U	Cermet P T1500Z	T2000Z	T3000Z	Carbide Uncoated P T1000A	T1500A	K G10E	S EH510	EH520	N H1
Roughing	 NMU	TNMG 160408 NMU	0,8		●	●	●	▲	▲			●	●				▲												
		TNMG 160412 NMU	1,2		●	●	●	▲	▲			●	●				▲												
		TNMG 220408 NMU	0,8		○	●	●	▲	▲			●	●																
		TNMG 220412 NMU	1,2		○	●	●	▲	▲			●	●																
		TNMG 220416 NMU	1,6		○	●	●	▲	▲			○	●																
		TNMG 270612 NMU	1,2			○	○																						
		TNMG 270616 NMU	1,6			○																							
Roughing	 NEM	TNMG 160408 NEM	0,8							●	●																		
		TNMG 160412 NEM	1,2							●	●																		
Roughing	 NME	TNMG 160408 NME	0,8	●	●	●	●																						
		TNMG 160412 NME	1,2	●	●	●	●																						
Roughing	 NMX	TNMG 160408 NMX	0,8			●	●																						
		TNMG 160412 NMX	1,2			●	●		▲																				
		TNMG 220408 NMX	0,8			○	○																						
		TNMG 220412 NMX	1,2			○	○																						
Roughing	 NGZ	TNMG 160404 NGZ	0,4											●	●														
		TNMG 160408 NGZ	0,8											●	●	●													
		TNMG 160412 NGZ	1,2											●	●	●													
		TNMG 220408 NGZ	0,8											●	●														
		TNMG 220412 NGZ	1,2											●	●														
		TNMG 220416 NGZ	1,6											●	●														
Roughing	 L/RHM	TNMG 160404 LHM	0,4							●																			
		TNMG 160408 LHM	0,8							●																			
		TNMG 160404 RHM	0,4							●																			
		TNMG 160408 RHM	0,8							●																			
Roughing	 NUZ	TNMG 160404 NUZ	0,4											●	●														
		TNMG 160408 NUZ	0,8											●	●	●													
		TNMG 160412 NUZ	1,2											●	●	●													
		TNMG 160416 NUZ	1,6												●														
		TNMG 220408 NUZ	0,8												●														
		TNMG 220412 NUZ	1,2											●	●														
		TNMG 220416 NUZ	1,6											●	●														

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

60° Triangle Type | 0° Relief | With Insert Hole



Dimensions (mm)				
TNMM	ℓ	ød (IC)	s	d_1
1604--	16,5	9,525	4,76	3,81
2204--	22,0	12,7	4,76	5,16

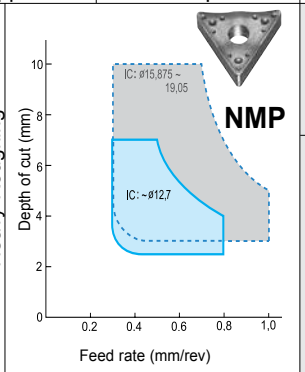
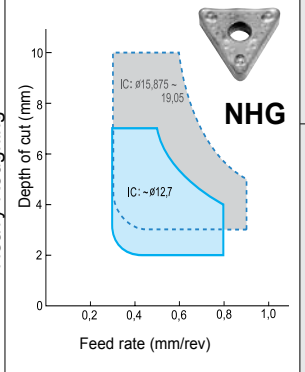
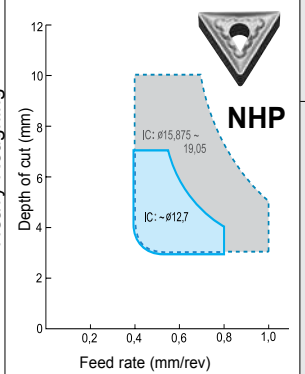


⇨D22-23 ⇨ E12

P Steel
M Stainless Steel
K Cast Iron
N Non-Ferrous Metals
S Super Alloy
H Hardened Steel

TNMM ●●●●●● ■-■■

● M-Class One Sided Bumpy Chipbreaker

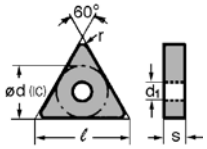
Application	Shape	ISO Cat. No.	r	Carbide Coated P AC805P	Carbide Coated P AC810P	Carbide Coated P **AC820P**	Carbide Coated P AC830P	Carbide Coated P AC2000	Carbide Coated P AC3000	Carbide Coated M AC6030M	Carbide Coated M AC6040M	Carbide Coated P/M AC610M	Carbide Coated P/M AC630M	Carbide Coated K **AC405K**	Carbide Coated K **AC415K**	Carbide Coated K AC420K	Carbide Coated K AC900G	Carbide ZX-Coated K/S AC510U	Carbide ZX-Coated M/S AC520U	Carbide ZX-Coated P/M AC530U	Cermet Uncoated P **T1500Z**	Cermet Uncoated P T2000Z	Cermet Uncoated P T3000Z	Cermet Uncoated P T1000A	Cermet Uncoated P T1500A	Carbide Uncoated K G10E	Carbide Uncoated S EH510	Carbide Uncoated S EH520	Carbide Uncoated N H1
Heavy Roughing	 NMP	**TNMM 160408 NMP**	0,8		●	●	●	▲	▲				●																
		TNMM 160412 NMP	1,2		○	●	●	▲	▲				●																
		TNMM 160416 NMP	1,6			●		▲	▲																				
		TNMM 220408 NMP	0,8		○	●	●	▲	▲																				
		TNMM 220412 NMP	1,2		○	●	●	▲	▲				●																
		TNMM 220416 NMP	1,6		○	●	●	▲	▲				●																
Heavy Roughing	 NHG	**TNMM 160408 NHG**	0,8		●		●	▲	▲			○	●				▲												
		TNMM 160412 NHG	1,2		●		●	▲	▲			○	●				▲												
		TNMM 160416 NHG	1,6		●			▲																					
		TNMM 220408 NHG	0,8		○	●	●	▲	▲																				
		TNMM 220412 NHG	1,2		○	●	●	▲	▲																				
		TNMM 220416 NHG	1,6		○	●	●	▲	▲																				
Heavy Roughing	 NHP	**TNMM 160408 NHP**	0,8				○																						
		TNMM 160412 NHP	1,2				○																						
		TNMM 220412 NHP	1,2				○																						
		TNMM 220416 NHP	1,6				○																						

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

T TRIANGLE TYPE
INSERTS FOR TURNING

60° Triangle Type

0° Relief
With Insert Hole



Dimensions (mm)				
TN__	ℓ	ød (IC)	s	d_1
1604--	16,5	9,525	4,76	3,81
2204- -	22,0	12,7	4,76	5,16



⇨ D15, D22~23 ⇨ E12

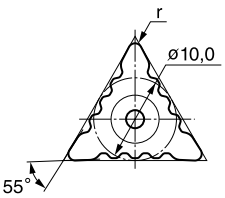
P Steel
M Stainless Steel
K Cast Iron
N Non-Ferrous Metals
S Super Alloy
H Hardened Steel

TNMA ●●●●●●

● G/M-Class No Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated M	Carbide Coated M	Carbide Coated M	Carbide Coated P/M	Carbide Coated K	Carbide Coated K	Carbide Coated K	Carbide Coated K	Carbide ZX-Coated K/S	Carbide ZX-Coated M/S	Carbide ZX-Coated P/M	Cermet Uncoated P	Cermet Uncoated P	Cermet Uncoated P	Carbide Uncoated K	Carbide Uncoated K	Carbide Uncoated S	Carbide Uncoated S	Carbide Uncoated N
				AC805P	AC810P	**AC820P**	AC830P	AC2000	AC3000	AC6030M	AC6040M	AC610M	AC630M	**AC405K**	**AC415K**	AC420K	AC900G	AC510U	AC520U	AC530U	**T1500Z**	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
Roughing		**TNMA 160404**	0,4											●	●										●			
		TNMA 160408	0,8											●	●	●									●			
		TNMA 160412	1,2											●	●	●												
		TNMA 160416	1,6											●	●													
		TNMA 220408	0,8											●	●													
		TNMA 220412	1,2											●	●													
		TNMA 220416	1,6											●	●													







⇨ D11 ⇨ E11

TRM ●●●●●● -■■

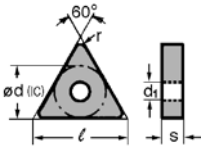
● M-Class Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated M	Carbide Coated M	Carbide Coated M	Carbide Coated P/M	Carbide Coated K	Carbide Coated K	Carbide Coated K	Carbide Coated K	Carbide ZX-Coated K/S	Carbide ZX-Coated M/S	Carbide ZX-Coated P/M	Cermet Uncoated P	Cermet Uncoated P	Cermet Uncoated P	Carbide Uncoated K	Carbide Uncoated K	Carbide Uncoated S	Carbide Uncoated S	Carbide Uncoated H
				AC805P	AC810P	**AC820P**	AC830P	AC2000	AC3000	AC6030M	AC6040M	**AC610M**	AC630M	**AC405K**	AC415K	AC420K	AC900G	AC510U	AC520U	AC530U	**T1500Z**	T2000Z	T3000Z	T1200A	T1500A	G10E	EH510	EH520	H1
Finishing	 -LU	**TRM 551704 -LU**	0,4		●	●		▲	▲								▲					▲	○						
		TRM 551708 -LU	0,8		●	●		▲	▲								▲					▲	○						
		TRM 551712 -LU	1,2		●	●			▲								▲					▲	○						
	 -SU	**TRM 551704 -SU**	0,4			○						●	●									▲	○						
		TRM 551708 -SU	0,8			○						●	●									▲	○						
		TRM 551712 -SU	1,2			○						●	●									▲	○						
Light Cut	 -GU	**TRM 551704 -GU**	0,4		●	●	●	▲	▲				●				▲												
		TRM 551708 -GU	0,8		●	●	●	▲	▲				●				▲												
		TRM 551712 -GU	1,2		●	●	●	▲	▲				○				▲												

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

T TRIANGLE TYPE
INSERTS FOR TURNING

60° Triangle Type | 0° Relief | With Insert Hole



Dimensions (mm)				
TN__	ℓ	ød (IC)	s	d_1
1103 - -	11,0	6,35	3,18	2,26
1603 - -	16,5	9,525	31,8	3,81
1604--	16,5	9,525	4,76	3,81
2204--	22,0	12,7	4,76	5,16



⇨ D15, D22~23 ⇨ E12

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

TNGG ●●●●●● ■-■■

● G-Class Double Sided Bumpy Chipbreaker

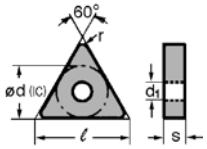
Application	Shape	ISO Cat. No.	r	Carbide Coated P AC805P	AC810P	AC820P	AC830P	Coated M AC2000	AC3000	AC6030M	AC6040M	Coated P/M AC610M	AC630M	Coated K AC405K	AC415K	AC420K	AC900G	ZX-Coated K/S AC510U	AC520U	ZX-Coated P/M AC530U	Cermet P T1500Z	T2000Z	T3000Z	Uncoated P T1000A	T1500A	Carbide Uncoated K G10E	S EH510	EH520	N H1
Finishing	L/RFT	TNGG 110302 LFT	0,2																					○	○				
		TNGG 110304 LFT	0,4																					○	○				
		TNGG 110302 RFT	0,2																					○	○				
		TNGG 110304 RFT	0,4																					○	○				
Light Cutting	L/RST	TNGG 160302 LST	0,2																					○	○				
		TNGG 160304 LST	0,4																					○	○				
		TNGG 160308 LST	0,8																					○	○				
		TNGG 160402 LST	0,2																					○	○				
		TNGG 160404 LST	0,4																					○	○				
		TNGG 160408 LST	0,8																					○	○				
		TNGG 160412 LST	1,2																						○				
		TNGG 160302 RST	0,2																					○	○				
		TNGG 160304 RST	0,4																					○	○				
		TNGG 160308 RST	0,8																					○	○				
		TNGG 160402 RST	0,2																					○	○				
		TNGG 160404 RST	0,4																					○	○				
		TNGG 160408 RST	0,8																					○	○				
		TNGG 160412 RST	1,2																						○				
Finishing	NSU	TNGG 160402 NSU	0,2																			○		○	○				
		TNGG 160404 NSU	0,4																			○		○	○				
		TNGG 160408 NSU	0,8																			○		○	○				
Finishing	L/RFY	TNGG 160401 LFY	0,1																			○		○	○				
		TNGG 160402 LFY	0,2																			○		○	○				
		TNGG 160404 LFY	0,4																			○		○	○				
		TNGG 160408 LFY	0,8																			○		○	○				
		TNGG 160412 LFY	1,2																			○			○				
		TNGG 160401 RFY	0,1																			○		○	○				
		TNGG 160402 RFY	0,2																			○		○	○				
		TNGG 160404 RFY	0,4																			○		○	○				
		TNGG 160408 RFY	0,8																			○		○	○				
		TNGG 160412 RFY	1,2																			○			○				
Finishing	L/RFX	TNGG 160402 LFX	0,2																			○		○	○				
		TNGG 160404 LFX	0,4																			○		○	○				
		TNGG 160402 RFX	0,2																			○		○	○				
		TNGG 160404 RFX	0,4																			○		○	○				
Medium Cut	L/RUM	TNGG 160402 LUM	0,2																			○		○	●				
		TNGG 160404 LUM	0,4																			○		○	●				
		TNGG 160408 LUM	0,8																			○		○	●				
		TNGG 160412 LUM	1,2																						○				
		TNGG 220404 LUM	0,4																						○				
		TNGG 220408 LUM	0,8																						○				
		TNGG 160402 RUM	0,2																			○		○	●				
		TNGG 160404 RUM	0,4																			○		○	●				
		TNGG 160408 RUM	0,8																			○		○	●				
		TNGG 160412 RUM	1,2																						○				
		TNGG 220404 RUM	0,4																						○				
		TNGG 220408 RUM	0,8																						○				

Depth of cut (mm) 0 1 2 3 4 — Feed rate (mm/rev) 0,2 0,4

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

60° Triangle Type

0° Relief
With Insert Hole



Dimensions (mm)				
TN__	ℓ	ød (IC)	s	d_1
1103 - -	11,0	6,35	3,18	2,26
1604--	16,5	9,525	4,76	3,81

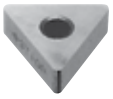


⇨ D15, D22~23 ⇨ E12

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

TNGA ●●●●●●

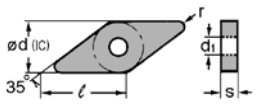
● G-Class No Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated M	Carbide Coated M	Carbide Coated M	Carbide Coated P/M	Carbide Coated K	Carbide Coated K	Carbide Coated K	Carbide Coated K	Carbide ZX-Coated K/S	Carbide ZX-Coated M/S	Carbide ZX-Coated P/M	Cermet Uncoated P	Cermet Uncoated P	Cermet Uncoated P	Carbide Uncoated K	Carbide Uncoated S	Carbide Uncoated S	Carbide Uncoated N
				AC805P	AC810P	**AC820P**	AC830P	AC2000	AC3000	AC6030M	AC6040M	AC610M	AC630M	**AC405K**	**AC415K**	AC420K	AC900G	AC510U	AC520U	AC530U	**T1500Z**	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
Medium Cut		**TNGA 110308**	0,8																				○					
		TNGA 160404	0,4																				○					
		TNGA 160408	0,8																				○	○				

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

V DIAMOND TYPE
INSERTS FOR TURNING

35° Diamond Type | 0° Relief / With Insert Hole



Dimensions (mm)				
VN_ _	ℓ	ød (IC)	s	d_1
1604--	16,6	9,525	4,76	3,81



⇨ D16

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

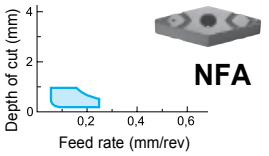
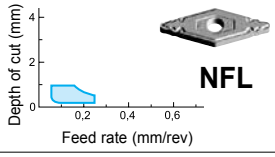
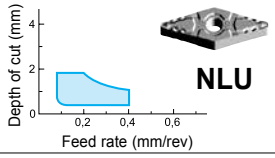
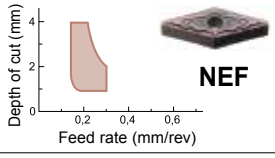
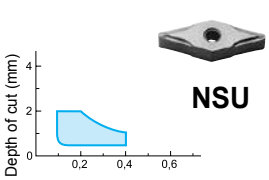
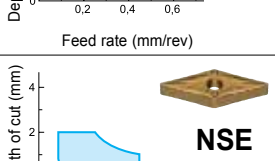
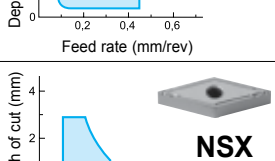
VNMA ●●●●●●

● M-Class No Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated M	Carbide Coated PM	Carbide Coated K	Carbide Coated K	Carbide Coated K	Carbide Coated K	Carbide ZX-Coated KS	Carbide ZX-Coated MS	Carbide ZX-Coated PM	Cermet P	Cermet P	Cermet P	Cermet P	Cermet P	Carbide Uncoated K	Carbide Uncoated S	Carbide Uncoated S	Carbide Uncoated N
				AC805P	AC810P	**AC820P**	AC830P	AC2000	AC3000	AC6030M	AC6040M	AC610M	AC630M	**AC405K**	**AC415K**	AC420K	AC900G	AC510U	AC520U	AC530U	**T1500Z**	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
Roughing		**VNMA 160404**	0,4											●	●													
		VNMA 160408	0,8											●	●													
		VNMA 160412	1,2											●	●													

VN_G ●●●●●● ■-■■

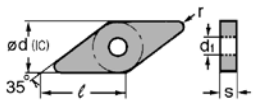
● G/M-Class Double Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated M	Carbide Coated PM	Carbide Coated K	Carbide Coated K	Carbide Coated K	Carbide Coated K	Carbide ZX-Coated KS	Carbide ZX-Coated MS	Carbide ZX-Coated PM	Cermet P	Cermet P	Cermet P	Cermet P	Cermet P	Carbide Uncoated K	Carbide Uncoated S	Carbide Uncoated S	Carbide Uncoated H
				AC805P	AC810P	**AC820P**	AC830P	AC2000	AC3000	AC6030M	AC6040M	AC610M	AC630M	**AC405K**	**AC415K**	AC420K	AC900G	AC510U	AC520U	AC530U	**T1500Z**	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
Fine Finishing		**VNMG 160404 NFA**	0,4																		○		○	○	○				
		VNMG 160408 NFA	0,8																		○		○	○	○				
Fine Finishing		**VNMG 160404 NFL**	0,4			○		▲					○								●	▲	●	●	●				
		VNMG 160408 NFL	0,8			○		▲					○								●	▲	●	●	●				
Finishing		**VNMG 160402 NLU**	0,2										○								●		●	●	●				
		VNMG 160404 NLU	0,4		●	●		▲					○				▲				●	▲	●	●	●				
		VNMG 160408 NLU	0,8		●	●		▲					○				▲				●	▲	●	●	●				
Medium Cut		**VNMG 160402 NEF**	0,2							●								●	●									
		VNMG 160404 NEF	0,4							●	●		●					●	●							●	●	
		VNMG 160408 NEF	0,8							●	●		●					●	●							●	●	
Finishing		**VNMG 160402 NSU**	0,2							●	●		○						○		○		○	○	○				
		VNMG 160404 NSU	0,4		●	●	○	▲	▲	●	●	●	●				▲	○	○		○		○	○	○				
		VNMG 160408 NSU	0,8		●	●	○	▲	▲	●	●	●	●				▲	○	○		○		○	○	○				
		VNGG 160402 NSU	0,2																		○		○	○	○				
		VNGG 160404 NSU	0,4																		○		○	○	○				
		VNGG 160408 NSU	0,8																		○		○	○	○				
Medium Cut		**VNMG 160404 NSE**	0,4		●	●	○														○			○	○				
		VNMG 160408 NSE	0,8		●	●	○														○			○	○				
Medium Cut		**VNMG 160404 NSX**	0,4																		○				○				
		VNMG 160408 NSX	0,8																		○				○				

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

V DIAMOND TYPE
INSERTS FOR TURNING

35° Diamond Type | 0° Relief | With Insert Hole



Dimensions (mm)				
VN__	ℓ	ød (IC)	s	d_1
1604--	16,6	9,525	4,76	3,81

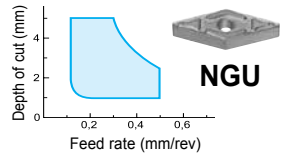
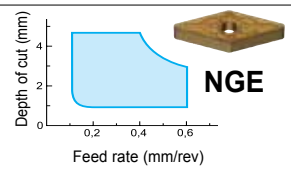
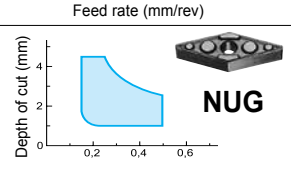
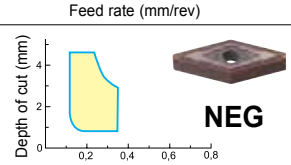
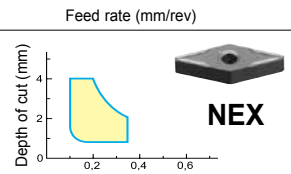
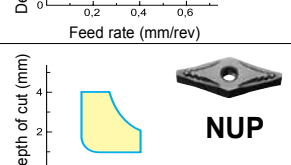
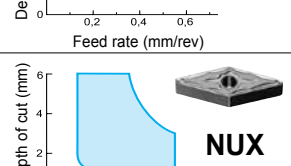
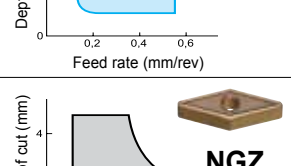
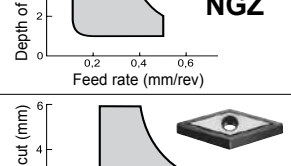


⇨ D16

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

VNMG ●●●●●● ■-■■

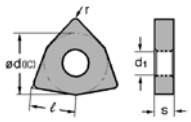
● M-Class Double Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	Carbide Coated M AC6030M	AC6040M	Carbide Coated P/M AC610M	AC630M	Carbide Coated K AC405K	AC415K	AC420K	AC900G	Carbide ZX-Coated K/S AC510U	ZX-Coated M/S AC520U	ZX-Coated P/M AC530U	Cermet P T1500Z	T2000Z	T3000Z	Carbide Uncoated P T1000A	T1500A	Uncoated K G10E	Uncoated S EH510	EH520	Uncoated N H1
Medium Cut	 NGU	**VNMG 160404 NGU**	0,4		●	●	○	▲		●	●	○	●				▲		○		○				○				
		VNMG 160408 NGU	0,8		●	●	○	▲		●	●	○	●				▲		○	○	○				○				
		VNMG 160412 NGU	1,2			●					●						▲		○										
Medium Cut	 NGE	**VNMG 160408 NGE**	0,8		●	●	●																						
Medium Cut	 NUG	**VNMG 160404 NUG**	0,4					▲																					
		VNMG 160408 NUG	0,8					▲																					
Medium Cut	 NEG	**VNMG 160408 NEG**	0,8							●	●																		
Medium Cut	 NEX	**VNMG 160404 NEX**	0,4							●	●		○					●	●										
		VNMG 160408 NEX	0,8							●	●		○					●	●										
Medium Cut	 NUP	**VNMG 160404 NUP**	0,4			●	●	▲	▲	●		●						●	●										
		VNMG 160408 NUP	0,8			●	●	▲	▲	●		●						●	●										
Medium Cut	 NUX	**VNMG 160404 NUX**	0,4		○	●	●																						
		VNMG 160408 NUX	0,8		○	●	●																						
		VNMG 160412 NUX	1,2		○	●	●																						
Medium Cut	 NGZ	**VNMG 160404 NGZ**	0,4											●	●														
		VNMG 160408 NGZ	0,8											●	●														
		VNMG 160412 NGZ	1,2											●	●														
Medium Cut	 NUZ	**VNMG 160404 NUZ**	0,4											●	●														
		VNMG 160408 NUZ	0,8											●	●														
		VNMG 160412 NUZ	1,2											●	●														

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

W TRIGON TYPE
INSERTS FOR TURNING

80° Trigon Type | 0° Relief | With Insert Hole



Dimensions (mm)				
WN_ _	ℓ	ød (IC)	s	d_1
0604--	6,52	9,525	4,76	3,81
0804--	8,69	12,7	4,76	5,16



⇨ D17, D24 D42 ⇨ E13

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

WNMG ●●●●●● ■-■■

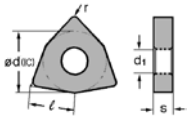
● M-Class Double Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P AC805P	AC810P	AC820P	AC830P	Coated M AC2000	AC3000	Coated P/M AC6030M	AC6040M	AC610M	AC630M	Coated K AC405K	AC415K	AC420K	AC900G	ZX-Coated K/S AC510U	AC520U	ZX-Coated M/S AC530U	Cermet P T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide Uncoated K G10E	S EH510	EH520	N H1
Fine Finishing	NFA	**WNMG 080402 NFA**	0,2																		○		○	○	○				
		WNMG 080404 NFA	0,4																		●	▲	●	●	●				
		WNMG 080408 NFA	0,8																		●	▲	●	●	●				
Fine Finishing	NFL	**WNMG 080404 NFL**	0,4			○		▲					○								●	▲	●	●	●				
		WNMG 080408 NFL	0,8			○		▲					○								●	▲	●	●	●				
Finishing	NLU	**WNMG 080404 NLU**	0,4		●	●		▲					○				▲				●	▲	●	●	●				
		WNMG 080408 NLU	0,8		●	●		▲					○				▲				●	▲	●	●	●				
		WNMG 080412 NLU	1,2		●	●							○				▲				●		●		●				
Finishing	NLU-W	**WNMG 060404 NLU-W**	0,4		●	●						●	●				▲				●	▲			●				
		WNMG 060408 NLU-W	0,8		●	●						●	●	●	●		▲				●	▲			●				
		WNMG 080404 NLU-W	0,4		●	●						●	●	●	●		▲				●	▲	●		●				
		WNMG 080408 NLU-W	0,8		●	●						●	●	●	●		▲				●	▲	●		●				
		WNMG 080412 NLU-W	1,2		●	●							○	●	●		▲				○		○		○				
Finishing	NEF	**WNMG 080404 NEF**	0,4							●	●		●					●	●								●	●	
		WNMG 080408 NEF	0,8							●	●		●					●	●								●	●	
Finishing	NSU	**WNMG 060404 NSU**	0,4		●	●	○	▲	▲			●	●				▲	●	●										
		WNMG 060408 NSU	0,8		●	●	○	▲	▲			●	●				▲	●	●										
		WNMG 080404 NSU	0,4		●	●	○	▲		●	●	●	●				▲	●	●		●	▲	●	●	●				
		WNMG 080408 NSU	0,8		●	●	○	▲		●	●	●	●				▲	●	●		●	▲	●	●	●				
		WNMG 080412 NSU	1,2		●	●	○	▲		●	●		○				▲	●	●		○		○	○	○				
Finishing	NSE / NSE-W	**WNMG 080404 NSE**	0,4		●	●	○														○			○	○				
		WNMG 080408 NSE	0,8	●	●	●	○														○			○	○				
		WNMG 080412 NSE	1,2	●	●	●	○																						
		WNMG 080404 NSE-W	0,4		●	●															○				○				
		WNMG 080408 NSE-W	0,8	●	●	●															○				○				
		WNMG 080412 NSE-W	1,2	●	●	●																							
Finishing	NSX	**WNMG 080404 NSX**	0,4																		○		○		○				
		WNMG 080408 NSX	0,8																		○		○		○				

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

80° Trigon Type | 0° Relief | With Insert Hole

Dimensions (mm)				
WN__	ℓ	ød (IC)	s	d_1
0604--	6,52	9,525	4,76	3,81
0804--	8,69	12,7	4,76	5,16



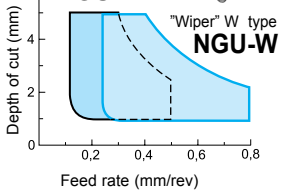

⇨ D17, D24 D42


⇨ E13

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

WNMG ●●●●●● ■-■■

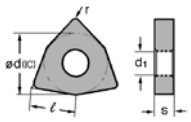
● M-Class Double Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P						Carbide Coated M		Carbide Coated P,M		Carbide Coated K			Carbide ZX-Coated K,S		Carbide ZX-Coated M,S	Carbide ZX-Coated P,M	Cermet P			Carbide Uncoated K	Carbide Uncoated S		Carbide Uncoated N
				AC805P	AC810P	**AC820P**	AC830P	AC2000	AC3000	AC6030M	AC6040M	AC610M	AC630M	**AC405K**	**AC415K**	AC420K	AC900G	AC510U	AC520U	AC530U	**T1500Z**	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
Medium Cut	 "Standard" **NGU** "Wiper" W type **NGU-W**  Depth of cut (mm) Feed rate (mm/rev)	**WNMG 060404 NGU**	0,4		●	●		▲				●	●				▲											
		WNMG 060408 NGU	0,8		●	●		▲				●	●				▲											
		WNMG 060412 NGU	1,2		●	●		▲				●	●				▲											
		WNMG 080404 NGU	0,4		●	●	●	▲	▲	●	●	●	●				▲		❍		❍				❍			
		WNMG 080408 NGU	0,8	●	●	●	●	▲	▲	●	●	●	●				▲		❍		❍				❍			
		WNMG 080412 NGU	1,2	●	●	●	●	▲	▲	●	●	●	●				▲		❍									
		WNMG 080408 NGU-W	0,8	●	●	●		▲				●	●	●	●		▲											
		WNMG 080412 NGU-W	1,2	●	●	●		▲				❍	●	●	●		▲											
Medium Cut	 **NGE** Depth of cut (mm) Feed rate (mm/rev)	**WNMG 060408 NGE**	0,8	●	●	●	●																					
		WNMG 060412 NGE	1,2	●	●	●	●																					
		WNMG 080408 NGE	0,8	●	●	●	●																					
		WNMG 080412 NGE	1,2	●	●	●	●																					
		WNMG 080416 NGE	1,6	●	●	●	●																					
Medium Cut	 **NUG** Depth of cut (mm) Feed rate (mm/rev)	**WNMG 060404 NUG**	0,4					▲																				
		WNMG 060408 NUG	0,8					▲																				
		WNMG 080408 NUG	0,8					▲	▲																			
		WNMG 080412 NUG	1,2					▲	▲																			
Medium Cut	 **NEG** Depth of cut (mm) Feed rate (mm/rev)	**WNMG 080408 NEG**	0,8							●	●		●					●	●								●	●	
		WNMG 080412 NEG	1,2							●	●		●					●	●								●	●	
Medium Cut	 **NEX** Depth of cut (mm) Feed rate (mm/rev)	**WNMG 060404 NEX**	0,4									●	●					●	●										
		WNMG 060408 NEX	0,8									●	●					●	●										
		WNMG 080404 NEX	0,4							●	●	●	●					●	●										
		WNMG 080408 NEX	0,8							●	●	●	●					●	❍										
		WNMG 080412 NEX	1,2							●	●	●	●					❍	❍										
Medium Cut	 **NUP** Depth of cut (mm) Feed rate (mm/rev)	**WNMG 080408 NUP**	0,8			●	●	▲	▲	●	●	❍	●					●	●										
		WNMG 080412 NUP	1,2			●	●	▲	▲	●	●	❍	●					●	●										
Medium Cut	 **NEM** Depth of cut (mm) Feed rate (mm/rev)	**WNMG 080408 NEM**	0,8							●	●																		
		WNMG 080412 NEM	1,2							●	●																		

● = Euro stock
❍ = Stock item in Japan
▲ = To be replaced by new item

W TRIGON TYPE
INSERTS FOR TURNING

80° Trigon Type | 0° Relief | With Insert Hole



Dimensions (mm)				
WN__	ℓ	ød (IC)	s	d_1
0604--	6,52	9,525	4,76	3,81
0804--	8,69	12,7	4,76	5,16

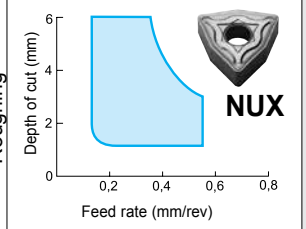
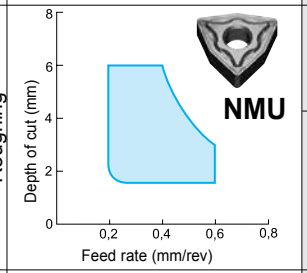
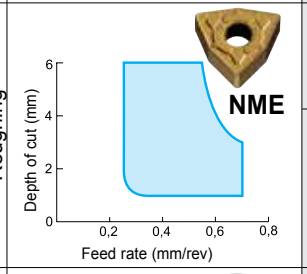
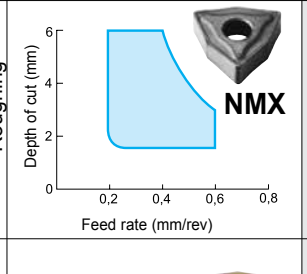
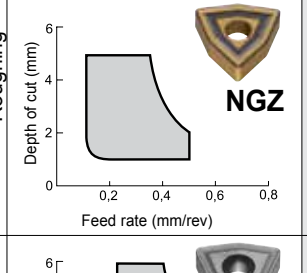
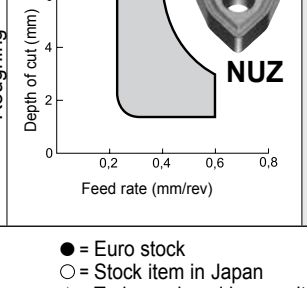


⇨ D17, D24 D42 ⇨ E13

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

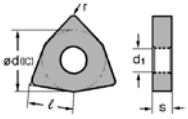
WNMG ●●●●●● ■-■■

● M-Class Double Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P AC805P	Carbide Coated P AC810P	Carbide Coated P AC820P	Carbide Coated P AC830P	Carbide Coated P AC2000	Carbide Coated P AC3000	Carbide Coated M AC6030M	Carbide Coated M AC6040M	Carbide Coated P/M AC610M	Carbide Coated P/M AC630M	Carbide Coated K AC405K	Carbide Coated K AC415K	Carbide Coated K AC420K	Carbide Coated K AC900G	ZX-Coated K/S AC510U	ZX-Coated M/S AC520U	ZX-Coated P/M AC530U	Cermet P T1500Z	Cermet P T2000Z	Cermet P T3000Z	Cermet P T1000A	Cermet P T1500A	Carbide Uncoated K G10E	Carbide Uncoated S EH510	Carbide Uncoated S EH520	Carbide Uncoated N H1
Roughing	 NUX	**WNMG 080404 NUX**	0,4		○	●	●	▲	▲								▲												
		WNMG 080408 NUX	0,8		●	●	●	▲	▲								▲												
		WNMG 080412 NUX	1,2		●	●	●	▲	▲								▲												
Roughing	 NMU	**WNMG 060408 NMU**	0,8		●	●	●	▲	▲			●	●				▲	●	●										
		WNMG 060412 NMU	1,2		●	●	●		▲			●	●				▲	●	●										
		WNMG 080408 NMU	0,8		●	●	●	▲	▲			●	●				▲	●	●										
		WNMG 080412 NMU	1,2		●	●	●	▲	▲			●	●				▲	●	●										
		WNMG 080416 NMU	1,6		●	●	●	▲	▲								▲												
Roughing	 NME	**WNMG 060408 NME**	0,8	●																									
		WNMG 060412 NME	1,2	●	●	●	●																						
		WNMG 080408 NME	0,8	●	●	●	●																						
		WNMG 080412 NME	1,2	●	●	●	●																						
		WNMG 080416 NME	1,6	●	●	●	●																						
Roughing	 NMX	**WNMG 080408 NMX**	0,8			●	●																						
		WNMG 080412 NMX	1,2			●	●																						
Roughing	 NGZ	**WNMG 080404 NGZ**	0,4											●	●														
		WNMG 080408 NGZ	0,8											●	●	●													
		WNMG 080412 NGZ	1,2											●	●	●													
Roughing	 NUZ	**WNMG 080404 NUZ**	0,4											●	●														
		WNMG 080408 NUZ	0,8											●	●	●	▲												
		WNMG 080412 NUZ	1,2											●	●		▲												

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

80° Trigon Type | 0° Relief | With Insert Hole



Dimensions (mm)				
WN__	ℓ	ød (IC)	s	d_1
0604--	6,52	9,525	4,76	3,81
0804--	8,69	12,7	4,76	5,16

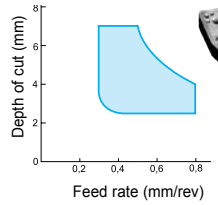
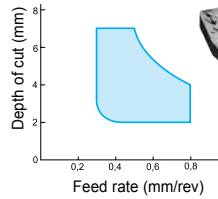

⇨ D17, D24


⇨ E13

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

WNMM ●●●●●● ■-■■

● M-Class One Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	AC805P	AC810P	**AC820P**	AC830P	AC2000	AC3000	AC6030M	AC6040M	AC610M	AC630M	**AC405K**	**AC415K**	AC420K	AC900G	AC510U	AC520U	AC530U	**T1500Z**	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
Heavy Roughing	 NMP	**WNMM 080408 NMP**	0,8		●	●	●		▲				●															
		WNMM 080412 NMP	1,2		●	●	●	▲	▲				●																
Heavy Roughing	 NHG	**WNMM 080408 NHG**	0,8		●	●	●	▲	▲				●				▲											
		WNMM 080412 NHG	1,2		●	●	●	▲	▲				●				▲											

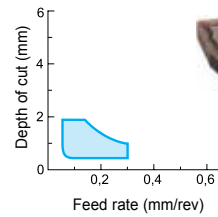
WNMA ●●●●●●

● M-Class No Chipbreaker

Application	Shape	ISO Cat. No.	r	AC805P	AC810P	**AC820P**	AC830P	AC2000	AC3000	AC6030M	AC6040M	**AC610M**	AC630M	**AC405K**	AC415K	AC420K	AC900G	AC510U	AC520U	AC530U	**T1500Z**	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
Roughing		**WNMA 080408**	0,8											●	●	●													
		WNMA 080412	1,2											●	●	●													
		WNMA 080416	1,6											●	●	●													

WNGG ●●●●●● ■-■■

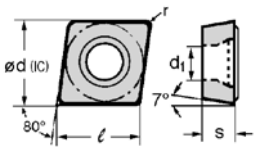
● G-Class Double Sided Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	AC805P	AC810P	**AC820P**	AC830P	AC2000	AC3000	AC6030M	AC6040M	**AC610M**	AC630M	**AC405K**	AC415K	AC420K	AC900G	AC510U	AC520U	AC530U	**T1500Z**	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
Finishing	 NSU	**WNGG 080404 NSU**	0,4																		○		○	○	○				

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

C DIAMOND TYPE
INSERTS FOR TURNING

80° Diamond Type | 7° Relief | With Insert Hole



Dimensions (mm)				
CC_ _	ℓ	ød (IC)	s	d_1
03X1--	3,55	3,5	1,4	1,8
04X1--	4,37	4,3	1,8	2,2
0602--	6,45	6,35	2,38	2,8
09T3--	9,7	9,525	3,97	4,4

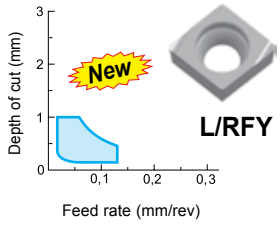


⇨ D31 ⇨ E14

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

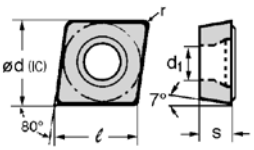
CCET ●●●●●● ●-■■

● E-Class Handed and Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide: Coated: P: AC805P	AC810P	AC820P	AC830P	Coated: M: AC2000	AC3000	AC6030M	AC6040M	Coated: P/M: AC610M	AC630M	Coated: K: AC405K	AC415K	AC420K	AC900G	ZX-Coated: K/S: AC510U	ZX-Coated: M/S: AC520U	ZX-Coated: P/M: AC530U	Cermet: Uncoated: P: T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide: Uncoated: K: G10E	S: EH510	EH520	N: H1
Finishing	 L/RFY	CCET 03X1003 LFY	0,03																					○	○				
		CCET 03X101 LFY	0,1																					○	○				
		CCET 03X102 LFY	0,2																					○	○				
		CCET 03X104 LFY	0,4																					○	○				
		CCET 04X1003 LFY	0,03																					○	○				
		CCET 04X101 LFY	0,1																					○	○				
		CCET 04X102 LFY	0,2																					○	○				
		CCET 04X104 LFY	0,4																					○	○				
		CCET 060201 LFY	0,1																					○	○				
		CCET 060202 LFY	0,2																					○	○				
		CCET 09T301 LFY	0,1																					○	○				
		CCET 09T302 LFY	0,2																					○	○				
		CCET 03X1003 RFY	0,03																					○	○				
		CCET 03X101 RFY	0,1																					○	○				
		CCET 03X102 RFY	0,2																					○	○				
		CCET 03X104 RFY	0,4																					○	○				
		CCET 04X1003 RFY	0,03																					○	○				
		CCET 04X101 RFY	0,1																					○	○				
		CCET 04X102 RFY	0,2																					○	○				
		CCET 04X104 RFY	0,4																					○	○				
		CCET 060201 RFY	0,1																					○	○				
		CCET 060202 RFY	0,2																					○	○				
		CCET 09T301 RFY	0,1																					○	○				
		CCET 09T302 RFY	0,2																					○	○				

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

80° Diamond Type | 7° Relief | With Insert Hole



Dimensions (mm)				
CC_ _	ℓ	ød (IC)	s	d_1
0602--	6,45	6,35	2,38	2,8
09T3--	9,7	9,525	3,97	4,4

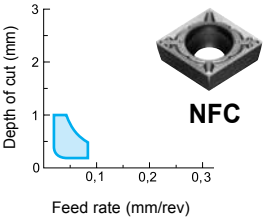
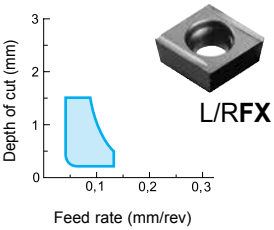


⇨ D31 ⇨ E14

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

CCGT ●●●●●● ●-■■

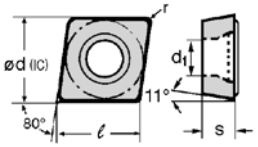
● G-Class Handed and Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide: Coated: P: AC805P	AC810P	AC820P	AC830P	Coated: M: AC2000	AC3000	AC6030M	AC6040M	Coated: P/M: AC610M	AC630M	Coated: K: AC405K	AC415K	AC420K	AC900G	ZX-Coated: K/S: AC510U	ZX-Coated: M/S: AC520U	ZX-Coated: P/M: AC530U	Cermet: Uncoated: P: T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide: Uncoated: K: G10E	Carbide: Uncoated: S: EH510	EH520	Carbide: Uncoated: N: H1
Finishing	 NFC	CCGT 060201M NFC	<0,1																	●				○	○				
		CCGT 060202M NFC	<0,2																	●				○	○				
		CCGT 060204M NFC	<0,4																	●				○	○				
		CCGT 09T301M NFC	<0,1																	●				○	○				
		CCGT 09T302M NFC	<0,2																	●				○	○				
		CCGT 09T304M NFC	<0,4																	●				○	○				
Finishing	 L/RFX	CCGT 0602003 LFX	0,03																	○									
		CCGT 060201 LFX	0,1																	○	●	▲		●	●				
		CCGT 060202 LFX	0,2																	●	●	▲		●	●				
		CCGT 060204 LFX	0,4																	●	●	▲		●	●				
		CCGT 09T301 LFX	0,1																		●	▲		●	●				
		CCGT 09T302 LFX	0,2																	●	●	▲		●	●				
		CCGT 09T304 LFX	0,4																	●	●	▲		●	●				
		CCGT 09T308 LFX	0,8																	○									
Finishing	L/RFX	CCGT 0602003 RFX	0,03																	○									
		CCGT 060201 RFX	0,1																	○	●	▲		●	●				
		CCGT 060202 RFX	0,2																	●	●	▲		●	●				
		CCGT 060204 RFX	0,4																	●	●	▲		●	●				
		CCGT 09T301 RFX	0,1																		●	▲		●	●				
		CCGT 09T302 RFX	0,2																	●	●	▲		●	●				
		CCGT 09T304 RFX	0,4																	●	●	▲		●	●				
		CCGT 09T308 RFX	0,8																	○									

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

C DIAMOND TYPE
INSERTS FOR TURNING

80° Diamond Type | 11° Relief | With Insert Hole



Dimensions (mm)				
CC_ _	ℓ	ød (IC)	s	d_1
0602--	6,45	6,35	2,38	2,8
0802--	8,1	7,94	2,38	3,4
0903--	9,7	9,525	3,18	4,4
09T3--			3,97	

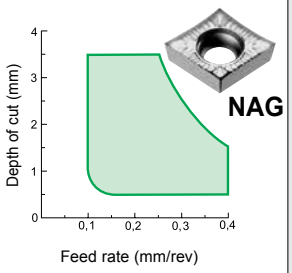
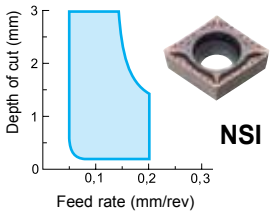
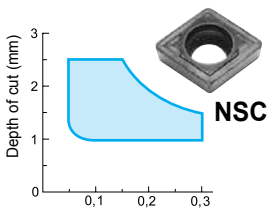


⇨ E14

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

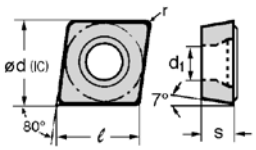
CCGT ●●●●●● ●-■■

● G-Class Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	Coated M AC6030M	AC6040M	Coated P/M AC610M	AC630M	Coated K AC405K	AC415K	AC420K	AC900G	ZX-Coated K/S AC510U	AC520U	ZX-Coated P/M AC530U	Cermet P T1500Z	T2000Z	Uncoated P T3000Z	T1000A	T1500A	Carbide K G10E	Uncoated S EH510	EH520	N H1
Light Cut	 NAG	CCGT 060202 NAG	0,2																										●
		CCGT 060204 NAG	0,4																										●
		CCGT 09T302 NAG	0,2																										●
		CCGT 09T304 NAG	0,4																										●
		CCGT 09T308 NAG	0,8																										●
		CCGT 120404 NAG	0,4																										●
		CCGT 120408 NAG	0,8																										●
Light cut	 NSI	CCGT 09T301M NSI	<0,1									●	●					●	●	●	○			○	○				
		CCGT 09T302M NSI	<0,2									●	●					●	●	●	○			○	○				
		CCGT 09T304M NSI	<0,4									●	●					●	●	●	○			○	○				
Light cut	 NSC	CCGT 0602003 NSC	0,03																	○				○	○				
		CCGT 09T3003 NSC	0,03																	○									
		CCGT 060201M NSC	<0,1																	○	●			●	●				
		CCGT 060202M NSC	<0,2																	●	●			●	●				
		CCGT 060204M NSC	<0,4																	●	●			○	●				
		CCGT 080201M NSC	<0,1																		○			○	○				
		CCGT 080202M NSC	<0,2																		○			○	○				
		CCGT 090301M NSC	<0,1																		○			○	○				
		CCGT 090302M NSC	<0,2																		○			○	○				
		CCGT 09T301M NSC	<0,1																	○	●			●	●				
		CCGT 09T302M NSC	<0,2																	●	●			●	●				
		CCGT 09T304M NSC	<0,4																	●	●			○	●				
		CCGT 09T308M NSC	<0,8																	●	●			○	●				

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

80° Diamond Type | 7° Relief | With Insert Hole



Dimensions (mm)				
CC_ _	ℓ	ød (IC)	s	d_1
0602--	6,45	6,35	2,38	2,8
09T3--	9,7	9,525	3,97	4,4
1204--	12,9	12,7	4,76	5,5

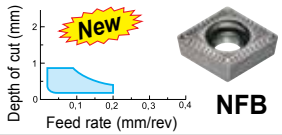
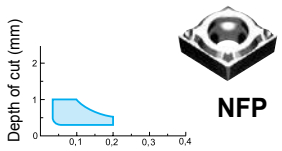
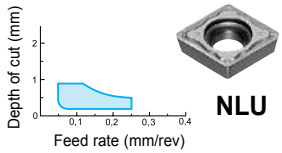
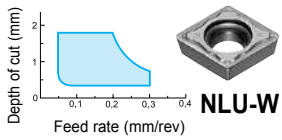
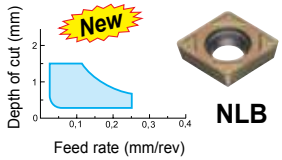
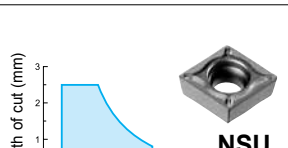
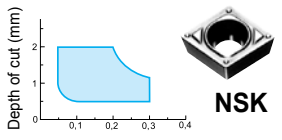
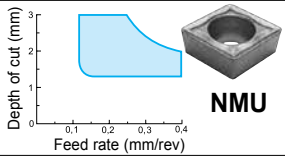
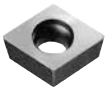


⇨ D31 ⇨ E14

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

CCMT/-W ●●●●●● ●-■■

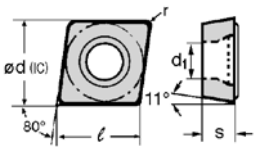
● M-Class Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide: Coated: P: AC805P	AC810P	AC820P	AC830P	M: AC2000	AC3000	AC6030M	AC6040M	PM: AC610M	AC630M	K: AC405K	AC415K	AC420K	AC900G	Carbide: ZX-Coated: KS: AC510U	MS: AC520U	PM: AC530U	Cermet: Uncoated: P: T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide: K: G10E	S: EH510	EH520	N: H1
Finishing		**NFB**	CCMT 060202 NFB	0,2																	●		●	●	●				
			CCMT 060204 NFB	0,4																	●		●	●	●				
			CCMT 09T304 NFB	0,4																	●		●	●	●				
			CCMT 09T308 NFB	0,8																	●		●	●	●				
Finishing ~ Light Cut		**NFP**	CCMT 060202 NFP	0,2																	●	▲	●	●	●				
			CCMT 060204 NFP	0,4																	●	▲	●	●	●				
			CCMT 060208 NFP	0,8																	●	▲	●	●	●				
			CCMT 09T302 NFP	0,2																	●	▲	●	●	●				
			CCMT 09T304 NFP	0,4																	●	▲	●	●	●				
			CCMT 09T308 NFP	0,8																	●	▲	●	●	●				
			CCMT 120404 NFP	0,4																	●	▲			●				
			CCMT 120408 NFP	0,8																	●	▲			●				
Finishing		**NLU**	CCMT 060202 NLU	0,2		●	○			●	●	●	●				▲			●	○		●	○	○				
			CCMT 060204 NLU	0,4		●	○			●	●	●	●				▲			●	○		●	○	○				
			CCMT 09T302 NLU	0,2																●			●						
			CCMT 09T304 NLU	0,4		●	●			●	●	●	●				▲			●	○		●	○	○				
			CCMT 09T308 NLU	0,8		●	●			●	●	●	●				▲			●	○		●	○	○				
		**NLU-W**	CCMT 09T304 NLU-W	0,4			●					●	●	●	●		▲			●	○		●		○				
			CCMT 09T308 NLU-W	0,8			●					●	●	●	●		▲			●	○		●		○				
Light Cut		**NLB**	CCMT 060202 NLB	0,2																	●		●		●				
			CCMT 060204 NLB	0,4																	●		●		●				
			CCMT 060208 NLB	0,8																	●		●		●				
			CCMT 09T302 NLB	0,2																	●		●		●				
			CCMT 09T304 NLB	0,4																	●		●		●				
			CCMT 09T308 NLB	0,8																	●		●		●				
Light Cut		**NSU**	CCMT 060202 NSU	0,2		●	●	○		●	●	●	●	●	●		▲	●	●	●	●	▲	●	●	●				
			CCMT 060204 NSU	0,4		●	●	○		●	●	●	●	●	●		▲	●	●	●	●	▲	●	●	●				
			CCMT 060208 NSU	0,8		●	●	○		●	●	●	●				▲			●	●	▲	●	●	●				
			CCMT 09T302 NSU	0,2			●	○		●	●	●								●	●	▲	●	●	●				
			CCMT 09T304 NSU	0,4	●	●	●	○		●	●	●	●	●	●		▲	●	●	●	●	▲	●	●	●				
			CCMT 09T308 NSU	0,8	●	●	●	○		●	●	●	●	●	●		▲	●	●	●	●	▲	●	●	●				
			CCMT 120404 NSU	0,4		●	●	○				●	●	●	●		▲			●									
			CCMT 120408 NSU	0,8		●	●	○				●	●	●	●		▲			●									
Light Cut		**NSK**	CCMT 060204 NSK	0,4			●	●	▲	▲																			
			CCMT 060208 NSK	0,8			●	●	▲	▲																			
			CCMT 09T304 NSK	0,4			●	●	▲	▲																			
			CCMT 09T308 NSK	0,8			●	●	▲	▲																			
			CCMT 120404 NSK	0,4			●	●	▲	▲																			
			CCMT 120408 NSK	0,8			●	●	▲	▲																			
Roughing		**NMU**	CCMT 09T304 NMU	0,4		●	●	●	▲	▲	●		●	●	●	●	●	▲											
			CCMT 09T308 NMU	0,8		●	●	●	▲	▲	●		●	●	●	●	●	▲											
Roughing			CCMW 09T304	0,4										●	●														
			CCMW 09T308	0,8										●	●														

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

80° Diamond Type

11° Relief
With Insert Hole



Dimensions (mm)				
CP_ _	ℓ	ød (IC)	s	d_1
0802--	8,1	7,94	2,38	3,4
0903--	9,7	9,525	3,97	4,4
1204--	12,9	12,7	4,76	5,5

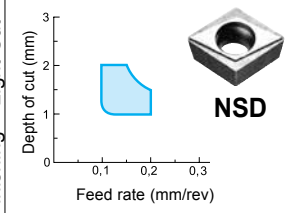


⇨ E15

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

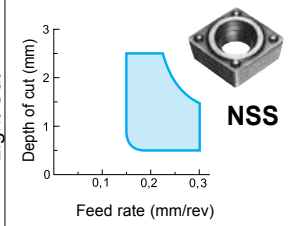
CPGT ●●●●●● NSD

● G-Class Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide: Coated: P: AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	M: AC6030M	AC6040M	AC610M	PM: AC630M	K: AC405K	AC415K	AC420K	AC900G	ZX-Coated: KS: AC510U	MS: AC520U	PM: AC530U	Cermet: P: T1500Z	T2000Z	T3000Z	Uncoated: P: T1000A	T1500A	Carbide: K: G10E	S: EH510	EH520	N: H1
Finishing ~ Light Cut	 NSD	**CPGT 080202 NSD**	0,2																		●	▲		●	●					
		CPGT 080204 NSD	0,4																		●	▲	○	●	●					
		CPGT 080208 NSD	0,8																		○			○	○					
		CPGT 090302 NSD	0,2																					○	○					
		CPGT 090304 NSD	0,4																		○		○	●	●					
		CPGT 090308 NSD	0,8																		○			○	○					
		CPGT 120402 NSD	0,2																					○	○					
		CPGT 120404 NSD	0,4																		○			○	○					
		CPGT 120408 NSD	0,8																					○	○					

CPMH ●●●●●● NSS

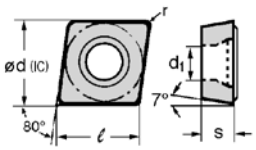
● M-Class Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide: Coated: P: AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	M: AC6030M	AC6040M	AC610M	PM: AC630M	K: AC405K	AC415K	AC420K	AC900G	ZX-Coated: KS: AC510U	MS: AC520U	PM: AC530U	Cermet: P: T1500Z	T2000Z	T3000Z	Uncoated: P: T1000A	T1500A	Carbide: K: G10E	S: EH510	EH520	H: H1
Light Cut	 NSS	**CPMH 090308 NSS**	0,8					▲																					

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

80° Diamond Type | 11° Relief | With Insert Hole

Dimensions (mm)				
CP_ _	ℓ	ød (IC)	s	d_1
0602--	6,45	6,35	2,38	2,8
0802--	8,1	7,94	2,38	3,4
0903--	9,7	9,525	3,18	4,4
09T3--	9,7	9,525	3,97	4,4



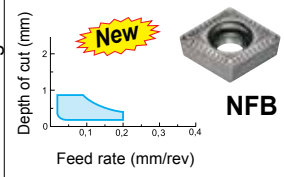
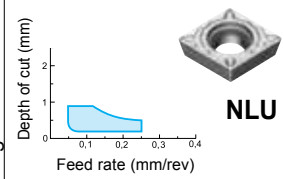
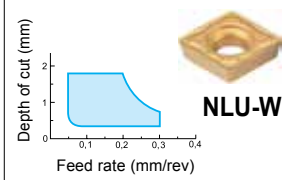
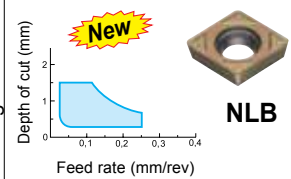
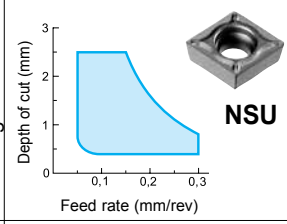
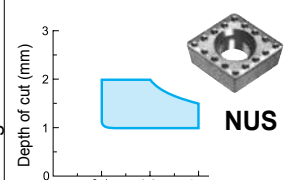
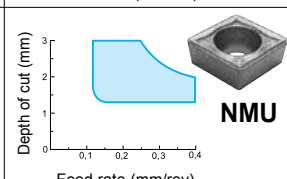


⇨ E15

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

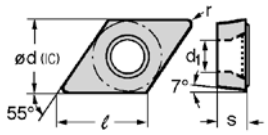
CPMT ●●●●●● ●-■■

● M-Class Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide: Coated P: AC805P	AC810P	AC820P	AC830P	Coated M: AC2000	AC3000	AC6030M	AC6040M	Coated P/M: AC610M	AC630M	Coated K: AC405K	AC415K	AC420K	AC900G	ZX-Coated K/S: AC510U	ZX-Coated M/S: AC520U	ZX-Coated P/M: AC530U	Cermet P: T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide Uncoated K: G10E	Carbide Uncoated S: EH510	EH520	Carbide Uncoated N: H1
Finishing	 NFB	**CPMT 080204 NFB**	0,4																		○		○	○	○				
		CPMT 090304 NFB	0,4																		○		○	○	○				
		CPMT 090308 NFB	0,8																		○		○	○	○				
Finishing	 NLU	**CPMT 080204 NLU**	0,4																		○		○	○	○				
		CPMT 090304 NLU	0,4							○											○		○	○	○				
		CPMT 090308 NLU	0,8							○											○		○	○	○				
Finishing	 NLU-W	**CPMT 090304 NLU-W**	0,4																		○		○		○				
		CPMT 090308 NLU-W	0,8																		○		○		○				
Light Cut	 NLB	**CPMT 090304 NLB**	0,4																		○		○		○				
		CPMT 090308 NLB	0,8																		○		○		○				
Light Cut	 NSU	**CPMT 080204 NSU**	0,4		○	○	○					○	○								○			○	○				
		CPMT 080208 NSU	0,8		○	○	○					○	○								○		○	○	○				
		CPMT 090304 NSU	0,4		○	○	○			○		○	○								○		○	○	○				
		CPMT 090308 NSU	0,8		○	○	○			○		○	○								○		○	○	○				
Light Cut	 NUS	**CPMT 060204 NUS**	0,4						▲																				
		CPMT 09T308 NUS	0,8					▲	▲																				
Light -Medium Cut	 NMU	**CPMT 090304 NMU**	0,4							○																			
		CPMT 090308 NMU	0,8							○																			

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

55° Diamond Type | 7° Relief | With Insert Hole



Dimensions (mm)				
DC_ _	ℓ	ød (IC)	s	d_1
0702--	7,75	6,35	2,38	2,8
11T3--	11,6	9,525	3,97	4,4

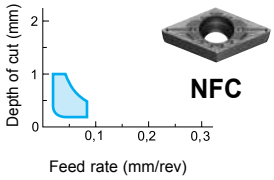
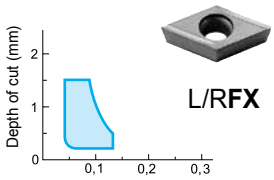
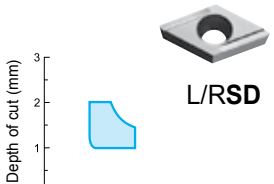
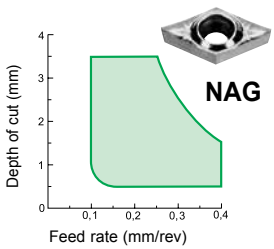


⇨ D32~33 ⇨ E16~17

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

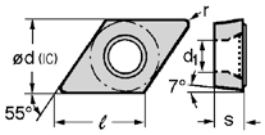
DCGT ●●●●●● ●-■■

● G-Class Handed and Bumpy Chipbreaker

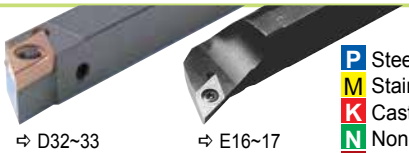
Application	Shape	ISO Cat. No.	r	Carbide Coated P AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	Carbide Coated M AC6030M	AC6040M	AC610M	Carbide Coated PM AC630M	Carbide Coated K AC405K	AC415K	AC420K	AC900G	Carbide ZX-Coated KS AC510U	MS AC520U	PM AC530U	Cermet P T1500Z	T2000Z	T3000Z	Carbide Uncoated P T1000A	T1500A	Carbide Uncoated K G10E	Carbide Uncoated S EH510	EH520	Carbide Uncoated N H1
Finishing	 NFC	DCGT 070201M NFC	<0,1																				○	○				
		DCGT 070202M NFC	<0,2																				○	○				
		DCGT 070204M NFC	<0,4																				○	○				
		DCGT 11T301M NFC	<0,1																				○	○				
		DCGT 11T302M NFC	<0,2																				○	○				
		DCGT 11T304M NFC	<0,4																				○	○				
Finishing	 L/RFX	DCGT 0702003 LFX	0,03																	○								
		DCGT 070201 LFX	0,1																○	●	●	▲		●	●				
		DCGT 070202 LFX	0,2																○	●	●	▲		●	●				
		DCGT 070204 LFX	0,4																	●	●	▲		●	●				
		DCGT 11T3003 LFX	0,03																○	○								
		DCGT 11T301 LFX	0,1																○	●	●	▲		●	●				
		DCGT 11T302 LFX	0,2																○	●	●	▲		●	●				
		DCGT 11T304 LFX	0,4																	●	●	▲		●	●				
		DCGT 0702003 RFX	0,03																	○								
		DCGT 070201 RFX	0,1																○	●	●	▲		●	●				
		DCGT 070202 RFX	0,2																○	●	●	▲		●	●				
		DCGT 070204 RFX	0,4																	●	●	▲		●	●				
		DCGT 11T3003 RFX	0,03																○	○								
		DCGT 11T301 RFX	0,1																○	●	●	▲		●	●				
		DCGT 11T302 RFX	0,2																○	●	●	▲		●	●				
		DCGT 11T304 RFX	0,4																	●	●	▲		●	●				
Finishing ~ Light Cut	 L/RSD	DCGT 070202 LSD	0,2																		○			○	○				
		DCGT 070204 LSD	0,4																		○			○	○				
		DCGT 11T304 LSD	0,4																		○			○	○				
		DCGT 11T308 LSD	0,8																		○			○	○				
		DCGT 070202 RSD	0,2																		○			○	○				
		DCGT 070204 RSD	0,4																		○			○	○				
		DCGT 11T304 RSD	0,4																		○			○	○				
		DCGT 11T308 RSD	0,8																		○			○	○				
Light Cut	 NAG	DCGT 070202 NAG	0,2																										●
		DCGT 070204 NAG	0,4																										●
		DCGT 11T302 NAG	0,2																										●
		DCGT 11T304 NAG	0.4																										●
		DCGT 11T308 NAG	0.8																										●

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

55° Diamond Type | 7° Relief | With Insert Hole



Dimensions (mm)				
DC_ _	ℓ	ød (IC)	s	d_1
0702--	7,75	6,35	2,38	2,8
1103--	11,6	9,525	3,18	4,4
11T3--			3,97	
0902 --	9,7	7,94	2,38	3,4

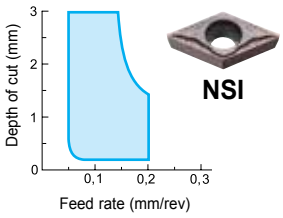
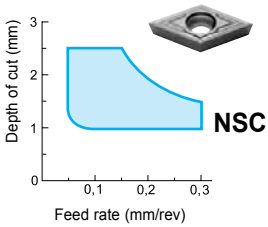


➪ D32~33 ➪ E16~17

P Steel
M Stainless Steel
K Cast Iron
N Non-Ferrous Metals
S Super Alloy
H Hardened Steel

DCGT ●●●●●● ●-■■

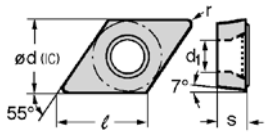
● G-Class Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated M	Carbide Coated M	Carbide Coated P/M	Carbide Coated P/M	Carbide Coated K	Carbide Coated K	Carbide Coated K	Carbide Coated K	Carbide ZX-Coated K/S	Carbide ZX-Coated M/S	Carbide ZX-Coated P/M	Cermet P	Cermet P	Carbide Uncoated P	Carbide Uncoated P	Carbide K	Carbide S	Carbide S	Carbide N
				AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	AC6030M	AC6040M	AC610M	AC630M	AC405K	AC415K	AC420K	AC900G	AC510U	AC520U	AC530U	T1500Z	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
Light Cut		DCGT 070201M NSI	<0,1									●	●					●	●	●	○			○	○				
		DCGT 070202M NSI	<0,2									●	●					●	●	●	○			○	○				
		DCGT 070204M NSI	<0,4									●	●					●	●	●	○			○	○				
		DCGT 11T301M NSI	<0,1									●	●					●	●	●	○			○	○				
		DCGT 11T302M NSI	<0,2									●	●					●	●	●	○			○	○				
		DCGT 11T304M NSI	<0,4									●	●					●	●	●	○			○	○				
		DCGT 11T308M NSI	<0,8									●	●					●	●	●	○			○	○				
		DCGT 0702003 NSC	0,03																	○				○	○				
		DCGT 11T3003 NSC	0,03																	○	●			○					
Light cut		DCGT 070201M NSC	<0,1																		●			●	●				
		DCGT 070202M NSC	<0,2																		●			●	●				
		DCGT 070204M NSC	<0,4																		●			●	●				
		DCGT 090201M NSC	<0,1																					○	○				
		DCGT 090202M NSC	<0,2																					○	○				
		DCGT 110301M NSC	<0,1																					○	○				
		DCGT 110302M NSC	<0,2																		●			●	●				
		DCGT 11T301M NSC	<0,1																	●	●			●	●				
		DCGT 11T302M NSC	<0,2																	●	●			●	●				
		DCGT 11T304M NSC	<0,4																	●	●			●	●				
		DCGT 11T308M NSC	<0,8																	●	●			●	●				

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

D DIAMOND TYPE
INSERTS FOR TURNING

55° Diamond Type | 7° Relief | With Insert Hole



Dimensions (mm)				
DC__	ℓ	ød (IC)	s	d_1
0702--	7,75	6,35	2,38	2,8
11T3--	11,6	9,525	3,97	4,4



⇨ D32~33 ⇨ E16~17

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

DCMT/-W ●●●●●● ●-■■

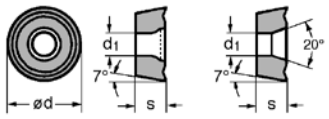
● M-Class Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P	Carbide Coated M	Carbide Coated P/M	Carbide Coated K	Carbide ZX-Coated K/S	Carbide ZX-Coated M/S	Carbide ZX-Coated P/M	Cermet Uncoated P	Carbide Uncoated K	Carbide Uncoated S	Carbide Uncoated N
				AC805P AC810P AC820P AC830P AC2000 AC3000	AC6030M AC6040M AC610M AC630M	AC405K AC415K AC420K AC900G	AC510U AC520U AC530U	T1500Z T2000Z T3000Z T1000A T1500A	G10E EH510 EH520 H1
Finishing	NFB	DCMT 070202 NFB	0,2					● ● ●		
		DCMT 070204 NFB	0,4					● ● ●		
		DCMT 070208 NFB	0,8					● ● ●		
		DCMT 11T302 NFB	0,2					● ● ●		
		DCMT 11T304 NFB	0,4					● ● ●		
		DCMT 11T308 NFB	0,8					● ● ●		
Finishing	NFP	DCMT 070202 NFP	0,2					● ▲ ● ●		
		DCMT 070204 NFP	0,4					● ▲ ● ● ●		
		DCMT 11T302 NFP	0,2					● ▲ ● ●		
		DCMT 11T304 NFP	0,4					● ▲ ● ● ●		
		DCMT 11T308 NFP	0,8					● ▲ ● ● ●		
		DCMT 11T312 NFP	1,2					● ▲ ● ●		
Finishing	NLU	DCMT 070202 NLU	0,2	● ●	● ● ● ●	▲	●	○ ● ○ ○		
		DCMT 070204 NLU	0,4	● ●	● ● ● ●	▲	●	○ ● ○ ○		
		DCMT 11T302 NLU	0,2	● ●	● ● ●	▲	●	○ ● ○ ○		
		DCMT 11T304 NLU	0,4 ●	● ●	● ● ● ●	▲	●	○ ● ○ ○		
		DCMT 11T308 NLU	0,8 ●	● ●	● ● ● ●	▲	●	○ ● ○ ○		
Light Cut	NLB	DCMT 070202 NLB	0,2					● ● ●		
		DCMT 070204 NLB	0,4					● ● ●		
		DCMT 070208 NLB	0,8					● ● ●		
		DCMT 11T302 NLB	0,2					● ● ●		
		DCMT 11T304 NLB	0,4					● ● ●		
		DCMT 11T308 NLB	0,8					● ● ●		
Light Cut	NSU	DCMT 070202 NSU	0,2	● ● ○ ▲ ▲	● ● ● ●	● ● ▲	● ● ●	● ▲ ● ● ●	○ ● ○ ○	
		DCMT 070204 NSU	0,4	● ● ○ ▲ ▲	● ● ● ●	● ● ▲	● ● ●	● ▲ ● ● ●	○ ● ○ ○	
		DCMT 070208 NSU	0,8	● ● ○ ▲ ▲	● ● ●	● ● ▲	●	○ ○ ○ ○	○ ● ○ ○	
		DCMT 11T302 NSU	0,2	● ● ○	● ● ●	● ●	●	○ ▲ ○ ○ ○		
		DCMT 11T304 NSU	0,4 ●	● ● ○ ▲ ▲	● ● ● ●	● ● ▲	● ● ●	● ▲ ● ● ●	○ ● ○ ○	
		DCMT 11T308 NSU	0,8 ●	● ● ○ ▲ ▲	● ● ● ●	● ● ▲	● ● ●	● ▲ ● ● ●	○ ● ○ ○	
Light Cut	NSK	DCMT 070204 NSK	0,4	● ● ▲ ▲						
		DCMT 070208 NSK	0,8	● ● ▲ ▲						
		DCMT 11T304 NSK	0,4	● ● ▲ ▲						
		DCMT 11T308 NSK	0,8	● ● ▲ ▲						
		DCMT 11T312 NSK	1,2	●						
Roughing	NMU	DCMT 11T304 NMU	0,4	● ● ● ▲ ▲	● ● ● ●	● ● ▲				
		DCMT 11T308 NMU	0,8	● ● ● ▲ ▲	● ● ● ●	● ● ▲				
Roughing		DCMW 11T304	0,4			● ●				
		DCMW 11T308	0,8			● ●				

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

Round Type Inserts | 7° Relief | With Insert Hole

RCMT RCMX



RC__	ℓ	ød (IC)	s	d1
1003	–	10,0	3,18	3,6
10T3			3,97	
12	–	12,0	4,76	4,2
16	–	16,0	6,35	5,2
20	–	20,0	6,35	6,5
25	–	25,0	7,94	7,2
32	–	32,0	9,52	9,5

(M0: IC is metric)

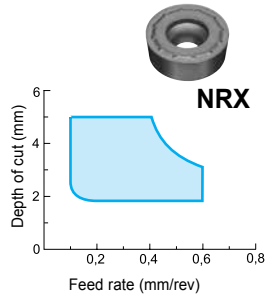


Lever lock holders for RCMX
⇨ D34~35

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

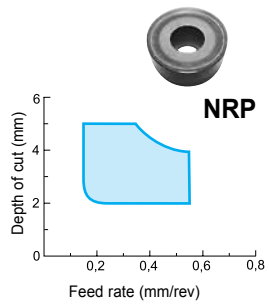
RCMT ●●●●M0 ●-■■

● M-Class Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide: Coated: P: AC805P	AC810P	AC820P	AC830P	M: AC2000	AC3000	AC6030M	AC6040M	PM: AC610M	AC630M	K: AC405K	AC415K	AC420K	AC900G	Carbide: ZX-Coated: KS: AC510U	MS: AC520U	PM: AC530U	Cermet: Uncoated: P: T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide: Uncoated: K: G10E	S: EH510	EH520	N: H1
Roughing	 NRX	RCMT 1003M0 NRX	–		●	●	●	▲	▲				●				▲												
		RCMT 10T3M0 NRX	–		●	●	●						●				▲												
		RCMT 1204M0 NRX	–		●	●	●	▲	▲				●				▲												
		RCMT 1606M0 NRX	–		●	●	●	▲	▲				●				▲												
		RCMT 2006M0 NRX	–		●	●	●	▲	▲				●				▲												
		RCMT 2507M0 NRX	–		●	●	●	▲	▲				●				▲												

RCMX ●●●●M0 ●-■■

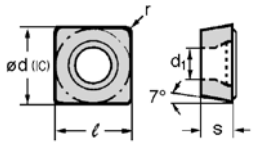
● M-Class Grooved Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide: Coated: P: AC805P	AC810P	AC820P	AC830P	M: AC2000	AC3000	AC6030M	AC6040M	PM: AC610M	AC630M	K: AC405K	AC415K	AC420K	AC900G	Carbide: ZX-Coated: KS: AC510U	MS: AC520U	PM: AC530U	Cermet: Uncoated: P: T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide: Uncoated: K: G10E	S: EH510	EH520	H: H1
Roughing	 NRP	RCMX 1003M0 NRP	–		❍	●	●	▲	▲																				
		RCMX 1204M0 NRP	–		❍	●	●	▲	▲									❍											
		RCMX 1606M0 NRP	–		❍	●	●	▲	▲																				
		RCMX 2006M0 NRP	–		❍	●	●	▲	▲									❍											
		RCMX 2507M0 NRP	–		❍	●	❍																						
		RCMX 3209M0 NRP	–		❍																								

● = Euro stock
❍ = Japan stock
▲ = To be replaced by new item

S SQUARE TYPE
INSERTS FOR TURNING

90° Square Type | 7° Relief | With Insert Hole



Dimensions (mm)				
SC__	ℓ	ød (IC)	s	d_1
0702--	7,94	7,94	2,38	3,4
0903--	9,525	9,525	3,18	4,4
09T3--	9,525	9,525	3,97	4,4
1204--	12,7	12,7	4,76	5,5



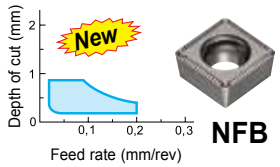
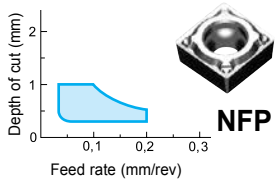
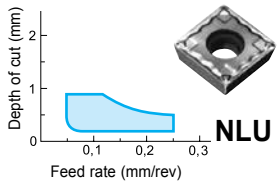
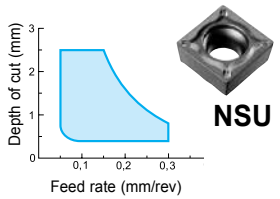
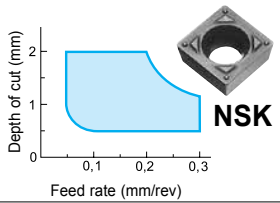
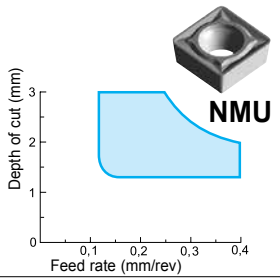
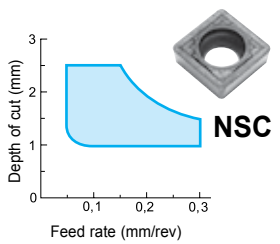
⇨ D36

"S ... SSKC" - Type
(⇨ Stock in Japan)

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

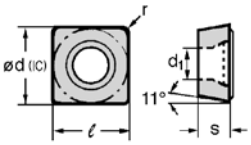
SC_T ●●●●●● ●-■■

● G/M-Class Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P AC805P	AC810P	AC820P	AC830P	P/M AC2000	AC3000	M AC6030M	AC6040M	P/M AC610M	AC630M	K AC405K	AC415K	AC420K	AC900G	Carbide ZX-Coated K/S AC510U	M/S AC520U	P/M AC530U	Cermet Uncoated P T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide K G10E	S EH510	EH520	N H1
Finishing	 NFB	SCMT 09T304 NFB	0,4																		○		○	○	○				
		SCMT 09T308 NFB	0,8																		○		○	○	○				
Finishing	 NFP	SCMT 09T304 NFP	0,4																		●	▲		●	●				
		SCMT 09T308 NFP	0,8																		●	▲		●	●				
		SCMT 120404 NFP	0,4																						○				
		SCMT 120408 NFP	0,8																						○				
Finishing	 NLU	SCMT 09T304 NLU	0,4		●					○											○		○	○	○				
		SCMT 09T308 NLU	0,8		●					○											○		○	○	○				
Light Cut	 NSU	SCMT 09T304 NSU	0,4		●	●	○	▲	▲	●		●	●	●	●		▲	●	●	●									
		SCMT 09T308 NSU	0,8		●	●	○	▲	▲	●		●	●	●	●		▲	●	●	●									
		SCMT 120404 NSU	0,4		●	●	○	▲	▲			●	●	●	●		▲			●									
		SCMT 120408 NSU	0,8		●	●	○	▲	▲			●	●	●	●		▲			●									
Light Cut	 NSK	SCMT 09T304 NSK	0,4			●	●	▲	▲																				
		SCMT 09T308 NSK	0,8			●	●	▲	▲																				
		SCMT 120404 NSK	0,4			●		▲																					
		SCMT 120408 NSK	0,8			●	●	▲	▲																				
		SCMT 120412 NSK	1,2			●		▲																					
Light - Medium Cut	 NMU	SCMT 09T308 NMU	0,8			●	●	▲	▲	●			○	●	●	●													
		SCMT 120408 NMU	0,8			●	●	▲	▲				○	●	●	●													
		SCMT 120412 NMU	1,2											●	●														
Light Cut	 NSC	SCGT 070201M NSC	<0,1																	○				○	○				
		SCGT 070202M NSC	<0,2																	○				○	○				
		SCGT 090301M NSC	<0,1																					○	○				
		SCGT 090302M NSC	<0,2																					○	○				
		SCGT 09T301M NSC	<0,1																	○				○	○				
		SCGT 09T302M NSC	<0,2																	○				○	○				

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

90° Square Type | 11° Relief | With Insert Hole



Dimensions (mm)				
SP_ _	ℓ	ød (IC)	s	d_1
0903--	9,525	9,525	3,18	3,3

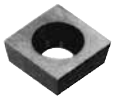


⇨ E18

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

SPGW ●●●●●●

● G-Class No Chipbreaker

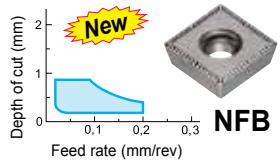
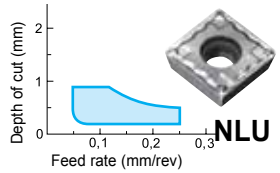
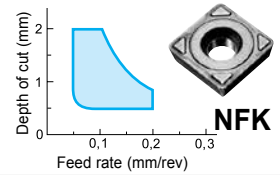
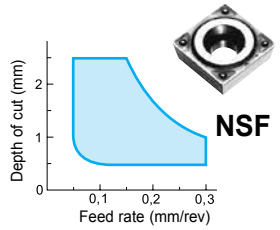
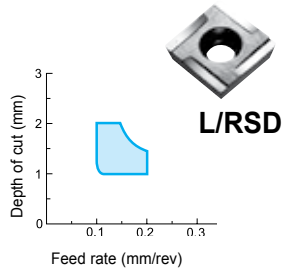
Application	Shape	ISO Cat. No.	r	AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	AC6030M	AC6040M	AC610M	AC630M	AC405K	AC415K	AC420K	AC900G	AC510U	AC520U	AC530U	T1500Z	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
				Carbide: Coated P						Coated M			Coated PM			Coated K		ZX-Coated KS	ZX-Coated MS	ZX-Coated PM	Cermet: Uncoated P					Carbide: Uncoated K	Uncoated S	Uncoated N	
Light Cut		**SPGW 090304 T**	0,4																					●				

SPGW / SPMT ..... NFK / NSF



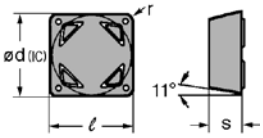
SP_T ●●●●●● ●-■■

● G/M-Class Handed and Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	AC6030M	AC6040M	AC610M	AC630M	AC405K	AC415K	AC420K	AC900G	AC510U	AC520U	AC530U	T1500Z	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
				Carbide: Coated P						Coated M			Coated PM			Coated K		ZX-Coated KS	ZX-Coated MS	ZX-Coated PM	Cermet: Uncoated P					Carbide: Uncoated K	Uncoated S	Uncoated H	
Finishing	 NFB	**SPMT 090304 NFB** **SPMT 090308 NFB**	0,4 0,8																		❍ ❍		❍ ❍	❍ ❍	❍ ❍				
Finishing	 NLU	**SPMT 090304 NLU** **SPMT 090308 NLU**	0,4 0,8							❍ ❍												❍ ❍	❍ ❍	❍ ❍				
Finishing	 NFK	**SPMT 090304 NFK**	0,4																					●				
Light - Medium Cut	 NSF	**SPMT 090304 NSF** **SPMT 090308 NSF**	0,4 0,8			● ●	● ●	▲ ▲	▲ ▲																				
Finishing - Light Cut	 L/RSD	**SPGT 090302 LSD** **SPGT 090304 LSD** **SPGT 090308 LSD** **SPGT 090302 RSD** **SPGT 090304 RSD** **SPGT 090308 RSD**	0,2 0,4 0,8 0,2 0,4 0,8																		❍ ❍ ❍ ❍ ❍ ❍		❍ ❍ ❍	❍ ❍ ❍	❍ ❍ ❍				

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

90° Square Type | 11° Relief | Without Insert Hole



Dimensions (mm)				
SP_ _	ℓ	ød (IC)	s	d_1
0903--	9,525	9,525	3,18	-
1203--	12,7	12,7	3,18	-

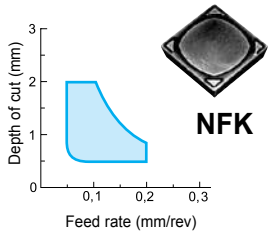
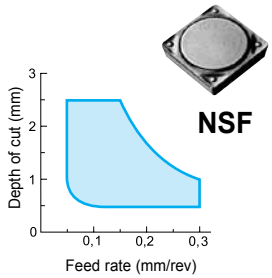


"S… CSKP…09/12" - Type
(⇨ Stock in Japan)

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

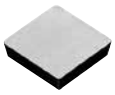
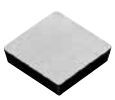
SPMR ●●●●●● ●-■■

● M-Class Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P	Carbide Coated M	Carbide Coated P/M	Carbide Coated K	Carbide ZX-Coated K/S	Carbide ZX-Coated M/S	Carbide ZX-Coated P/M	Cermet Uncoated P	Cermet Uncoated K	Carbide Uncoated S	Carbide Uncoated N
				AC805P AC810P AC820P AC830P AC2000 AC3000	AC6030M AC6040M AC610M AC630M	AC405K AC415K AC420K AC900G	AC510U AC520U AC530U	T1500Z T2000Z T3000Z T1000A T1500A	G10E	EH510 EH520 H1
Finishing	 NFK	SPMR 090304 NFK	0,4					○			○ ●			
		SPMR 090308 NFK	0,8					○		○	○ ○			
		SPMR 120304 NFK	0,4					○			○ ○			
		SPMR 120308 NFK	0,8					○			○ ○			
Light- Medium Cut	 NSF	SPMR 090304 NSF	0,4	○ ○										
		SPMR 090308 NSF	0,8	● ● ▲ ▲										
		SPMR 120304 NSF	0,4	● ● ▲										
		SPMR 120308 NSF	0,8	● ● ▲										
		SPMR 120312 NSF	1,2	● ▲										

SP_N ●●●●●●

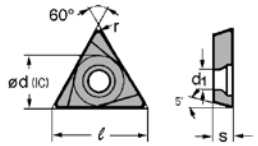
● G/M-Class No Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P	Carbide Coated M	Carbide Coated P/M	Carbide Coated K	Carbide ZX-Coated K/S	Carbide ZX-Coated M/S	Carbide ZX-Coated P/M	Cermet Uncoated P	Cermet Uncoated K	Carbide Uncoated S	Carbide Uncoated H
				AC805P AC810P AC820P AC830P AC2000 AC3000	AC6030M AC6040M AC610M AC630M	AC405K AC415K AC420K AC900G	AC510U AC520U AC530U	T1500Z T2000Z T3000Z T1000A T1500A	G10E	EH510 EH520 H1
Medium Cut		SPGN 090304	0,4								○ ●			
		SPGN 090308	0,8								○ ●			
		SPGN 120304	0,4								○ ○			
		SPGN 120308	0,8								○ ○			
Medium Cut		SPMN 090304	0,4								○ ○			
		SPMN 090308	0,8								○ ○			
		SPMN 120308	0,8								○ ○			
		SPMN 120312	1,2								○ ○			

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

60° Triangle Type

5° Relief
With Insert Hole



Dimensions (mm)

TB_ _	ℓ	ød (IC)	s	d1
0601--	6,9	3,97	1,59	2,3

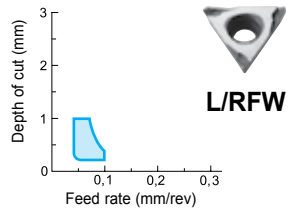
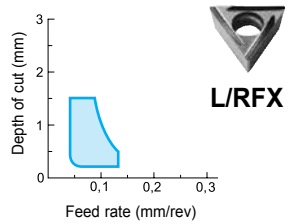
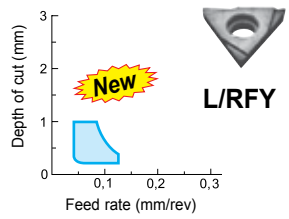
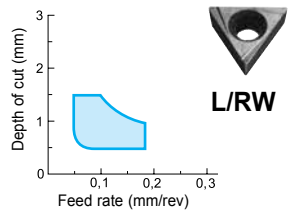


⇨ E20

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

TBGT ●●●●●● ●-■■

● G-Class Handed Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide: Coated: P: AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	M: AC6030M	AC6040M	AC610M	PM: AC630M	K: AC405K	AC415K	AC420K	AC900G	ZX-Coated: KS: AC510U	MS: AC520U	PM: AC530U	Cermet: P: T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide: Uncoated: K: G10E	S: EH510	EH520	N: H1
Finishing	 L/RFW	**TBGT 060102 LFW**	0,2																		○				○				
		TBGT 060104 LFW	0,4																		○				○				
		TBGT 060102 RFW	0,2																		○				○				
		TBGT 060104 RFW	0,4																		○				○				
Finishing	 L/RFX	**TBGT 060102 LFX**	0,2															○		○									
		TBGT 060104 LFX	0,4															○		○									
		TBGT 060102 RFX	0,2															○		○									
		TBGT 060104 RFX	0,4															○		○									
Finishing	 L/RFY	**TBGT 060102 LFY**	0,2																					○	○				
		TBGT 060104 LFY	0,4																					○	○				
		TBGT 060102 RFY	0,2																					○	○				
		TBGT 060104 RFY	0,4																					○	○				
Finishing-Light Cut	 L/RW	**TBGT 060102 LW**	0,2																	○	○	○		○	●				
		TBGT 060104 LW	0,4																	○	○			○	●				
		TBGT 060102 RW	0,2																	○	○			○	●				
		TBGT 060104 RW	0,4																	○	○			○	●				

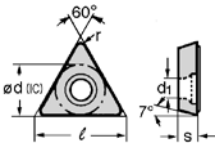
TBGW ●●●●●●

● G-Class No Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide: Coated: P: AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	M: AC6030M	AC6040M	AC610M	PM: AC630M	K: AC405K	AC415K	AC420K	AC900G	ZX-Coated: KS: AC510U	MS: AC520U	PM: AC530U	Cermet: P: T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide: Uncoated: K: G10E	S: EH510	EH520	H: H1
Light Cut		**TBGW 060102**	0,2																						○				
		TBGW 060104	0,4																						○				

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

60° Triangle Type | 0° Relief | With Insert Hole



Dimensions (mm)

TC_ _	ℓ	ød (IC)	s	d_1
0802--	8,2	4,76	2,38	2,3
0902--	9,62	5,56	2,38	2,5
1102--	11,0	6,35	2,38	2,8
16T3--	16,5	9,525	3,97	4,3

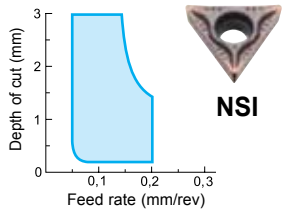
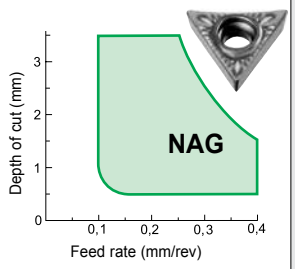
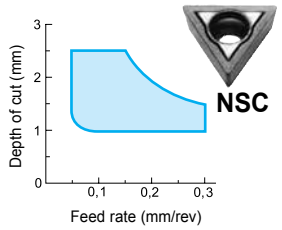


⇨ D37 ⇨ E19

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

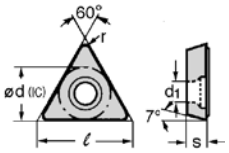
TCGT ●●●●●● ●-■■

● G-Class Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide: Coated: P: AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	Coated: M: AC6030M	AC6040M	Coated: P/M: AC610M	AC630M	Coated: K: AC405K	AC415K	AC420K	AC900G	ZX-Coated: K/S: AC510U	ZX-Coated: M/S: AC520U	ZX-Coated: P/M: AC530U	Cermet: Uncoated: P: T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide: Uncoated: K: G10E	S: EH510	EH520	N: H1
Light cut		**TCGT 110204M NSI**	<0,4									●	●					●	●	●								
Light Cut		**TCGT 110202 NAG**	0,2																									●
		TCGT 110204 NAG	0,4																									●
		TCGT 16T304 NAG	0,4																									●
		TCGT 16T308 NAG	0,8																									●
Light Cut		**TCGT 080201M NSC**	<0,1																	○				○	○			
		TCGT 080202M NSC	<0,2																	○				○	○			
		TCGT 090201M NSC	<0,1																	○				○	○			
		TCGT 090202M NSC	<0,2																	○				●	●			
		TCGT 110201M NSC	<0,1																	○				○	○			
		TCGT 110202M NSC	<0,2																	●				●	●			
		TCGT 110204M NSC	<0,4																	●				●	●			
		TCGT 110301M NSC	<0,1																					○	○			
		TCGT 110302M NSC	<0,2																					○	○			

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

60° Triangle Type | 7° Relief | With Insert Hole



Dimensions (mm)				
TC_ _	ℓ	ød (IC)	s	d_1
0902--	9,62	5,56	2,38	2,5
1102--	11,0	6,35	2,38	2,8
16T3--	16,5	9,525	3,97	4,3

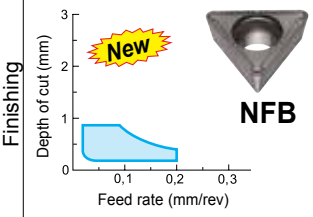
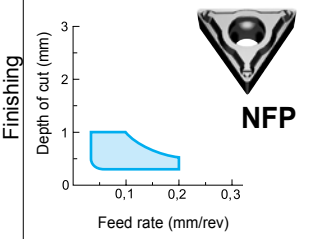
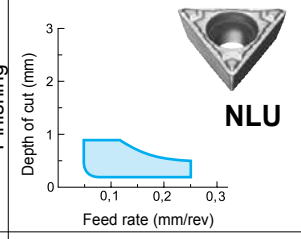
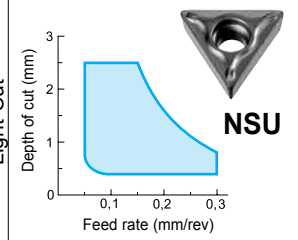
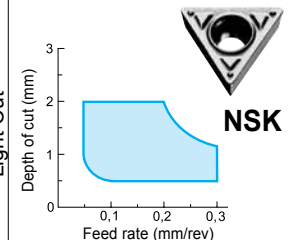


⇨ D37 ⇨ E19

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

TCMT/-W ●●●●●● ●-■■

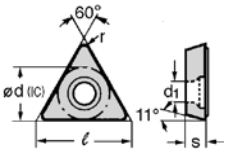
● M-Class Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide: Coated P: AC805P	AC810P	AC820P	AC830P	Coated M: AC2000	AC3000	AC6030M	AC6040M	Coated P/M: AC610M	AC630M	Coated K: AC405K	AC415K	AC420K	AC900G	ZX-Coated K/S: AC510U	ZX-Coated M/S: AC520U	ZX-Coated P/M: AC530U	Cermet Uncoated P: T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide K: G10E	Carbide S: EH510	EH520	Carbide N: H1
Finishing	 NFB	**TCMT 110204 NFB**	0,4																		●		●	●	●				
		TCMT 110208 NFB	0,8																		●		●	●	●				
Finishing	 NFP	**TCMT 090202 NFP**	0,2																						●				
		TCMT 090204 NFP	0,4																						●				
		TCMT 090208 NFP	0,8																						●				
		TCMT 110202 NFP	0,2																		●	▲			●				
		TCMT 110204 NFP	0,4																		●	▲	●		●				
		TCMT 110208 NFP	0,8																		●	▲	●		●				
		TCMT 16T304 NFP	0,4																		●	▲	●		●				
		TCMT 16T308 NFP	0,8																		●	▲	●		●				
Finishing	 NLU	**TCMT 110204 NLU**	0,4		❍	●				❍										●	❍		❍	❍	❍				
		TCMT 110208 NLU	0,8		❍	●				❍											❍		❍	❍	❍				
Light Cut	 NSU	**TCMT 110204 NSU**	0,4		●	●	❍	▲	▲	●	●	●	●	●	●		▲			●	●	▲	●						
		TCMT 110208 NSU	0,8		●	●	❍	▲	▲	●	●	●	●	●	●		▲			●			●						
		TCMT 16T304 NSU	0,4		●	●	❍	▲	▲	●		●	●	●	●		▲			●									
		TCMT 16T308 NSU	0,8		●	●	❍	▲	▲	●		●	●	●	●		▲			●									
Light Cut	 NSK	**TCMT 110204 NSK**	0,4			●	●	▲	▲																				
		TCMT 110208 NSK	0,8			●	●	▲	▲																				
		TCMT 16T304 NSK	0,4			●	●	▲	▲																				
		TCMT 16T308 NSK	0,8			●	●	▲																					
		TCMT 16T312 NSK	1,2			●		▲																					
Light Cut		**TCMW 110204**	0,4											●	●														
		TCMW 110208	0,8											●	●														
		TCMW 16T304	0,4											●	●														
		TCMW 16T308	0,8											●	●														

● = Euro stock
❍ = Japan stock
▲ = To be replaced by new item

60° Triangle Type

11° Relief
With Insert Hole



Dimensions (mm)				
TP_ _	ℓ	ød (IC)	s	d_1
0802--	8,2	4,76	2,38	2,3
0902--	9,6	5,56	2,38	2,8
1103--	11,0	6,35	3,18	3,3
1604--	16,5	9,525	4,76	4,3

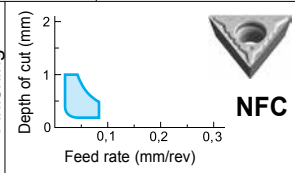
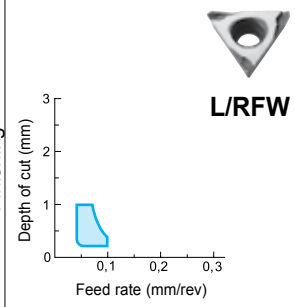
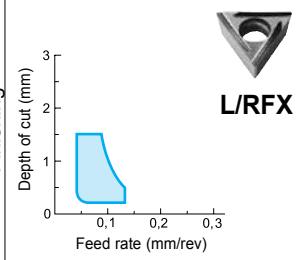
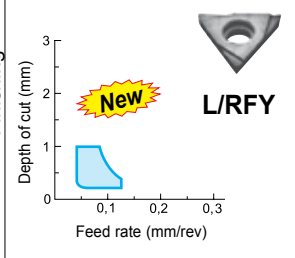


⇨ E20

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

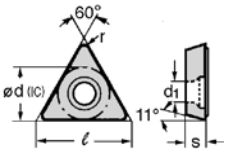
TPGT ●●●●●● ●-■■

● G-Class Handed and Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide: Coated: P: AC805P	AC810P	AC820P	AC830P	P/M: AC2000	AC3000	M: AC6030M	AC6040M	P/M: AC610M	AC630M	K: AC405K	AC415K	AC420K	AC900G	K/S: AC510U	M/S: AC520U	P/M: AC530U	Cermet: ZX-Coated: P: T1500Z	T2000Z	T3000Z	Uncoated: P: T1000A	T1500A	Carbide: Uncoated: K: G10E	S: EH510	EH520	N: H1
Finishing	 NFC	**TPGT 110302M NFC**	<0,2																					○	○				
		TPGT 110304M NFC	<0,4																					○	○				
Finishing	 L/RFW	**TPGT 080202 LFW**	0,2																		○			○	○				
		TPGT 080204 LFW	0,4																		○			○	○				
		TPGT 110202 LFW	0,2																		○			○	○				
		TPGT 110204 LFW	0,4																		○			○	○				
		TPGT 080202 RFW	0,2																		○			○	○				
		TPGT 080204 RFW	0,4																		○			○	○				
		TPGT 110202 RFW	0,2																		○			○	○				
		TPGT 110204 RFW	0,4																		○			○	○				
Finishing	 L/RFX	**TPGT 090204 LFX**	0,4																					○	○				
		TPGT 110302 LFX	0,2																○	●									
		TPGT 110304 LFX	0,4																○	●									
		TPGT 110302 RFX	0,2																○	●									
		TPGT 110304 RFX	0,4																○	●									
		TPGT 110308 RFX	0,8																○										
Finishing	 New L/RFY	**TPGT 080202 LFY**	0,2																					○	○				
		TPGT 080204 LFY	0,4																					○	○				
		TPGT 110202 LFY	0,2																					○	○				
		TPGT 110204 LFY	0,4																					○	○				
		TPGT 110208 LFY	0,8																						○				
		TPGT 110302 LFY	0,2																		○		○	○	○				
		TPGT 110304 LFY	0,4																		○		○	○	○				
		TGPT 110308 LFY	0,8																						○				
		TPGT 080202 RFY	0,2																					○	○				
		TPGT 080204 RFY	0,4																					○	○				
		TPGT 110202 RFY	0,2																					○	○				
		TPGT 110204 RFY	0,4																					○	○				
		TPGT 110208 RFY	0,8																						○				
		TPGT 110302 RFY	0,2																		○			○	○				
		TPGT 110304 RFY	0,4																		○			○	○				
		TPGT 110308 RFY	0,8																						○				

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

60° Triangle Type | 11° Relief | With Insert Hole



Dimensions (mm)				
TP__	ℓ	ød (IC)	s	d_1
0802--	8,2	4,76	2,38	2,3
1103--	11,0	6,35	3,18	3,3
1604--	16,5	9,525	4,76	4,3

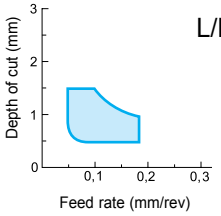
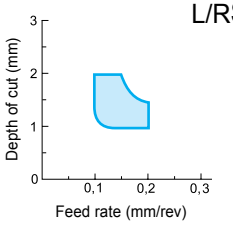
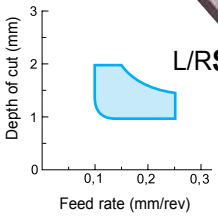


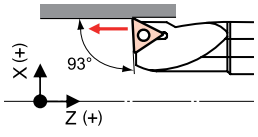
⇨ E20

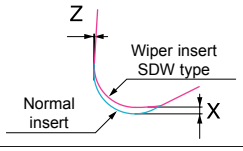
- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

TPGT ●●●●●● ●-■■

● G-Class Handed Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide: Coated: P: AC805P	AC810P	AC820P	AC830P	Coated: M: AC2000	AC3000	AC6030M	AC6040M	Coated: P,M: AC610M	AC630M	Coated: K: AC405K	AC415K	AC420K	AC900G	ZX-Coated: K,S: AC510U	ZX-Coated: M,S: AC520U	ZX-Coated: P,M: AC530U	Cermet: Uncoated: P: T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide: Uncoated: K: G10E	S: EH510	EH520	N: H1
Finishing-Light Cutting	 L/R**W** 	**TPGT 080202 LW**	0,2																	●					●				
		TPGT 080204 LW	0,4																	●					●				
		TPGT 110302 LW	0,2																	●					●				
		TPGT 110304 LW	0,4																	●					●				
		TPGT 160402 LW	0,2																						●				
		TPGT 160404 LW	0,4																						●				
		TPGT 080202 RW	0,2																						●				
		TPGT 080204 RW	0,4																	●					●				
		TPGT 110302 RW	0,2																	●					●				
		TPGT 110304 RW	0,4																	●					●				
		TPGT 160404 RW	0,4																						●				
Finishing-Light Cutting	 L/R**SD** 	**TPGT 110302 LSD**	0,2															❍			❍		❍	❍	●				
		TPGT 110304 LSD	0,4															❍		●	❍		❍	❍	●				
		TPGT 110308 LSD	0,8																		❍		❍	❍	❍				
		TPGT 160402 LSD	0,2																					❍	●				
		TPGT 160404 LSD	0,4															❍			❍		❍	❍	●				
		TPGT 160408 LSD	0,8																		❍			❍	❍				
		TPGT 110302 RSD	0,2																		❍			❍	●				
		TPGT 110304 RSD	0,4																	●	❍		❍	❍	●				
		TPGT 110308 RSD	0,8																		❍			❍	❍				
		TPGT 160402 RSD	0,2																					❍	❍				
		TPGT 160404 RSD	0,4																		❍		❍	❍	●				
		TPGT 160408 RSD	0,8																		❍			❍	●				
Finishing-Light Cutting	 L/R**SDW** 	**TPGX 110304 L-SDW**	0,4																				●						
		TPGX 110308 L-SDW	0,8																				●						
		TPGX 160404 L-SDW	0,4																		❍				❍				
		TPGX 160408 L-SDW	0,8																		❍				❍				
		TPGX 110304 R-SDW	0,4																				●						
		TPGX 110308 R-SDW	0,8																				●						
		TPGX 160404 R-SDW	0,4																		❍				❍				
		TPGX 160408 R-SDW	0,8																		❍				❍				
Light Cut		**TPGW 080202**	0,2																					❍	❍				
		TPGW 110304	0,4																					❍	❍				
		TPGW 110308	0,8																					❍	❍				





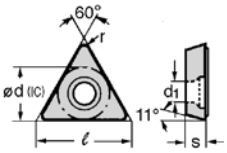
(Note) The cutting point position of the SDW type does not follow the ISO standard.
Wenn using on a boring holder with a 93° approach angle, there is a need to revise the cutting point position (refer to right table) relative to using standard inserts.

r	Compensation (mm)	
	X (Diam. change)	Z
0,4	+0,12 (Ø: +0,24)	-0,02
0,8	+0,12 (Ø: +0,24)	-0,02

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

T TRIANGLE TYPE
INSERTS FOR TURNING

60° Triangle Type | 11° Relief | With Insert Hole



Dimensions (mm)				
TP__	ℓ	ød (IC)	s	d_1
0802--	8,2	4,76	2,38	2,4
0902--	9,6	5,56	2,38	2,8
1103--	11,0	6,35	3,18	3,3
1604--	16,5	9,525	4,76	4,3



⇨ E20

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

TPMT ●●●●●● ●-■■

● M-Class Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	M AC6030M	AC6040M	PM AC610M	PM AC630M	K AC405K	AC415K	AC420K	AC900G	Carbide Coated ZX-Coated KS AC510U	MS AC520U	PM AC530U	Cermet Uncoated P T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide Uncoated K G10E	S EH510	EH520	N H1
Finishing	NFB	**TPMT 080202 NFB**	0,2																		○		○	○	○				
		TPMT 080204 NFB	0,4																		○		○	○	○				
		TPMT 090202 NFB	0,2																		○		○	○	○				
		TPMT 090204 NFB	0,4																		○		○	○	○				
		TPMT 110302 NFB	0,2																		○		○	○	○				
		TPMT 110304 NFB	0,4																		○		○	○	○				
		TPMT 110308 NFB	0,8																		○		○	○	○				
		TPMT 160304 NFB	0,4																		○		○	○	○				
		TPMT 160404 NFB	0,4																		○		○	○	○				
		TPMT 160408 NFB	0,8																		○		○	○	○				
Light Cut	NLB	**TPMT 090202 NLB**	0,2																		○		○		○				
		TPMT 090204 NLB	0,4																		○		○		○				
		TPMT 110302 NLB	0,2																		○		○		○				
		TPMT 110304 NLB	0,4																		○		○		○				
		TPMT 110308 NLB	0,8																		○		○		○				
Finishing	NFK	**TPMT 110304 NFK**	0,4																					●	●				
		TPMT 110308 NFK	0,8																					●	●				
		TPMT 160404 NFK	0,4																					●	●				
		TPMT 160408 NFK	0,8																					●	●				
Finishing	NLU	**TPMT 080202 NLU**	0,2							●	●													○	○				
		TPMT 080204 NLU	0,4		●					●	●	●					▲						●	○	○				
		TPMT 080208 NLU	0,8									●					▲						●						
		TPMT 090202 NLU	0,2																		○		○	○	○				
		TPMT 090204 NLU	0,4																		○		○	○	○				
		TPMT 110302 NLU	0,2								●										○			○	○				
		TPMT 110304 NLU	0,4		●					●	●	●					▲		●		○		●	○	○				
		TPMT 110308 NLU	0,8		●					●	●	●					▲		●		○		●	○	○				
Light Cut	NSU	**TPMT 080202 NSU**	0,2							●	●													○	○				
		TPMT 080204 NSU	0,4							●	●													○	○				
		TPMT 110302 NSU	0,2			○	○			●	●										○			○	○				
		TPMT 110304 NSU	0,4		●	●	○	▲		●	●	●	●	●	●		▲		●		○	▲	○	○	●				
		TPMT 110308 NSU	0,8		●	●	○	▲		●	●	●	●	●	●		▲		●		○	▲	○	○	●				
		TPMT 160404 NSU	0,4		●	●	○	▲		○		●	●	●	●		▲		●		○	▲	○	○	●				
		TPMT 160408 NSU	0,8		●	●	○	▲		○		●	●	●	●		▲		●		○	▲	○	○	●				
Light -Medium Cut	NMU	**TPMT 110304 NMU**	0,4			○				●		○	○																
		TPMT 110308 NMU	0,8							●		○	○																
		TPMT 160404 NMU	0,4			○				○																			
		TPMT 160408 NMU	0,8			○				○																			

TPMT/-H ●●●●●● NSF

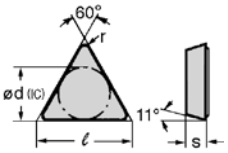
● M-Class Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	M AC6030M	AC6040M	PM AC610M	PM AC630M	K AC405K	AC415K	AC420K	AC900G	Carbide Coated ZX-Coated KS AC510U	MS AC520U	PM AC530U	Cermet Uncoated P T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide Uncoated K G10E	S EH510	EH520	H H1
Light -Medium Cut	NSF	**TPMH 110304 NSF**	0,4			●	●	▲	▲																				
		TPMH 110308 NSF	0,8			●	●	▲	▲																				
		TPMT 160404 NSF	0,4			●	●	▲	▲																				
		TPMT 160408 NSF	0,8			●	●	▲	▲																				

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

60° Triangle Type

5°/11° Relief
Without Insert Hole



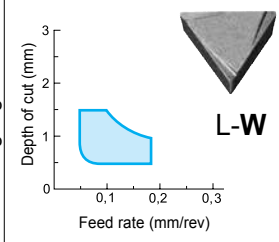
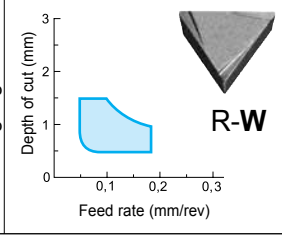
Dimensions (mm)				
TP/TB_ _	ℓ	ød (IC)	s	d_1
0601--	6,9	3,97	1,59	–
0902--	9,6	5,56	2,38	–
1103--	11,0	6,35	3,18	–
1603--	16,5	9,525	3,18	–



P Steel
M Stainless Steel
K Cast Iron
N Non-Ferrous Metals
S Super Alloy
H Hardened Steel

TPGR ●●●●●● ●-■

● G-Class Handed Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	Carbide Coated M AC6030M	AC6040M	AC610M	AC630M	Carbide Coated P/M AC405K	Carbide Coated K AC415K	AC420K	AC900G	Carbide ZX-Coated K/S AC510U	ZX-Coated M/S AC520U	ZX-Coated P/M AC530U	Cermet P T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide Uncoated K G10E	Uncoated S EH510	EH520	H H1
Finishing-Light Cut	 L-W	**TPGR 090202 LW**	0,2																						○				
		TPGR 090204 LW	0,4																						○				
		TPGR 090208 LW	0,8																						○				
		TPGR 110302 LW	0,2																		○			○	○				
		TPGR 110304 LW	0,4																		○			○	●				
		TPGR 110308 LW	0,8																		○			○	○				
		TPGR 160302 LW	0,2																		○			○	○				
		TPGR 160304 LW	0,4																		○			○	●				
		TPGR 160308 LW	0,8																		○			○	●				
Finishing-Light Cut	 R-W	**TPGR 090202 RW**	0,2																						○				
		TPGR 090204 RW	0,4																						○				
		TPGR 090208 RW	0,8																						○				
		TPGR 110302 RW	0,2																		○			○	○				
		TPGR 110304 RW	0,4																		○			○	●				
		TPGR 160302 RW	0,2																		○			○	○				
		TPGR 160304 RW	0,4																		○			○	●				
		TPGR 160308 RW	0,8																		○			○	●				

TBG_ ●●●●●● ●-■

● G-Class No Chipbreaker/ Handed Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	Carbide Coated M AC6030M	AC6040M	AC610M	AC630M	Carbide Coated P/M AC405K	Carbide Coated K AC415K	AC420K	AC900G	Carbide ZX-Coated K/S AC510U	ZX-Coated M/S AC520U	ZX-Coated P/M AC530U	Cermet P T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide Uncoated K G10E	Uncoated S EH510	EH520	H H1
Fin.-Light-C. Light Cut		**TBGN 060104**	0,4																						○				
		**TBGR 060104 LW**	0,4																						○				

TPGN ●●●●●●

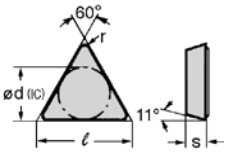
● G-Class No Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	Carbide Coated M AC6030M	AC6040M	AC610M	AC630M	Carbide Coated P/M AC405K	Carbide Coated K AC415K	AC420K	AC900G	Carbide ZX-Coated K/S AC510U	ZX-Coated M/S AC520U	ZX-Coated P/M AC530U	Cermet P T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide Uncoated K G10E	Uncoated S EH510	EH520	H H1
Light Cut		**TPGN 090202**	0,2																						○				
		TPGN 090204	0,4																						○				
		TPGN 090208	0,8																						○				
		TPGN 110302	0,2																					○	○				
		TPGN 110304	0,4																					○	○				
		TPGN 110308	0,8																					○	○				
		TPGN 160302	0,2																					○	○				
		TPGN 160304	0,4																					○	○				
		TPGN 160308	0,8																					○	○				

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

60° Triangle Type

11°/20° Relief
Without Insert Hole



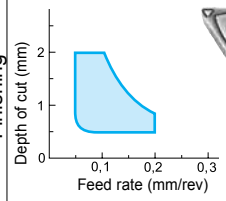
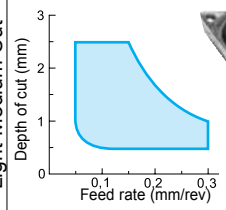
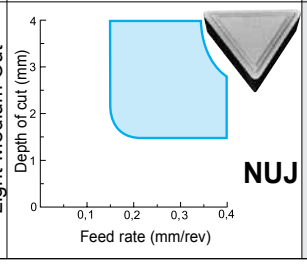
Dimensions (mm)				
TP__	ℓ	ød (IC)	s	d_1
0902--	9,6	5,56	2,38	–
1103--	11,0	6,35	3,18	–
1603--	16,5	9,525	3,18	–
2204--	22,0	12,7	4,76	–



- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

TPMR ●●●●●● ●-■■

● M-Class Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	Coated M AC6030M	AC6040M	AC610M	Coated PM AC630M	Coated K AC405K	AC415K	AC420K	AC900G	ZX-Coated KS AC510U	ZX-Coated MS AC520U	ZX-Coated PM AC530U	Cermet P T1500Z	T2000Z	Uncoated P T3000Z	T1000A	T1500A	Carbide K G10E	Uncoated S EH510	EH520	N H1
Finishing	 NFK	TPMR 090204 NFK	0,4																						○				
		TPMR 110302 NFK	0,2																						●				
		TPMR 110304 NFK	0,4																						●				
		TPMR 110308 NFK	0,8																						●				
		TPMR 160304 NFK	0,2																						●				
		TPMR 160308 NFK	0,4																						●				
		TPMR 160312 NFK	1,2																						○				
Light-Medium Cut	 NSF	TPMR 110304 NSF	0,4			●	●	▲																					
		TPMR 110308 NSF	0,8			●	●	▲																					
		TPMR 160304 NSF	0,4			●	●	▲	▲																				
		TPMR 160308 NSF	0,8			●	●	▲	▲																				
		TPMR 160312 NSF	1,2			●																							
Light-Medium Cut	 NUJ	TPMR 110304 NUJ	0,4					▲																					
		TPMR 110308 NUJ	0,8					▲																					
		TPMR 160304 NUJ	0,4					▲	▲																				
		TPMR 160308 NUJ	0,8					▲	▲																				

TPMN ●●●●●

● M-Class No Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	Coated M AC6030M	AC6040M	AC610M	Coated PM AC630M	Coated K AC405K	AC415K	AC420K	AC900G	ZX-Coated KS AC510U	ZX-Coated MS AC520U	ZX-Coated PM AC530U	Cermet P T1500Z	T2000Z	Uncoated P T3000Z	T1000A	T1500A	Carbide K G10E	Uncoated S EH510	EH520	H H1
Medium Cut		TPMN 160308	0,8																					○	○				
		TPMN 220408	0,8																					○	○				

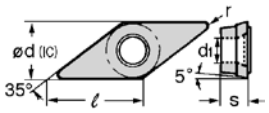
TEGN ●●●●●●

● E-Class No Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	Coated M AC6030M	AC6040M	AC610M	Coated PM AC630M	Coated K AC405K	AC415K	AC420K	AC900G	ZX-Coated KS AC510U	ZX-Coated MS AC520U	ZX-Coated PM AC530U	Cermet P T1500Z	T2000Z	Uncoated P T3000Z	T1000A	T1500A	Carbide K G10E	Uncoated S EH510	EH520	H H1
Light-Medium Cut		TEGN 160308	0,8																					○					

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

35° Diamond Type | 5° Relief | With Insert Hole



Dimensions (mm)

VB__	ℓ	ød (IC)	s	d_1
1102--	11,0	6,35	2,38	2,8
1103--			3,18	
1604--	16,6	9,525	4,76	4,4

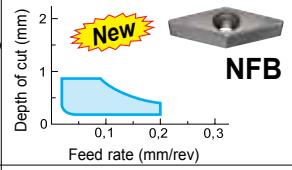
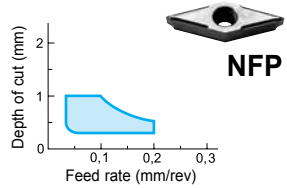
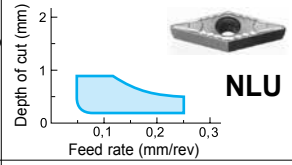
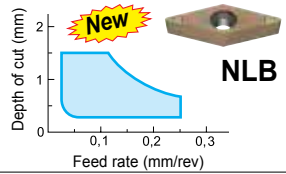
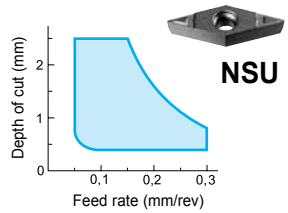
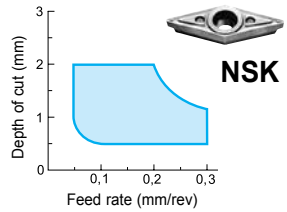
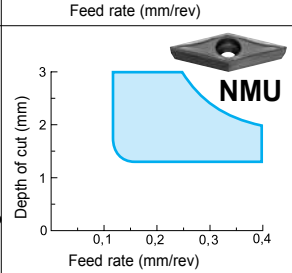


⇨ D38 ⇨ E21~22

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

VBMT/-W ●●●●●● ●-■■

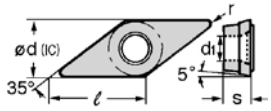
● M-Class Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P AC805P	AC810P	AC820P	AC830P	Carbide Coated M AC2000	AC3000	AC6030M	AC6040M	Carbide Coated P/M AC610M	AC630M	Carbide Coated K AC405K	AC415K	AC420K	AC900G	Cermet ZX-Coated K/S AC510U	M/S AC520U	P/M AC530U	Cermet Uncoated P T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide Uncoated K G10E	S EH510	EH520	N H1
Finishing	 NFB	VBMT 110302 NFB	0,2																		○		○	○	○				
		VBMT 110304 NFB	0,4																		○		○	○	○				
		VBMT 110308 NFB	0,8																		○		○	○	○				
		VBMT 160404 NFB	0,4																		●		●	●	●				
		VBMT 160408 NFB	0,8																		●		●	●	●				
Finishing	 NFP	VBMT 110202 NFP	0,2																			▲	●	●	●				
		VBMT 110204 NFP	0,4																			▲	●	●	●				
		VBMT 110208 NFP	0,8																			▲							
		VBMT 160404 NFP	0,4																	●		▲	●	●	●				
		VBMT 160408 NFP	0,8																	●		▲	●	●	●				
Finishing	 NLU	VBMT 110302 NLU	0,2																		○			○	○				
		VBMT 110304 NLU	0,4		○	○				●											○		○	○	○				
		VBMT 110308 NLU	0,8							○	●																		
		VBMT 160404 NLU	0,4	●	●				○	●										●	○		○	○	○				
		VBMT 160408 NLU	0,8		●	●				○	●										○		○	○	○				
Light Cut	 NLB	VBMT 160404 NLB	0,4																		●		●		●				
		VBMT 160408 NLB	0,8																		●		●		●				
		VBMT 160412 NLB	1,2																		●		●		●				
Light Cut	 NSU	VBMT 110204 NSU	0,4		●	●		▲				●	●							●									
		VBMT 110208 NSU	0,8		●	●		▲				●	●							●									
		VBMT 110304 NSU	0,4		●	●		▲			●	●	●	●	●					●									
		VBMT 110308 NSU	0,8		●	●		▲		●		●	●	●	●					●									
		VBMT 160404 NSU	0,4		●	●	○	▲	▲	●	●	●	●	●	●		▲	●	●	●	●	▲	●	○	○				
		VBMT 160408 NSU	0,8		●	●	○	▲	▲	●	●	●	●	●	●		▲	●	●	●	●	▲	●	○	○				
Light Cut	 NSK	VBMT 110204 NSK	0,4			●	●	▲																					
		VBMT 110208 NSK	0,8			●	●	▲	▲																				
		VBMT 160404 NSK	0,4			●	●	▲	▲										●	●									
		VBMT 160406 NSK	0,6			●	●	▲	▲																				
		VBMT 160408 NSK	0,8			●	●	▲	▲										●	●									
		VBMT 160412 NSK	1,2			●	●	▲	▲																				
Light - Medium Cut	 NMU	VBMT 160408 NMU	0,8		●								●				▲												
Light Cut		VBMW 160404	0,4											●	●														
		VBMW 160408	0,8											●	●														

●= Euro stock
○= Japan stock
▲= To be replaced by new item

V DIAMOND TYPE
INSERTS FOR TURNING

35° Diamond Type | 5° Relief | With Insert Hole



VB__	ℓ	ød (IC)	s	d1
1102--	11,0	6,35	2,38	2,8
1103--			3,18	
1604--	16,6	9,525	4,76	4,4

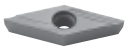
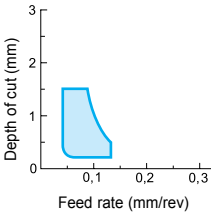
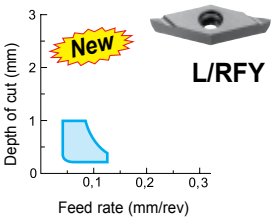


⇨ D38 ⇨ E21~22

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

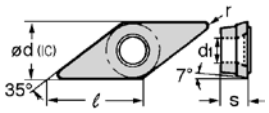
VBGT ●●●●●● ●-■■

● G-Class Handed Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide: Coated: P: AC805P	AC810P	AC820P	AC830P	Coated: M: AC2000	AC3000	AC6030M	AC6040M	Coated: P/M: AC610M	AC630M	Coated: K: AC405K	AC415K	AC420K	AC900G	ZX-Coated: K/S: AC510U	ZX-Coated: M/S: AC520U	ZX-Coated: P/M: AC530U	Cermet: Uncoated: P: T1500Z	T2000Z	T3000Z	T1000A	T1500A	Carbide: Uncoated: K: G10E	S: EH510	EH520	N: H1
Finishing	 L/RFX 	VBGT 110301 LFX	0,1																		○			○	○				
		VBGT 110302 LFX	0,2																		○			○	○				
		VBGT 110304 LFX	0,4																		○			○	○				
		VBGT 160402 LFX	0,2																					○	○				
		VBGT 160404 LFX	0,4																					○	○				
		VBGT 110301 RFX	0,1																		○			○	○				
		VBGT 110302 RFX	0,2																		○			○	○				
		VBGT 110304 RFX	0,4																		○			○	○				
		VBGT 160402 RFX	0,2																					○	○				
		VBGT 160404 RFX	0,4																					○	○				
Finishing	 L/RFY	VBGT 110301 LFY	0,1																		○			○	○				
		VBGT 110302 LFY	0,2																		○			○	○				
		VBGT 110301 RFY	0,1																		○			○	○				
		VBGT 110302 RFY	0,2																		○			○	○				

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

35° Diamond Type | 7° Relief | With Insert Hole



Dimensions (mm)				
VC_ _	ℓ	ød (IC)	s	d_1
1103--	11,0	6,35	3,18	2,8
1604--	16,6	9,525	4,76	4,4



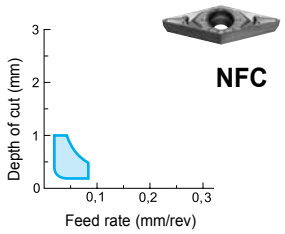
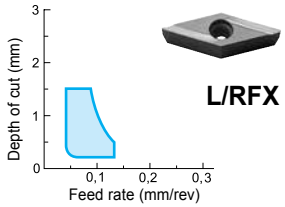
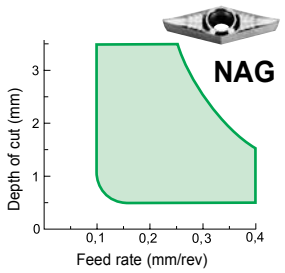
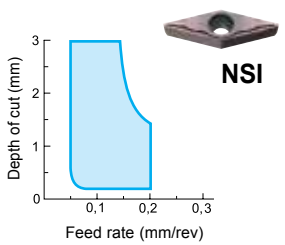
⇨ D39

"S…- SV…C" - Type
(⇨ Stock in Japan)

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

VCGT ●●●●●● ●-■■

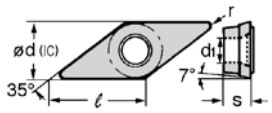
● G-Class Handed and Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated P	Carbide Coated M	Carbide Coated M	Carbide Coated P/M	Carbide Coated P/M	Carbide Coated K	Carbide Coated K	Carbide Coated K	Carbide Coated K	Carbide ZX-Coated K/S	Carbide ZX-Coated M/S	Carbide ZX-Coated P/M	Cermet Uncoated P	Cermet Uncoated P	Carbide Uncoated P	Carbide Uncoated P	Carbide Uncoated K	Carbide Uncoated S	Carbide Uncoated S	Carbide Uncoated N
				AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	AC6030M	AC6040M	AC610M	AC630M	AC405K	AC415K	AC420K	AC900G	AC510U	AC520U	AC530U	T1500Z	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
Finishing	 NFC	**VCGT 110301M NFC**	<0,1																	●			○	○				
		VCGT 110302M NFC	<0,2																	●			○	○				
		VCGT 110304M NFC	<0,4																	●			○	○				
Finishing	 L/RFX	**VCGT 110301 LFX**	0,1																○	●			○	●				
		VCGT 110302 LFX	0,2																○	●			○	●				
		VCGT 110301 RFX	0,1																○	●			○	●				
		VCGT 110302 RFX	0,2																○	●			○	●				
Light Cut	 NAG	**VCGT 110302 NAG**	0,2																									●
		VCGT 110304 NAG	0,4																									●
		VCGT 160408 NAG	0,8																									●
		VCGT 160412 NAG	1,2																									●
Light Cut	 NSI	**VCGT 110301M NSI**	<0,1									●	●					●	●	●	○			○	○				
		VCGT 110302M NSI	<0,2									●	●					●	●	●	○			○	○				
		VCGT 110304M NSI	<0,4									●	●					●	●	●	○			○	○				
		VCGT 110308M NSI	<0,8									●	●					●	●	●	○			○	○				
		VCGT 160401M NSI	<0,1									●	●					●	●	●	○			○	○				
		VCGT 160402M NSI	<0,2									●	●					●	●	●	○			○	○				
		VCGT 160404M NSI	<0,4									●	●					●	●	●	○			○	○				

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

V DIAMOND TYPE
INSERTS FOR TURNING

35° Diamond Type | 7° Relief | With Insert Hole



Dimensions (mm)				
VC__	ℓ	ød (IC)	s	d_1
0802--	8,3	4,76	2,38	2,3
1103--	11,0	6,35	3,18	2,8
1604--	16,6	9,525	4,76	4,4



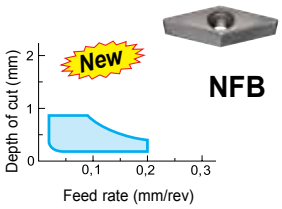
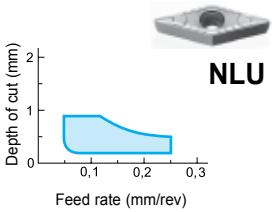
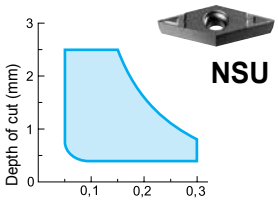
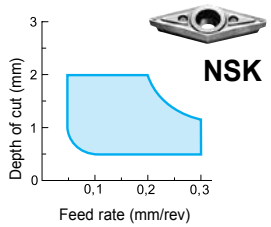
⇨ D39

"S...- SV...C" - Type
(⇨ Stock in Japan)

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

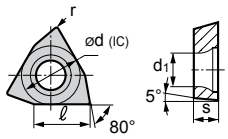
VCMT ●●●●●● ●-■■

● M-Class Bumpy Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide Coated P AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	Coated M AC6030M	AC6040M	Coated PM AC610M	AC630M	Coated K AC405K	AC415K	AC420K	AC900G	ZX-Coated KS AC510U	ZX-Coated MS AC520U	ZX-Coated PM AC530U	Cermet P T1500Z	T2000Z	Uncoated P T3000Z	T1000A	T1500A	Carbide K G10E	Carbide S EH510	EH520	N H1
Finishing	 NFB	VCMT 080202 NFB	0,2																		❍		❍	❍	❍				
		VCMT 080204 NFB	0,4																		❍		❍	❍	❍				
		VCMT 160404 NFB	0,4																		❍		❍	❍	❍				
		VCMT 160408 NFB	0,8																		❍		❍	❍	❍				
Finishing	 NLU	VCMT 160404 NLU	0,4							❍											❍		❍	❍	❍				
		VCMT 160408 NLU	0,8							❍											❍		❍	❍	❍				
Light Cut	 NSU	VCMT 080204 NSU	0,4							❍	●																		
		VCMT 110302 NSU	0,2							●			❍																
		VCMT 110304 NSU	0,4							●			❍																
		VCMT 110308 NSU	0,8							●			❍																
		VCMT 160404 NSU	0,4		●	●	❍	▲	▲	●		●	●	●	●			●	●	●									
		VCMT 160408 NSU	0,8		●	●	❍	▲	▲	●		●	●	●	●			●	●	●									
Light Cut	 NSK	VCMT 160404 NSK	0,4			●	●	▲	▲										●										
		VCMT 160408 NSK	0,8			●	●		▲										●										

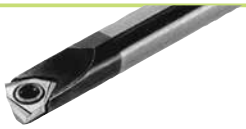
● = Euro stock
❍ = Japan stock
▲ = To be replaced by new item

80° Trigon Type | 5° Relief | With Insert Hole



Dimensions (mm)

WB_ _	ℓ	ød (IC)	s	d_1
0601_ _	3,2	3,97	1,59	2,20
0802_ _	4,6	4,76	2,38	2,4

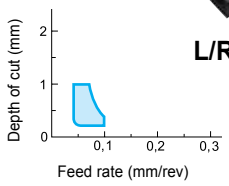
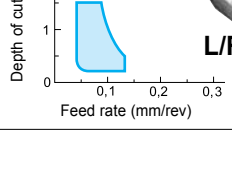
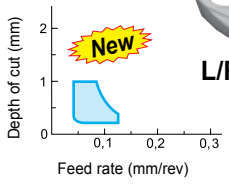
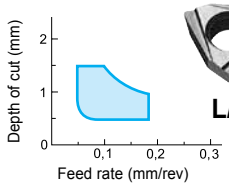


⇨ E23

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

WBGT ●●●●●● ●-■■

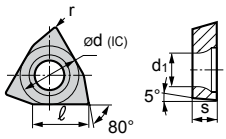
● G-Class Handed Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide: Coated: P: AC805P	AC810P	AC820P	AC830P	Coated: M: AC2000	AC3000	AC6030M	AC6040M	Coated: P/M: AC610M	AC630M	Coated: K: AC405K	AC415K	AC420K	AC900G	ZX-Coated: K/S: AC510U	ZX-Coated: M/S: AC520U	ZX-Coated: P/M: AC530U	Cermet: P: T1500Z	T2000Z	Carbide: Uncoated: P: T3000Z	T1000A	T1500A	Uncoated: K: G10E	Uncoated: S: EH510	EH520	Uncoated: N: H1
Finishing	 L/RFW 	WBGT 060102 LFW	0,2																		○				○				
		WBGT 060104 LFW	0,4																		○				○				
		WBGT 080202 LFW	0,2																		○				○				
		WBGT 080204 LFW	0,4																		○				○				
		WBGT 060102 RFW	0,2																		○				○				
		WBGT 060104 RFW	0,4																		○				○				
		WBGT 080202 RFW	0,2																		○				○				
		WBGT 080204 RFW	0,4																		○				○				
Finishing	 L/RFX 	WBGT 060102 LFX	0,2																	●									
		WBGT 060104 LFX	0,4																	●									
		WBGT 060102 RFX	0,2																	●									
		WBGT 060104 RFX	0,4																	●									
Finishing	 L/RFY 	WBGT 0601003 LFY	0,03																						○				
		WBGT 060101 LFY	0,1																						○				
		WBGT 060102 LFY	0,2																					○	○				
		WBGT 060104 LFY	0,4																					○	○				
		WBGT 080201 LFY	0,1																					○	○				
		WBGT 080202 LFY	0,2																					○	○				
		WBGT 080204 LFY	0,4																					○	○				
		WBGT 060101 RFY	0,1																						○				
		WBGT 060102 RFY	0,2																					○	○				
		WBGT 060104 RFY	0,4																					○	○				
		WBGT 080201 RFY	0,1																					○	○				
		WBGT 080202 RFY	0,2																					○	○				
		WBGT 080204 RFY	0,4																					○	○				
Finishing ~ Light Cut	 L/RW 	WBGT 060102 LW	0,2																	●				○	●				
		WBGT 060104 LW	0,4																	●				○	●				
		WBGT 060102 RW	0,2																	●				○	●				
		WBGT 060104 RW	0,4																	●				○	●				

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

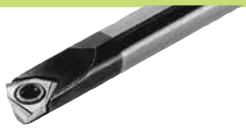
W TRIGON TYPE
INSERTS FOR TURNING

80° Trigon Type | 11° Relief | With Insert Hole



Dimensions (mm)

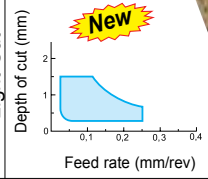
WP_ _	ℓ	ød (IC)	s	d_1
1102_ _	4,3	6,35	2,38	2,8
1603_ _	6,5	9,525	3,18	4,4



- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-Ferrous Metals
- S Super Alloy
- H Hardened Steel

WP_ _ ●●●●●● ●-■■

● M-Class Handed Chipbreaker

Application	Shape	ISO Cat. No.	r	Carbide / Coated														Carbide / ZX-Coated			Cermet / Uncoated					Carbide			
				P						M			F M	K				K S	M S	P M	P					K	S		N
				AC805P	AC810P	AC820P	AC830P	AC2000	AC3000	AC6030M	AC6040M	AC610M	AC630M	AC405K	AC415K	AC420K	AC900G	AC510U	AC520U	AC530U	T1500Z	T2000Z	T3000Z	T1000A	T1500A	G10E	EH510	EH520	H1
Light Cut	  NLB	**WPMT 110204 NLB**	0,4																		❍		❍		❍				
		WPMT 160308 NLB	0,8																		❍		❍		❍				

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

External Holders

D

D1 ~ D46



External Holders

Selection — **Turning Holder Series** ..... D2 - 7
ISO — Turning Holder Identification Table D8
Calculation of The Cutting Edge Position D9

T-REX Tool Holders — **SumiTurn T-REX Tool Holders** ..... D10 - 11

For High Performance Turning — **D Type Double Clamp Holders**
DC Type Holders D12
DD Type Holders D13
DS Type Holders D14
DT Type Holders D15
DV Type Holders D16
DW Type Holders D17

For General Turning — **P Type Lever Lock and M Type Top & Hole Clamp Holders**
PC Type Holders D18
PD Type Holders D19
PS Type Holders D20-21
PT / MT Type Holders D22-23
PW / MW Type Holders D24

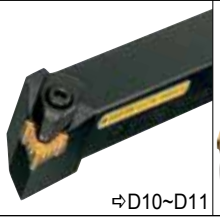
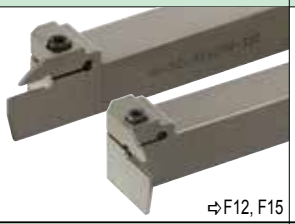
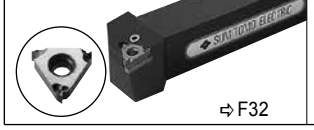
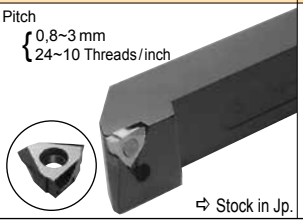
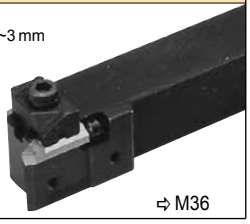
For Solid CBN Inserts — **C Type Clamp On Holders** D25-26
X Type Dimple Lock Holders D27

Selection — **Mini Holders Series** D28-29
Special for Back Facing — SBT Type Mini Holders D30
Small Product Turning — PC / SC Type Mini Holders D31
PD / SD Type Mini Holders D32-33
PR Type Holders D34
SR Type Holders D35
SS Type Mini Holders D36
ST Type Mini Holders D37
SV Type Copying Holders D38-39

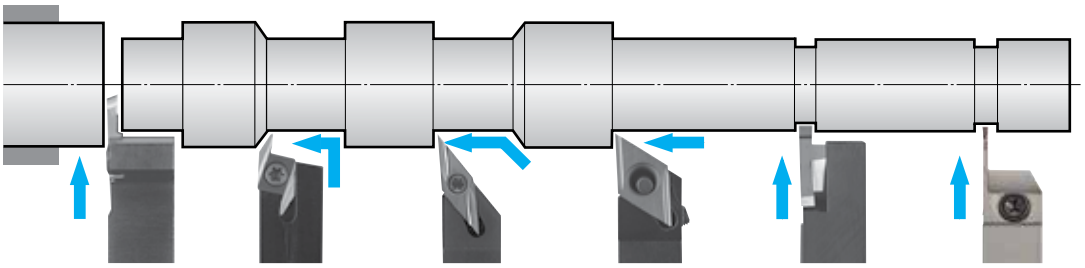
New — **Polygon-Shank Holders** D40

For High Performance Turning — **D Type Double Clamp Holders**
PSC**DC Type Holders D41
PSC**DD Type Holders D41
PSC**DS Type Holders D41
PSC**DT Type Holders D42
PSC**DW Type Holders D42

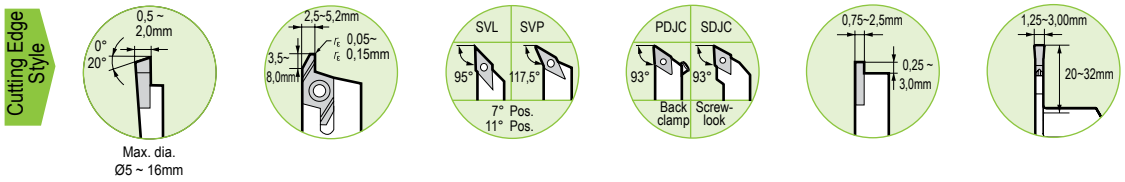
For General Turning — **S Type Srew Clamp**
PSC**SC Type Holders D43
PSC**SD Type Holders D43
PSC**SS Type Holders D43
PSC**ST Type Holders D44
PSC**SV Type Holders D44-45

Application	Economical Type for Neg. Inserts	Economical Type for Pos. Inserts	Special Type for Hardened Steel
General Turning	**P Type Lever Lock Type**  ⇨ D18~D22	**P Type Lever Lock Type**  ⇨ D31, D32	**D Type Double Lock Type**   ⇨ D12~D17 ⇨ D41~D42
	M Type Double Lock Type  ⇨ D23~D24	**S Type Screw On Type**   D31~D33 ⇨ D35~D37 ⇨D43~D45	**C Type Top Clamp Type**  ⇨ D25~D26
Copying	**T-REX**  ⇨D10~D11	**S Type Screw On Type**   ⇨D38~D39 ⇨D43~D45	**D Type Double Lock Type**   ⇨ D13, D16 ⇨ D41
Parting-Off Grooving	**GNDM and GNDMS Type**  ⇨F12, F14	**GNDL and GNDLS Type**  ⇨F12, F15	**GNDF Type**  ⇨ F17
	SCT and GWC Type  ⇨ F21~ F22	**Sumi Grip and Sumi Grip Jr.**  ⇨ F23~ F28	**GWB Type**  ⇨ M35
Threading	**LTE and STE Type** Pitch { 1~4 mm 24~8 Threads/inch  ⇨ F32	**THE Type** Pitch { 0,8~3 mm 24~10 Threads/inch  ⇨ Stock in Jp.	**BNGG-TT Type** Pitch 1~3 mm  ⇨ M36

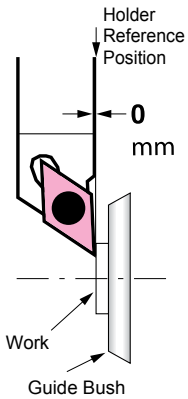
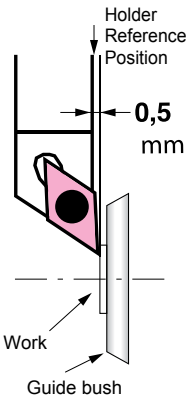
External Turning



Usage / Type	Cut - Off	Back Turning	Copying	General Turning	Grooving	Grooving & Cut-Off
	SCT Type	SBT Type	SV Type	P / S Type	GWC Type	GND Type



Holder Selection for Autolathe

	Offset - 0 mm Type Holders	Offset - 0,5 mm Type Holders
Tooling		
Features	Program correction is not necessary.	The position of cutting edge can be put in near guide bush through a program correction.
Holder Types	SDJC-X, SDAC-X SDLC-X, SCAC-X SVJC-X (⇨ Stock in Japan)	PDJC, SDJC, SDAC PCLC, SCAC STAC, SVLC

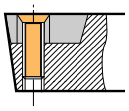
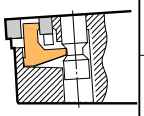
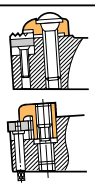
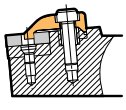


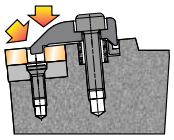
External Tool Holder Series



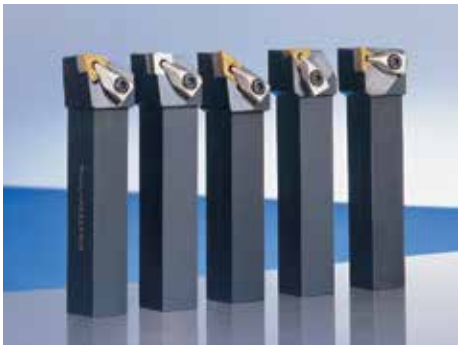
X Type "Dimple Lock" Holder
XSBN-R 2525 N12
for special solid CBN and ceramic inserts

■ TOOLING SELECTION

Application			General Turning & Facing		General Turning & Copying			General Turning	
Insert Type / System			80° Diamond Type		55° Diamond Type		T-REX 55°	90° Square Type	
Screw Lock System	S Type Mini Holder		SCLC ⇨ D31	SCAC ⇨ D31	SDJC ⇨ D32 SDHC ⇨ D32	SDAC ⇨ D33	–	–	SSBC ⇨ D36
			–	–	SDNC ⇨ D33	–	–	–	–
Lever Lock System	P Type (✳ Side Lever Lock Type)		PCLC (✳) ⇨ D31	–	PDJC (✳) ⇨ D32	–	–	PSBN ⇨ D20	PSDN ⇨ D20
			PCBN ⇨ D18	PCLN ⇨ D18	PDJN ⇨ D19	–	–	PSKN ⇨ D21	PSSN ⇨ D21
Top-On Clamp System	C & M Type		CCLN ⇨ D25	–	–	–	–	CSBN ⇨ D25	CSKN ⇨ D25
Double Lock (D) Dimple Lock (X)	D & X Type		DCLN ⇨ D12	XCLN ⇨ D27	DDJN ⇨ D13	–	DTR ⇨ D11	XSBN ⇨ D27	–
			–	–	DDHN ⇨ D13	DDNN ⇨ D13	–	DSBN ⇨ D14	DSDN ⇨ D14



D Type "Double Clamp" Holders
for high performance machining



■ TOOLING SELECTION

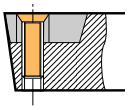
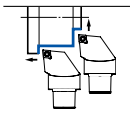
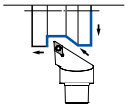
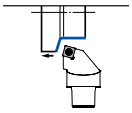
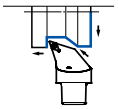
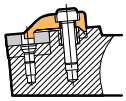
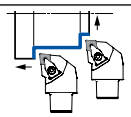
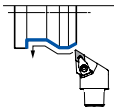
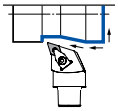
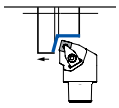
Application		General Turning			Copying		General Turning	Special Turning	
Insert Type / System		60° Triangle Type			35° Diamond Type		80° Trigon Type	Round and Special Purpose Inserts	
Screw Lock System	S Type Mini Holder	STAC ⇨ D37	STGC ⇨ D37	–	SVJB ⇨ D38 SVLC ⇨ D39	SVVB ⇨ D38	–	SRDC ⇨ D35	SRSC ⇨ D35
		–	–	–	SVPB ⇨ D38 SVPC ⇨ D39	–	–	SBT ⇨ D30	–
Lever Lock System	P Type	PTGN ⇨ D22	PTFN ⇨ D22	PTTN ⇨ D22	–	–	PWLN ⇨ D24	PRDC ⇨ D34	PRGC ⇨ D34
		–	–	–	–	–	–	–	–
Top-On Clamp System	C & M Type	MTJN ⇨ D23	MTXN ⇨ D23	–	–	–	MWLN ⇨ D24	CRDN ⇨ D26	CRSN ⇨ D26
Double Lock (D) Dimple Lock (X)	D & X Type	DTJN ⇨ D15	DTFN ⇨ D15	–	DVJN ⇨ D16	–	DWLN ⇨ D17	–	–
		DTGN ⇨ D15	–	–	DVQN ⇨ D16	DVVN ⇨ D16	–	–	–

Polygon - Shank Holder - Produced According to ISO 26623-1



Negative Insert Type

■ TOOLING SELECTION

Application			General Turning & Facing		General Turning & Copying			General Turning	
Insert Type / System			80° Diamond Type		55° Diamond Type		T-REX 55°	90° Square Type	
Screw Lock System	S Type Mini Holder		 **SCLC** ⇨ D43	–	 **SDJC** ⇨ D43	–	–	–	 **SSBC** ⇨ D43
			–	–	 **SDHC** ⇨ D43	–	–	–	–
Double Lock (D)	D Type		 **DCLN** ⇨ D41	–	 **DDJN** ⇨ D41	–	–	–	–
			–	–	 **DDHN** ⇨ D41	–	–	 **DSBN** ⇨ D41	–

■ Classification System for Polygon - Shank Holder

P S C 4 0 - S C L C R 2 7 0 5 0 - 0 9

- **P S C** — Polygon Shank
- **4 0** — Size (ø*D*)
- **S** — Clamping System: D: Double Clamp; S: Screw Clamp
- **C** — Insert Shape
- **L** — Holder Style
- **C** — Seat Clearance Angle: N = 0°; C = 7°; P = 11°
- **R** — Feed Direction: R: Right Hand; L: Left Hand; N: Neutral
- **2 7** — Size (*f*)
- **0 5 0** — Holder Length (L_1)
- **0 9** — Insert Cutting Edge Length



Positive Insert Type

■ TOOLING SELECTION

Application		General Turning			Copying		General Turning	Special Turning	
Insert Type / System		60° Triangle Type			35° Diamond Type		80° Trigon Type	Round and Special Purpose Inserts	
Screw Lock System	S Type Mini Holder	STJC ⇨ D44	–	–	SVJB ⇨ D44 SVHB ⇨ D44	SVJC ⇨ D45 SVHC ⇨ D45	–	–	–
		–	–	–	SVVB ⇨ D44	SVVC ⇨ D45	–	–	–
Double Lock (D)	D Type	DTJN ⇨ D42	–	–	–	–	DWLN ⇨ D42	–	–
		–	–	–	–	–	–	–	–

■ Classification System for Polygon - Shank Holder

P S C 5 0 - S T J C R 3 5 0 6 0 - 1 6

- P S C — Polygon Shank
- 5 0 — Size (ø*D*)
- S — Clamping System: D: Double Clamp; S: Screw Clamp
- T — Insert Shape
- J — Holder Style
- C — Seat Clearance Angle: N = 0°; C = 7°; P = 11°
- R — Feed Direction: R: Right Hand; L: Left Hand; N: Neutral
- 3 5 — Size (*f*)
- 0 6 0 — Holder Length (L_1)
- 1 6 — Insert Cutting Edge Length

ISO Holders Identification

■ Catalogue Classification System For SEC-Tool Holders

D	T	F	N	R	25	25	M	16	E
Clamping System Chart 1	Insert Shape Chart 2	Holder Style Chart 3	Seat Clearance Angle Chart 4	Feed Direction Chart 5	Shank Height Chart 6	Shank Width Chart 7	Shank Length Chart 8	Insert Size Chart 9	For D-Type Euro-Inserts DXXX1506XX



Clamping: Double clamp system
Shape: Triangular insert with 91° approach angle
Shank: H = 25mm, W = 25mm, L = 150mm

Chart 1

Clamping System					
Symbol	Clamp Types	Example of Structure	Symbol	Clamp Types	Example of Structure
C	Top Clamp		M	Top & Hole Clamp Type	
D	Double Clamp		P	Lever Lock Type (Insert is Supported by 1 face)	
E	Pin Lock Type (Insert is supported by 1 face)		S	Screw Clamp Type	

Chart 2

Insert Shape			
Symbol	Insert Shape	Symbol	Insert Shape
A	Parallelogram 85°	M	Rhombic 86°
B	Parallelogram 82°	O	Octagonal
C	Diamond 80°	P	Pentagonal
D	Diamond 55°	R	Round
E	Diamond 75°	S	Square
F	Diamond 50°	T	Triangular
H	Hexagonal	V	Diamond 35°
K	Parallelogram 55°	W	Trigon
L	Rectangular		

Chart 4

Seat Clearance Angle	
Symbol	Relief Angle
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
O	Special Angle

Chart 5

Feed Direction					
Symbol	Right Hand Feed	Symbol	Neutral Feed	Symbol	Left Hand Feed
R		N		L	

Chart 3

Holder Style					
Symbol	Shape	Offset	Symbol	Shape	Offset
A	90i	Nil	L	95i 95i	With Offset
B	75i	Nil	N	63i	Nil
D	45i	Nil	R	75i	With Offset
E	60i	Nil	S	45i	With Offset
F	90i	With Offset	T	60i	With Offset
G	90i	With Offset	U	93i	With Offset
J	93i	With Offset	W	60i	With Offset
K	75i	With Offset	Y	85i	With Offset

Chart 6

Shank Height	
Symbol	Height (mm)
12	12
16	16
20	20
25	25
32	32
40	40
50	50
00	Round shank,

2 digits are used for each dimension in mm.

Chart 7

Shank Width	
Symbol	Width (mm)
12	12
16	16
20	20
25	25
32	32
40	40
50	50
	Shank Diamater is Shown for Round Shank,

Chart 8

Shank Length	
Symbol	Length (mm)
F	80
H	100
K	125
M	150
N	160
P	170
Q	180
S	250
T	300
U	350

For some Products, a Hypen is used Instead of an alphabet.

Chart 9

Cutting Edge	
Symbol	Length (mm)

Eg. for Triangle Inserts:

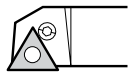
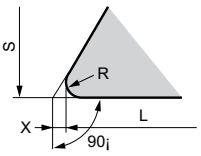
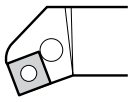
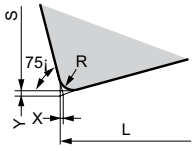
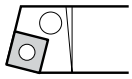
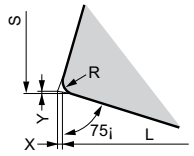
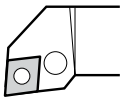
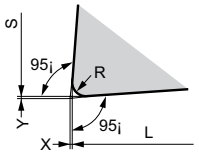
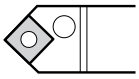
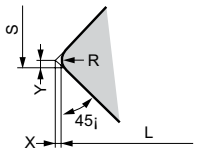
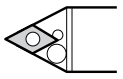
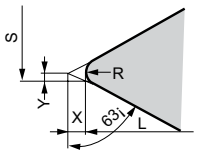
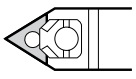
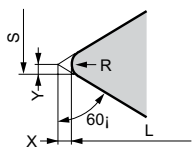
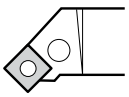
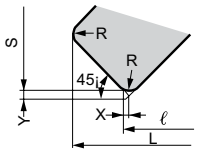
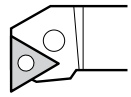
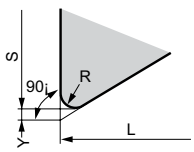
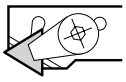
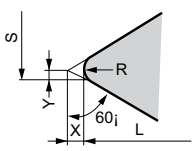
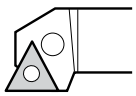
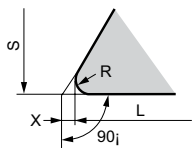
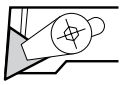
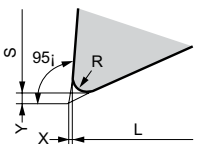
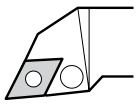
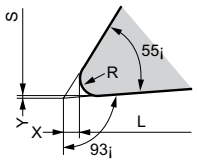
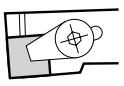
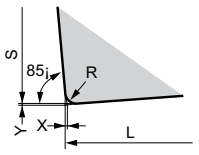
06	6,9
08	8,2
09	9,6
11	11,0
16	16,5
22	22,0
27	27,5
33	33,0

For Round Inserts:

10	10
12	12
16	16
20	20
25	25
32	32

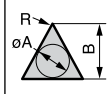
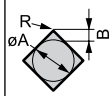
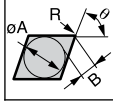
■ Cutting Edge Dimensions by Corner Radius

(This table shows X and Y dimensions based on 0° approach angle cutting edge inclination)

Holders			Dimensions(mm)			Holders			Dimensions(mm)		
Symbol	Shapes	Corner Shapes	R	X	Y	Symbol	Shapes	Corner Shapes	R	X	Y
A			0,4	0,291	–	K			0,4	0,024	0,089
			0,8	0,581	–				0,8	0,048	0,178
			1,2	0,872	–				1,2	0,072	0,268
			1,6	1,162	–				1,6	0,096	0,357
			2,4	1,743	–				2,4	0,143	0,535
B			0,4	0,089	0,024	L			0,4	0,040	0,040
			0,8	0,178	0,048				0,8	0,079	0,079
			1,2	0,268	0,072				1,2	0,119	0,119
			1,6	0,357	0,096				1,6	0,159	0,159
			2,4	0,535	0,143				2,4	0,238	0,238
D			0,4	0,164	0,164	N			0,4	0,463	0,263
			0,8	0,329	0,329				0,8	0,925	0,471
			1,2	0,493	0,493				1,2	1,388	0,707
			1,6	0,658	0,658				1,6	1,850	0,943
			2,4	0,986	0,986				2,4	2,776	1,414
E			0,4	0,396	0,229	S			0,4	0,164	0,164
			0,8	0,793	0,458				0,8	0,329	0,329
			1,2	1,190	0,687				1,2	0,493	0,493
			1,6	1,587	0,916				1,6	0,658	0,658
			2,4	2,381	1,374				2,4	0,986	0,986
F			0,4	–	0,291	T			0,4	0,396	0,229
			0,8	–	0,581				0,8	0,793	0,458
			1,2	–	0,872				1,2	1,190	0,687
			1,6	–	1,162				1,6	1,587	0,916
			2,4	–	1,743				2,4	2,381	1,374
G			0,4	0,291	–	U			0,4	0,253	0,058
			0,8	0,581	–				0,8	0,506	0,116
			1,2	0,872	–				1,2	0,759	0,175
			1,6	1,162	–				1,6	1,013	0,233
			2,4	1,743	–				2,4	1,519	0,350
J			0,4	0,344	0,033	Y			0,4	0,002	0,033
			0,8	0,687	0,079				0,8	0,005	0,066
			1,2	1,031	0,118				1,2	0,008	0,099
			1,6	1,375	0,157				1,6	0,011	0,132
			2,4	2,062	0,236				2,4	0,017	0,198

● Calculation of the Nose Radius Dimensions

(Unit in mm)

Insert Shape		Calculation
	Triangle	$B = \frac{3}{2}A - R$
	Square	$B=(\sqrt{2}-1) \times (\frac{A}{2}-R)$
	Rhombic	$B=\{\frac{1}{Sin(\theta/2)}-1\} \times (\frac{A}{2}-R)$

Figures of „A“ and „R“ to calculate Figure „B“

I.C. size (inch)		„øA“ dimensions (mm)
–	5/32	3,9688
–	6/32	4,7625
–	7/32	5,5562
2/8	8/32	6,3500
–	(0)	7,9375
3/8	–	9,5250
4/8	–	12,7000
5/8	–	15,8750
6/8	–	19,0500
8/8	–	25,4000

Nose symbol	Size (inch)	„R“ dimension (mm)
02	(0)	0,203
04	1/64	0,397
08	2/64	0,794
12	3/64	1,191
16	4/64	1,588
24	6/64	2,389

T-REX Tool Holders

RIGIDITY - ECONOMY - PRECISION

The Biting Force Behind



SumiTurn T-REX

● T-REX clamping for maximum rigidity 50% more cutting edges than a DNMG Insert



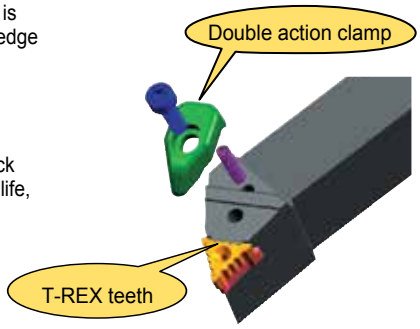
■ Advantages

● T-REX Inserts for Maximum Economy

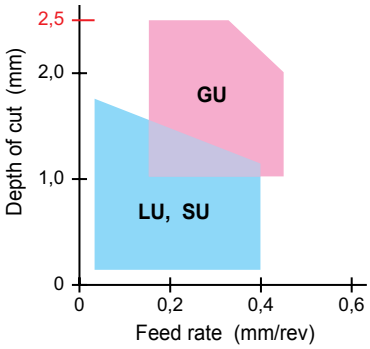
With 6 cutting edges and a 55 degree included angle - T-Rex is the intelligent alternative to profile turning with a traditional 4 edge DNMG insert.

● Biting Performance from T-REX Teeth

The double clamp tool holder and powerful teeth of T-REX lock the insert to eliminate movement, dramatically improving tool life, machining accuracy, and cutting edge security.

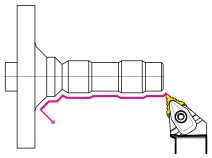


● Application Range

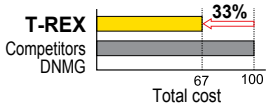


■ Application Examples

● 20Cr4 Shaft

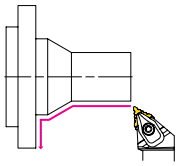


[Results]
33% cost saving

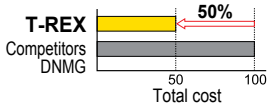


Insert: TRM551708-GU, AC2000
Cutting data: v_c= 150m/min, f = 0,25mm/rev, d_{oc} < 2,0mm, Wet

● 25CrMo4 Gear



[Results]
1,3 times long tool life



Insert: TRM551708-LU, AC900G
Cutting data: v_c= 220m/min, f = 0,2~0,3mm/rev, d_{oc} < 1,0mm, Wet

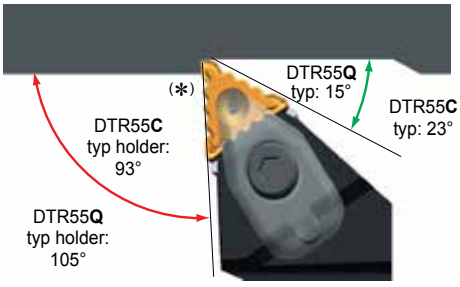
■ Recommendations

● Depth of Cut



Max. a_p = 2,5 mm

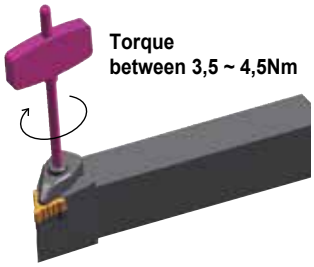
● Approach Angle



(*) Angle of major cutting edge

C-Type: 95,5°
Q-Type: 107,5°

● Insert Clamping



● = Eurostock
○ = Japanstock

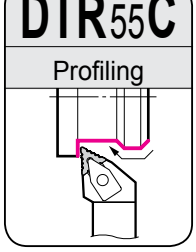
▲ = To be replaced by new item

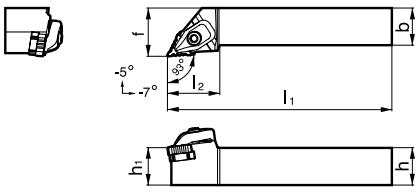
Recommended Tightening Torque (N·m)

SumiTurn

External Turning & Copying

DTR55C
Profiling



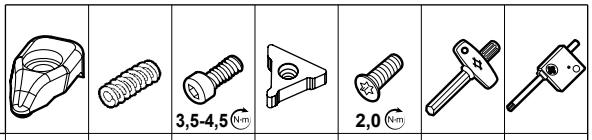


Holders

Above figures show right hand tools.

Ordering No.	Stock R	Stock L	h	h_1	b	l_1	l_2	f
DTR 55C-R/L 2020–K17	●	●	20	20	20	125	35	25
DTR 55C-R/L 2525–M17	●	●	25	25	25	150	35	32

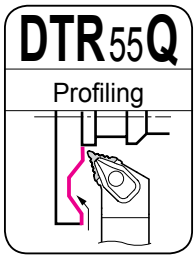
Spare Parts

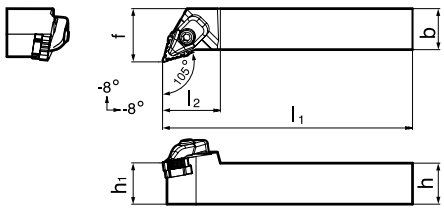


Clamp	Spring	Screw	Shim	Screw	Wrench	Wrench
TRCP3	S-SP4-20	BX0520	TRW5505	BFTX0307N	TSW040	TRX10(*)

(*) Note: Wrench (TRX) for shim clamp screw is not included.

DTR55Q
Profiling



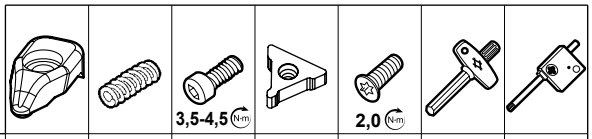


Holders

Above figures show right hand tools.

Ordering No.	Stock R	Stock L	h	h_1	b	l_1	l_2	f
DTR 55Q-R/L 2020–K17	●	●	20	20	20	125	35	28,5
DTR 55Q-R/L 2525–M17	●	●	25	25	25	150	35	32

Spare Parts



Clamp	Spring	Screw	Shim	Screw	Wrench	Wrench
TRCP3	S-SP4-20	BX0520	TRW5505	BFTX0307N	TSW040	TRX10(*)

(*) Note: Wrench (TRX) for shim clamp screw is not included.

Inserts

● Type **LU**



● Type **SU**

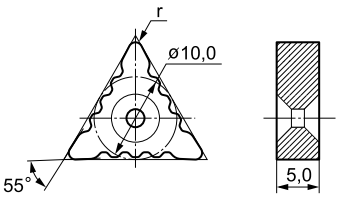


Application P Steel
M Stainles steel

	Ordering No.	r	AC900G	AC810P	AC820P	AC830P	AC2000	AC3000	AC610M	AC630M	T2000Z	T3000Z
			Coated Carbide								Coated Cermet	
Finishing	TRM 551704 -LU	0,4	▲	●	●		▲	▲			▲	❍
	TRM 551708 -LU	0,8	▲	●	●		▲	▲			▲	❍
	TRM 551712 -LU	1,2	▲	●	●			▲			▲	❍
	TRM 551704 -SU	0,4			❍				●	●	▲	❍
	TRM 551708 -SU	0,8			❍				●	●	▲	❍
	TRM 551712 -SU	1,2			❍				●	●	▲	❍

● Type **GU**





	Ordering No.	r	AC900G	AC810P	AC820P	AC830P	AC2000	AC3000	AC610M	AC630M	T2000Z	T3000Z
			Coated Carbide								Coated Cermet	
Light Cut	TRM 551704 -GU	0,4	▲	●	●	●	▲	▲		●		
	TRM 551708 -GU	0,8	▲	●	●	●	▲	▲		●		
	TRM 551712 -GU	1,2	▲	●	●	●	▲	▲		❍		

● Recommended Cutting Conditions

Cutting speed (m/min)

Grade		Coated Carbide AC810P	AC820P (AC2000)	AC830P (AC3000)	AC610M	AC630M	Coated Cermet T2000Z	T3000Z
Work materials	Low carbon steel	220 400	150 350	120 300	180 350	120 300	100 400	100 350
	Alloy steel	150 300	100 250	80 200	180 300	80 230	100 300	100 250
	Stainless steel			50 150	130 210	100 160		
Application range	Finishing	◎	❍	❍	◎	❍	◎	◎
	Medium cutting	❍	◎	❍	❍	◎	❍	❍
	Interrupted cutting		❍	◎		❍		❍

◎ Preferred choice ❍ Suitable

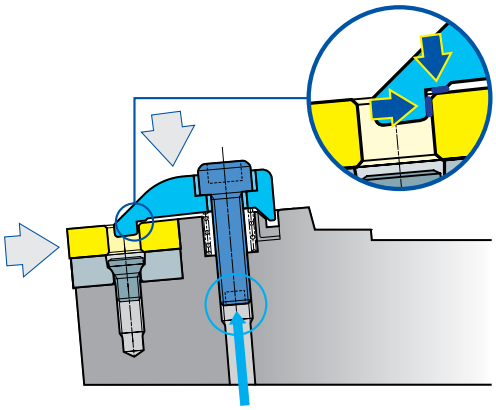


Characteristics

Insert is clamping firmly for improved fracture resistance.
High indexing accuracy improves machining accuracy.
Insert can be changed from below the holder.
Suitable for high efficiency machining and interrupted cutting in hardened steel.

Clamp Mechanism

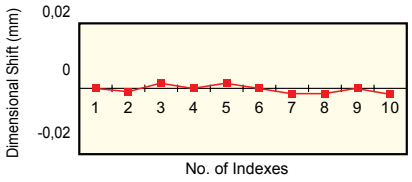
Secured in two directions and supported by two faces.



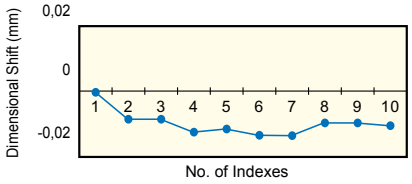
Insert can be changed from below the holder.

Index Accuracy Comparison (Length Wise)

D Type Tool Holders



Lever Lock



General Turning and Facing

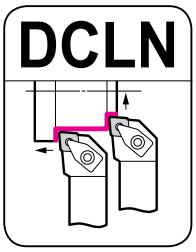


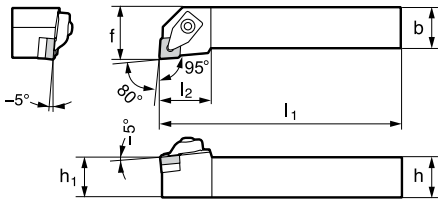
Inserts



❶ CNMG 120408 N–GU
❷ CNMG 160608 N-GU
❸ CNMM 190612 N-HG
❹ CNMM 250924 N-HU

DCLN





Spare Parts

Holders

Above figures show right hand tools.

Ordering No.	Stock R	Stock L	Dimensions (mm) h	h1	b	l1	l2	f	Clamp	Spring	Clamp bolt	Shim	Shim Screw	Wrench	Wrench	Insert
DCLN R/L 2020 K12	●	●	20	20	20	125	32	25	SCP-2		5,0 (N·m)	CNS1204	BFTX0409N 3,4 (N·m)	TRX15(*)	LH040 LH025	❶
DCLN R/L 2525 M12	●	●	25	25	25	150	32	32								
DCLN R/L 2525 M16	●	●	25	25	25	150	32	32	SCP-3		5,0 (N·m)	CNS1606	BFTX0509N 5,0 (N·m)	TRX20(*)	LH040 LH025	❷
DCLN R/L 3232 P16	●	●	32	32	32	170	32	40								
DCLN R/L 3232 P19	●	●	32	32	32	170	42	40	SCP-5		5,0 (N·m)	CNS1906	BFTX0511N 5,0 (N·m)	TRX20(*)	LH040 LH025	❸
DCLN R/L 4040 S19	●	●	40	40	40	250	42	50								
DCLN R/L 4040 S25	●	●	40	40	40	250	53	50	SCP-6		6,0 (N·m)	CNS2509	BFTX0615N	TRD25(*)	LH060	❹

(*) Note: Wrench (TRX / TRD) for shim clamp screw is not included.

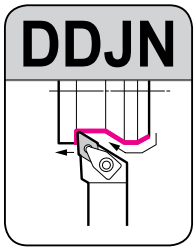
● = Eurostock ❑ = Delivery on request (N·m) Recommended Tightening Torque (N·m)

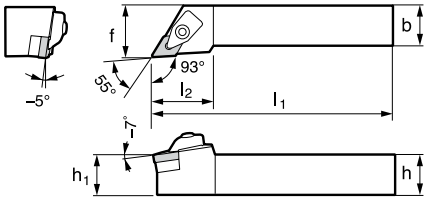
External Tool Holders
D Type (Double Clamp)



General Turning and Copying

DDJN





Inserts

Eg.



N-GU

❶ DNMG 150408 N–GU
❷ DNMG 150608 N–GU

Holders

Above figures show right hand tools.

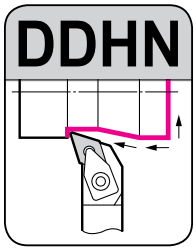
Ordering No.	Stock R	Stock L	h	h_1	b	l_1	l_2	f
DDJN R/L 2020 K15			20	20	20	125	38	25
DDJN R/L 2020 K15E	●	●	20	20	20	125	38	25
DDJN R/L 2525 M15	❑		25	25	25	150	38	32
DDJN R/L 2525 M15E	●	●	25	25	25	150	38	32

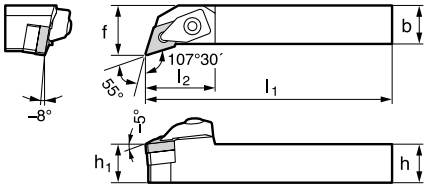
Spare Parts

Clamp	Spring	Clamp bolt	Shim	Shim Screw	Wrench	Wrench	Insert
			DNS1504				❶
			DNS1506				❷
SCP–2			DNS1504	BFTX0409N	TRX15(*)	LH040	❶
		5,0 N·m	DNS1506	3,4 N·m			❷

(*) Note: Wrench (TRX) for shim clamp screw is not included.

DDHN





Inserts

Eg.



N-GU

❷ DNMG 150608 N–GU

Holders

Above figures show right hand tools.

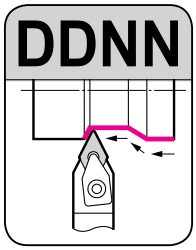
Ordering No.	Stock R	Stock L	h	h_1	b	l_1	l_2	f
DDHN R/L 2020 K15E	●	●	20	20	20	125	35	25
DDHN R/L 2525 M15E	●	●	25	25	25	150	35	32

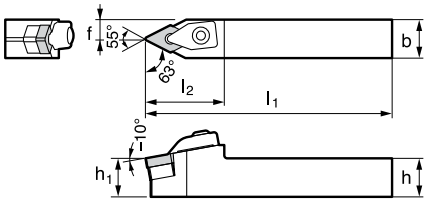
Spare Parts

Clamp	Spring	Clamp bolt	Shim	Shim Screw	Wrench	Wrench	Insert
SCP–2		5,0 N·m	DNS1506	BFTX0409N 3,4 N·m	TRX15(*)	LH040	❷

(*) Note: Wrench (TRX) for shim clamp screw is not included.

DDNN





Inserts

Eg.



N-GU

❷ DNMG 150608 N–GU

Holders

Above figures show right hand tools.

Ordering No.	Stock	h	h_1	b	l_1	l_2	f
DDNN N 2020 K15E	●	20	20	20	125	40	10,5
DDNN N 2525 M15E	●	25	25	25	150	40	13,0

Spare Parts

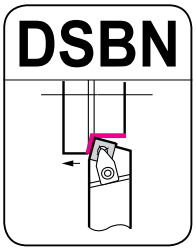
Clamp	Spring	Clamp bolt	Shim	Shim Screw	Wrench	Wrench	Insert
SCP–2		5,0 N·m	DNS1506	BFTX0409N 3,4 N·m	TRX15(*)	LH040	❷

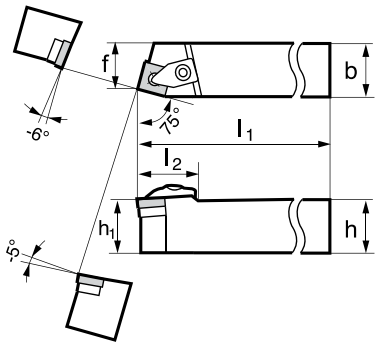
(*) Note: Wrench (TRX) for shim clamp screw is not included.

General Turning and Facing



DSBN





Inserts

Eg.



N-UZ, N-HU

❶ SNMG 190612 N–UZ
❷ SNMM 250724 N–HU
❸ SNMM 250924 N–HU

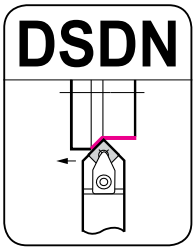
Holders

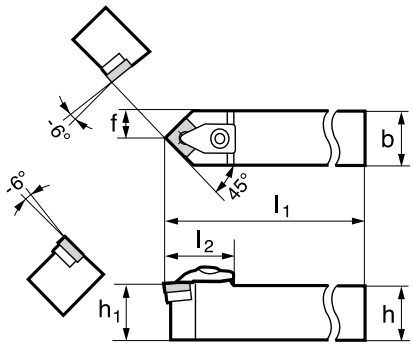
Above figures show right hand tools.

Ordering No.	Stock		Dimensions (mm)						Spare Parts							
	R	L	h	h_1	b	l_1	l_2	f	Clamp	Spring	Clamp bolt	Shim	Shim Screw	Wrench	Wrench	Insert
DSBN R/L 3232 P19	●	●	32	32	32	170	45	27		SCP–5	5,0 N·m	SNS1906	BFTX0511N 5,0 N·m	TRX20(*)	LH040,LH025	❶
DSBN R/L 4040 S2507	●	●	40	40	40	250	58	35		SCP–6	6,0 N·m	SNS2507	BFTX0615N 7,5 N·m	TRD25(*)	LH060	❷
DSBN R/L 4040 S2509	●	●	40	40	40	250	58	35				SNS2509				❸

(*) Note: Wrench (TRX / TRD) for shim clamp screw is not included.

DSDN





Inserts

Eg.



N-UZ, N-HU

❶ SNMG 190612 N–UZ
❷ SNMM 250724 N–HU
❸ SNMM 250924 N–HU

Holders

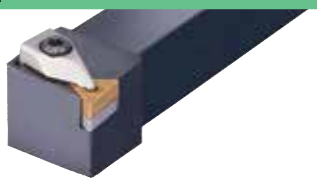
Above figures show right hand tools.

Ordering No.	Stock	Dimensions (mm)						Spare Parts							
		h	h_1	b	l_1	l_2	f	Clamp	Spring	Clamp bolt	Shim	Shim Screw	Wrench	Wrench	Insert
DSDN N 3232 P19	●	32	32	32	170	50	16		SCP–5	5,0 N·m	SNS1906	BFTX0511N 5,0 N·m	TRX20(*)	LH040,LH025	❶
DSDN N 4040 S2507	●	40	40	40	250	63	20		SCP–6	6,0 N·m	SNS2507	BFTX0615N 7,5 N·m	TRD25(*)	LH060	❷
DSDN N 4040 S2509	●	40	40	40	250	63	20				SNS2509				❸

(*) Note: Wrench (TRX / TRD) for shim clamp screw is not included.

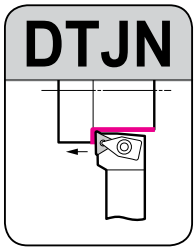
● = Eurostock ❑ = Delivery on request N·m Recommended Tightening Torque (N·m)

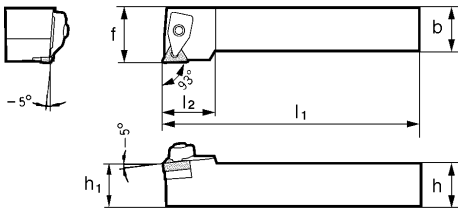
External Tool Holders
D Type (Double Clamp)



General Turning and Facing

DTJN





■ Inserts

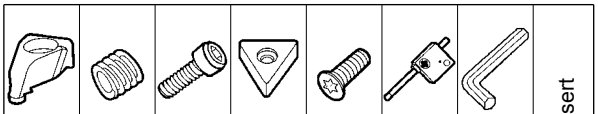
Eg.



N-GU

❶ TNMG 160408 N–GU

■ Spare Parts



Clamp	Spring	Clamp bolt	Shim	Shim Screw	Wrench	Wrench	Insert
SCP–1 5,0 (N-m)			TNS1604	BFTX0307N 2,0 (N-m)	TRX10(*)	LH040	❶

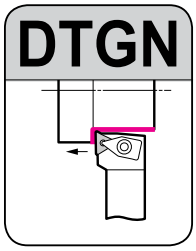
■ Holders

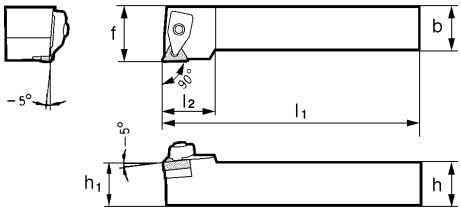
Above figures show right hand tools.

Ordering No.	Stock R	Stock L	h	h_1	b	l_1	l_2	f
DTJN R/L 2020 K16	●	●	20	20	20	125	31	25
DTJN R/L 2525 M16	●	●	25	25	25	150	31	32

(*) Note: Wrench (TRX) for shim clamp screw is not included.

DTGN





■ Inserts

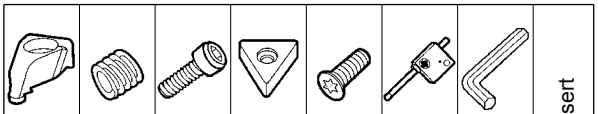
Eg.



N-GU

❶ TNMG 160408 N–GU

■ Spare Parts



Clamp	Spring	Clamp bolt	Shim	Shim Screw	Wrench	Wrench	Insert
SCP–1 5,0 (N-m)			TNS1604	BFTX0307N 2,0 (N-m)	TRX10(*)	LH040	❶

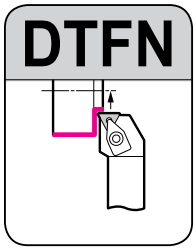
■ Holders

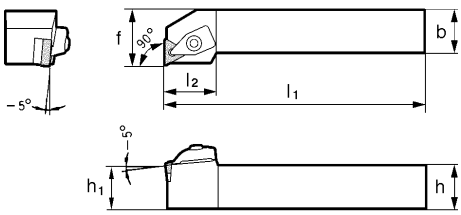
Above figures show right hand tools.

Ordering No.	Stock R	Stock L	h	h_1	b	l_1	l_2	f
DTGN R/L 2020 K16	❑		20	20	20	125	31	25
DTGN R/L 2525 M16	●	●	25	25	25	150	31	32

(*) Note: Wrench (TRX) for shim clamp screw is not included.

DTFN





■ Inserts

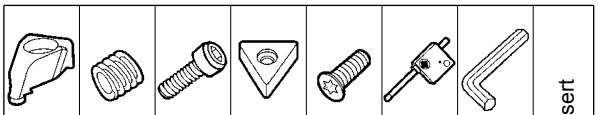
Eg.



N-GU

❶ TNMG 160408 N–GU

■ Spare Parts



Clamp	Spring	Clamp bolt	Shim	Shim Screw	Wrench	Wrench	Insert
SCP–1 5,0 (N-m)			TNS1604	BFTX0307N 2,0 (N-m)	TRX10(*)	LH040	❶

■ Holders

Above figures show right hand tools.

Ordering No.	Stock R	Stock L	h	h_1	b	l_1	l_2	f
DTFN R/L 2020 K16	❑		20	20	20	125	30	25
DTFN R/L 2525 M16	●	●	25	25	25	150	30	32

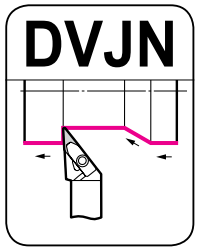
(*) Note: Wrench (TRX) for shim clamp screw is not included.

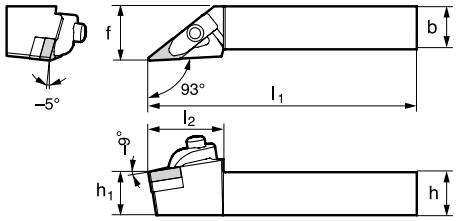
D Type (Double Clamp)

General Turning and Copying



DVJN





Inserts

Eg.



❶ VNMG 160408 N–GU

N-GU

Holders

Above figures show right hand tools.

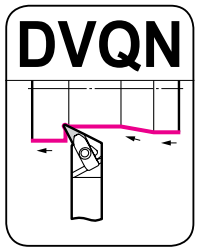
Ordering No.	Stock R	Stock L	h	h_1	b	l_1	l_2	f
DVJN R/L 2020 K16	●	●	20	20	20	125	35	25
DVJN R/L 2525 M16	●	●	25	25	25	150	35	32

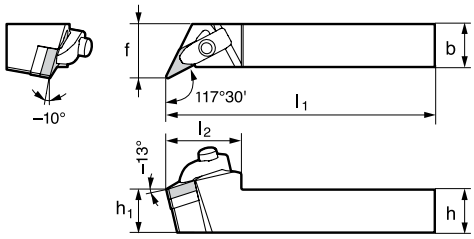
Spare Parts

Clamp	Spring	Clamp bolt	Shim	Shim Screw	Wrench	Wrench	Insert
		SCP–4 5,0 (N·m)	VNS1604	BFTX0307N 2,0 (N·m)	TRX10(*)	LH040 LH025	❶

(*) Note: Wrench (TRX) for shim clamp screw is not included.

DVQN





Inserts

Eg.



❶ VNMG 160408 N–GU

N-GU

Holders

Above figures show right hand tools.

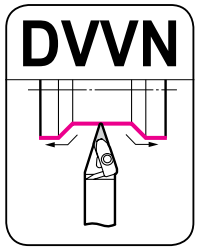
Ordering No.	Stock R	Stock L	h	h_1	b	l_1	l_2	f
DVQN R/L 2020 K16	●	●	20	20	20	125	35	25
DVQN R/L 2525 M16	●	●	25	25	25	150	35	32

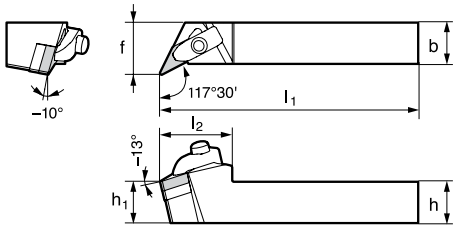
Spare Parts

Clamp	Spring	Clamp bolt	Shim	Shim Screw	Wrench	Wrench	Insert
		SCP–4 5,0 (N·m)	VNS1604	BFTX0307N 2,0 (N·m)	TRX10(*)	LH040 LH025	❶

(*) Note: Wrench (TRX) for shim clamp screw is not included.

DVVN





Inserts

Eg.



❶ VNMG 160408 N–GU

N-GU

Holders

Above figures show right hand tools.

Ordering No.	Stock	h	h_1	b	l_1	l_2	f
DVVN N 2020 K16	●	20	20	20	125	37	10,0
DVVN N 2525 M16	●	25	25	25	150	37	12,5

Spare Parts

Clamp	Spring	Clamp bolt	Shim	Shim Screw	Wrench	Wrench	Insert
		SCP–4 5,0 (N·m)	VNS1604	BFTX0307N 2,0 (N·m)	TRX10(*)	LH040 LH025	❶

(*) Note: Wrench (TRX) for shim clamp screw is not included.

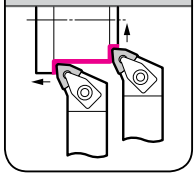
● = Eurostock ❑ = Delivery on request (N·m) Recommended Tightening Torque (N·m)

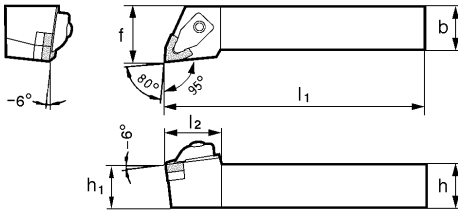
External Tool Holders
D Type (Double Clamp)

General Turning and Facing



DWLN





Holders

Above figures show right hand tools.

Ordering No.	Stock R	Stock L	h	h_1	b	l_1	l_2	f
DWLN R/L 2020 K08	●	●	20	20	20	125	32	25
DWLN R/L 2525 M08	●	●	25	25	25	150	32	32

Inserts

Eg.



N-GU

❶ WNMG 080408 N–GU

Spare Parts

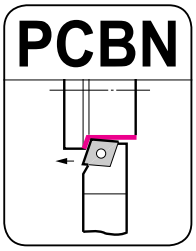
Clamp	Spring	Clamp bolt	Shim	Shim Screw	Wrench	Wrench	Insert
SCP–2		**5,0** N·m	WNS0804	BFTX0409N **3,4** N·m	TRX15(*)	LH040 LH025	❶

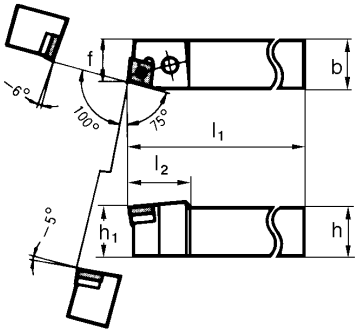
(*) Note: Wrench (TRX) for shim clamp screw is not included.

General Turning and Facing



PCBN





Holders

Above figures show right hand tools.

Ordering No.	Stock R	Stock L	h	h_1	b	l_1	l_2	f
PCBN R/L 2020 K12	●	❑	20	20	20	125	27	17
PCBN R/L 2525 M12	●	●	25	25	25	150	27,7	22
PCBN R/L 3225 P12	❑	●	32	32	25	170	27,7	22
PCBN R/L 2525 M16	❑	●	25	25	25	150	31,7	22
PCBN R/L 3225 P16	❑	●	32	32	25	170	31,7	22
PCBN R/L 3232 P19	●	●	32	32	32	170	37,9	27

Inserts

Eg.



N-GU N-HG

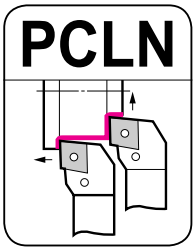
❶ CNMG 120408 N–GU
❷ CNMG 160612 N–GU
❸ CNMM 190612 N–HG

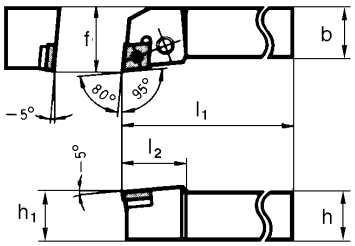
Spare Parts



Lever pin	Clamp bolt	Shim	Shim pin	Wrench	Insert
LCL4SD	LCS42BS-SD	LSC42SD	LSP4SD	LH030	❶
LCL5SD	LCS5B-SD	LSC53SD	LSP5SD	LH030	❷
LCL6SD	LCS6B-SD	LSC63SD	LSP6SD	LH040	❸

PCLN





Holders

Above figures show right hand tools.

Ordering No.	Stock R	Stock L	h	h_1	b	l_1	l_2	f
PCLN R/L 1616 H09	●	●	16	16	16	100	25,7	20
PCLN R/L 2020 K09	●	❑	20	20	20	125	27	25
PCLN R/L 2525 M09	❑	❑	25	25	25	150	27	32
PCLN R/L 1616 H12	●	●	16	16	16	100	26,1	20
PCLN R/L 2020 K12	❑	❑	20	20	20	125	27,4	25
PCLN R/L 2525 M12	❑	❑	25	25	25	150	28	32
PCLN R/L 3225 P12	●	●	32	32	25	170	28	32
PCLN R/L 2525 M16	●	❑	25	25	25	150	32,6	32
PCLN R/L 3225 P16	●	❑	32	32	25	170	32,6	32
PCLN R/L 3232 P16	●	●	32	32	32	170	32,6	40
PCLN R/L 2525 M19	❑	●	25	25	25	150	37	32
PCLN R/L 3225 P19	❑	❑	32	32	32	170	38	32
PCLN R/L 3232 P19	❑	❑	32	32	32	170	38	40
PCLN R/L 4040 S19	❑	❑	40	40	40	250	37,8	50

Inserts

Eg.



N-GU N-HG

❶ CNMG 090308 N–SU
❷ CNMG 120408 N–GU
❸ CNMG 160612 N–GU
❹ CNMM 190612 N–HG

Spare Parts



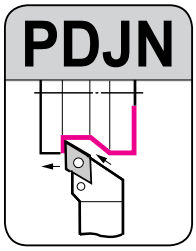
Lever pin	Clamp bolt	Shim	Shim pin	Wrench	Insert
LCL3SD	LCS3TB-SD	LSC32SD	LSP3SD	LH025	❶
LCL4SD	LCS 4CA LCS42BS-SD	LSC42SD	LSP4SD	LH030	❷
LCL5SD	LCS5B-SD	LSC53SD	LSP5SD	LH030	❸
LCL6SD	LCS6B-SD	LSC63SD	LSP6SD	LH040	❹

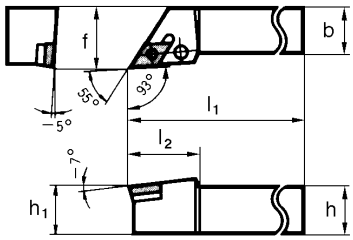
● = Eurostock ❑ = Delivery on request

External Tool Holders
P Type (Lever Lock)

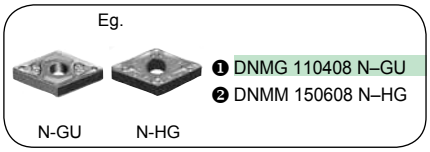


General Turning and Facing





Inserts



Spare Parts

Holders

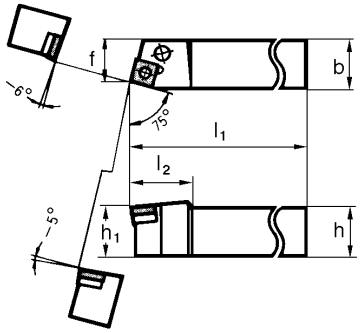
Above figures show right hand tools.

Ordering No.	Stock		Dimensions (mm)						Lever pin	Clamp bolt	Shim	Shim pin	Wrench	Insert
	R	L	h	h_1	b	l_1	l_2	f						
PDJN R/L 1616 H11	●	●	16	16	16	100	30	20	LCL3D-SD	LCS3TB-SD	LSD32SD	LSP3SD	LH025	❶
PDJN R/L 2020 K11	●	●	20	20	20	125	30	25						
PDJN R/L 2525 M11	●	●	25	25	25	150	30	32						
PDJN R/L 2020 K15	●	●	20	20	20	125	34,7	25	LCL4D-SD	LCS5DB-SD	LSD42SD	LSP4SD	LH030	❷
PDJN R/L 2525 M15	●	●	25	25	25	150	34,7	32						
PDJN R/L 3225 P15	●	●	32	32	25	170	34,7	32						
PDJN R/L 4025 P15	❑	❑	40	40	25	170	35	28,7						



General Turning and Chamfering

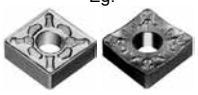
PSBN



Above figures show right hand tools.

Inserts

Eg.



❶ SNMG 120408 N–GU
❷ SNMG 150612 N–GU
❸ SNMM 190612 N–HG

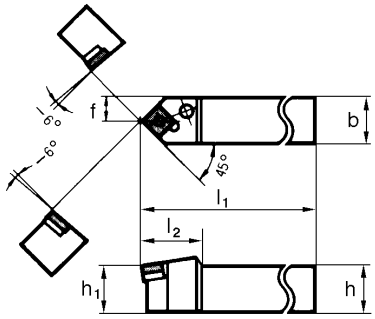
Holders

Ordering No.	Stock R	Stock L	h	h_1	b	l_1	l_2	f
PSBN R/L 2020 K12	●	●	20	20	20	125	27,5	17
PSBN R/L 2525 M12	●	●	25	25	25	150	27,5	22
PSBN R/L 2525 M15	●	●	25	25	25	150	32	22
PSBN R/L 3225 P15	●	●	32	32	25	170	32	22
PSBN R/L 3232 P19	●	●	32	32	32	170	39,2	27

Spare Parts

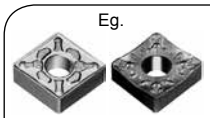
Lever pin	Clamp bolt	Shim	Shim pin	Wrench	Insert
LCL4SD	LCS42BS-SD	LSS42SD	LSP4SD	LH030	❶
LCL5SD	LCS5B-SD	LSS53SD	LSP5SD	LH030	❷
LCL6SD	LCS6B-SD	LSS63SD	LSP6SD	LH040	❸

PSDN



Inserts

Eg.



❶ SNMG 090308 N–UG
❷ SNMG 120408 N–GU
❸ SNMM 190612 N–HG

Holders

Ordering No.	Stock	h	h_1	b	l_1	l_2	f
PSDN N 1616 H09	●	16	16	16	100	21	8,3
PSDN N 2020 K12	●	20	20	20	125	27,6	10,3
PSDN N 2525 M12	●	25	25	25	150	27,6	12,8
PSDN N 3225 P12	●	32	32	25	170	27,6	12,8
PSDN N 3225 P19	❑	32	32	25	170	40,6	13
PSDN N 3232 P19	●	32	32	32	170	40,6	16,5

Spare Parts

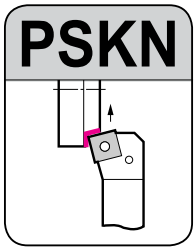
Lever pin	Clamp bolt	Shim	Shim pin	Wrench	Insert
LCL3SD	LCS 3TB-SD	LSS32SD	LSP3SD	LH025	❶
LCL4SD	LCS42BS-SD	LSS42SD	LSP4SD	LH030	❷
LCL6SD	LCS6B-SD	LSS63SD	LSP6SD	LH040	❸

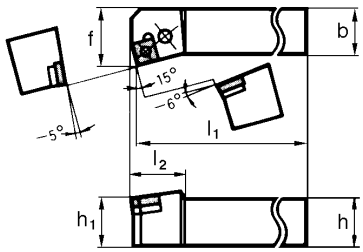
● = Eurostock ❑ = Delivery on request

General Turning and Facing



PSKN



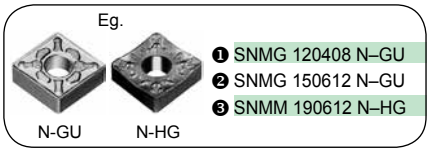


Holders

Above figures show right hand tools.

Ordering No.	Stock R	Stock L	h	h_1	b	l_1	l_2	f
PSKN R/L 2020 K12	●	❑	20	20	20	125	22,7	17
PSKN R/L 2525 M12	●	●	25	25	25	150	22,7	32
PSKN R/L 3225 P12	❑	❑	32	32	25	170	22,7	32
PSKN R/L 2525 M15	❑	❑	25	25	25	150	32	32
PSKN R/L 3225 P15	❑	●	32	32	25	170	32	32
PSKN R/L 3232 P15	❑	❑	32	32	32	170	32	40
PSKN R/L 3232 P19	❑	❑	32	32	32	170	33,7	40

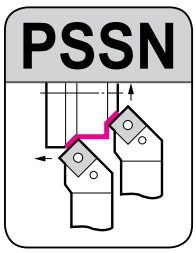
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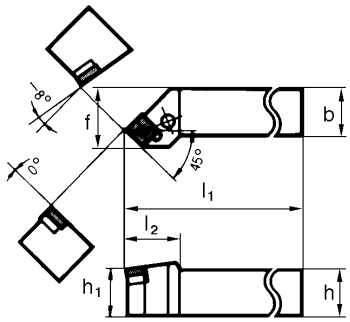


Spare Parts

Lever pin	Clamp bolt	Shim	Shim pin	Wrench	Insert
LCL4SD	LCS42BS-SD	LSS42SD	LSP4SD	LH030	❶
LCL5SD	LCS5B-SD	LSS53SD	LSP5SD	LH030	❷
LCL6SD	LCS6B-SD	LSS63SD	LSP6SD	LH040	❸

PSSN



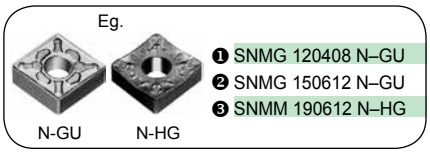


Holders

Above figures show right hand tools.

Ordering No.	Stock R	Stock L	h	h_1	b	l_1	l_2	f
PSSN R/L 2020 K12	●	●	20	20	20	125	29,3	25
PSSN R/L 2525 M12	●	●	25	25	25	150	29,3	32
PSSN R/L 3225 P12	●	❑	32	32	25	170	29,3	32
PSSN R/L 2525 M15	●	●	25	25	25	150	32	32
PSSN R/L 3225 P15	❑	❑	32	32	25	170	32	32
PSSN R/L 3232 P15	●	❑	32	32	32	170	32	40
PSSN R/L 3232 P19	●	●	32	32	32	170	40,2	40

Inserts



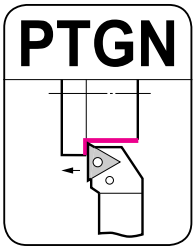
Spare Parts

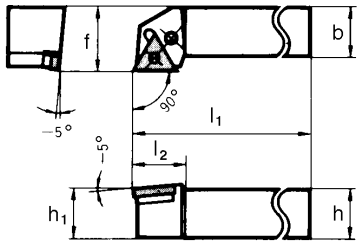
Lever pin	Clamp bolt	Shim	Shim pin	Wrench	Insert
LCL4SD	LCS42BS-SD	LSS42SD	LSP4SD	LH030	❶
LCL5SD	LCS5B-SD	LSS53SD	LSP5SD	LH030	❷
LCL6SD	LCS6B-SD	LSS63SD	LSP6SD	LH040	❸

General Turning and Facing



PTGN





Holders

Above figures show right hand tools.

Ordering No.	Stock		Dimensions (mm)						Lever pin	Clamp bolt	Shim	Shim pin	Wrench	Insert
	R	L	h	h_1	b	l_1	l_2	f						
PTGN R/L 1616 H16	●	●	16	16	16	100	20	20	LCL3SD	LCS3TB-SD	LST317SD	LSP3SD	LH025	❶
PTGN R/L 2020 K16	●	●	20	20	20	125	20	25						
PTGN R/L 2525 M16	●	●	25	25	25	150	22,2	32						
PTGN R/L 2525 M22	●	●	25	25	25	150	28,7	32	LCL4SD	LCS42BS-SD	LST42SD	LSP4SD	LH030	❷
PTGN R/L 3225 P22	●	❑	32	32	25	170	28,7	32						
PTGN R/L 3232 P22	●	●	32	32	32	170	28,7	32						

Inserts

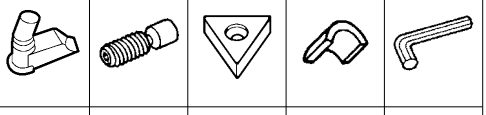
Eg.



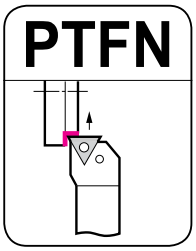
N-GU N-HG

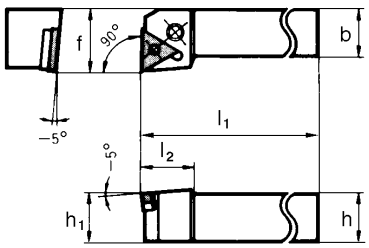
❶ TNMG 160408 N–GU
❷ TNMM 220412 N–HG

Spare Parts



PTFN





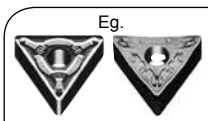
Holders

Above figures show right hand tools.

Ordering No.	Stock		Dimensions (mm)						Lever pin	Clamp bolt	Shim	Shim pin	Wrench	Insert
	R	L	h	h_1	b	l_1	l_2	f						
PTFN R/L 1616 H16	●	●	16	16	16	100	19,7	20	LCL3SD	LCS3TB-SD	LST317SD	LSP3SD	LH025	❶
PTFN R/L 2020 K16	●	●	20	20	20	125	20,2	25						
PTFN R/L 2525 M16	●	●	25	25	25	150	20,2	32						
PTFN R/L 2525 M22	●	❑	25	25	25	150	25,2	32	LCL4SD	LCS42BS-SD	LST42SD	LSP4SD	LH030	❷
PTFN R/L 3225 P22	●	●	32	32	25	170	25,2	32						

Inserts

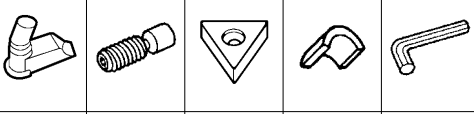
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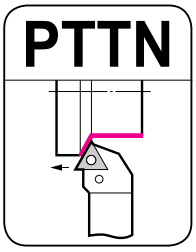
N-GU N-HG

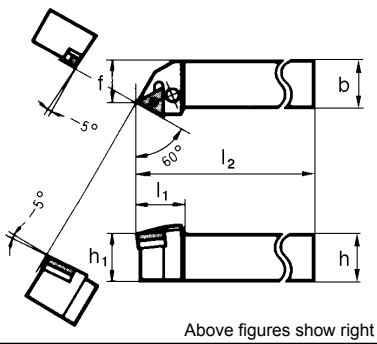
❶ TNMG 160408 N–GU
❷ TNMM 220412 N–HG

Spare Parts



PTTN





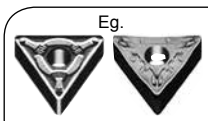
Holders

Above figures show right hand tools.

Ordering No.	Stock		Dimensions (mm)						Lever pin	Clamp bolt	Shim	Shim pin	Wrench	Insert
	R	L	h	h_1	b	l_1	l_2	f						
PTTN R/L 2020 K16	❑	❑	20	20	20	125	25,9	17	LCL3SD	LCS3TB-SD	LST317SD	LSP3SD	LH025	❶
PTTN R/L 2525 M16	●	❑	25	25	25	150	25,9	22						
PTTN R/L 2525 M22		❑	25	25	25	150	31,9	22	LCL4SD	LCS42BS-SD	LST42SD	LSP4SD	LH030	❷
PTTN R/L 3225 P22	❑	●	32	32	25	170	31,9	22						

Inserts

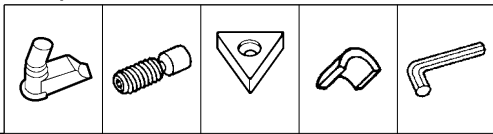
Eg.



N-GU N-HG

❶ TNMG 160408 N–GU
❷ TNMM 220412 N–HG

Spare Parts

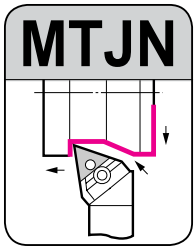


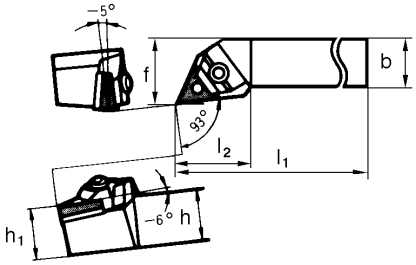
● = Eurostock ❑ = Delivery on request (N·m) Recommended Tightening Torque (N·m)

General Turning and Copying

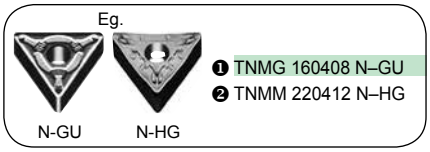


MTJN





Inserts

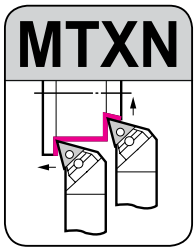


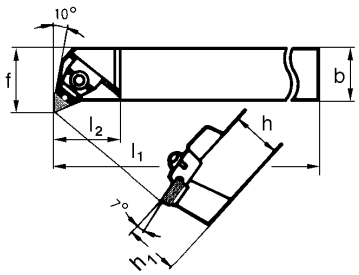
Holders

Above figures show right hand tools.

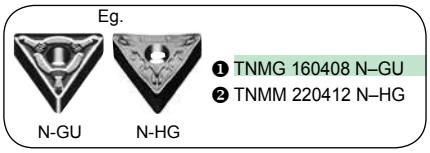
Ordering No.	Stock		Dimensions (mm)						Spare Parts							
	R	L	h	h_1	b	l_1	l_2	f	Wedge	Shim pin	Shim	Clamp bold	Nut	Ring	Wrench	Insert
MTJN R/L 2020-33 (K16)	●	●	20	20	20	125	37	25	MMW30	MP317	STW323	BHA0525 4,0 Nm	CPM32N	ER04	LH030	❶
MTJN R/L 2525-33 (M16)	●	●	25	25	25	150	37	32		MP320						
MTJN R/L 2525-43 (M22)	●	●	25	25	25	150	37	32	MMW40	MP420	STW434	BHA0625 4,5 Nm	CPM43N	ER05	LH030 LH040	❷
MTJN R/L 3225-43 (P22)	❑	❑	32	32	25	170	37	32		MP416						
MTJN R/L V-43 (D22)			20	20	25	60	37	30								

MTXN





Inserts



Holders

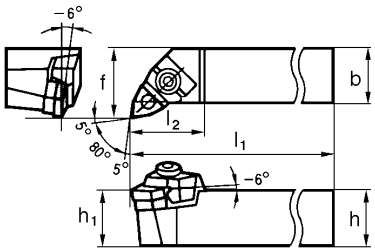
Above figures show right hand tools.

Ordering No.	Stock		Dimensions (mm)						Spare Parts							
	R	L	h	h_1	b	l_1	l_2	f	Wedge	Shim pin	Shim	Clamp bold	Nut	Ring	Wrench	Insert
MTXN R/L 2020-33 (K16)	❑	❑	20	20	20	125	32	25	MMW30	MP317	STW323	BHA0525 4,0 Nm	CPM32N	ER04	LH030	❶
MTXN R/L 2525-33 (M16)	❑	❑	25	25	25	150	32	32		MP320						
MTXN R/L 2525-43 (M22)			25	25	25	150	38	32	MMW40	MP420	STW434	BHA0625 4,5 Nm	CPM43N	ER05	LH030, 040	❷

General Turning and Facing

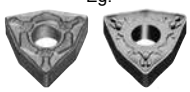


MWLN



Inserts

Eg.



N-GU N-HG

❶ WNMG 080408 N–GU
❷ WNMM 080412 N–HG

Holders

Above figures show right hand tools.

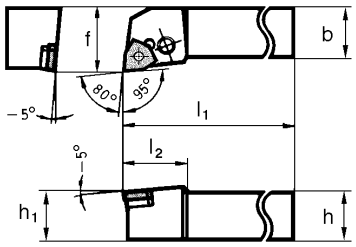
Ordering No.	Stock R	Stock L	h	h_1	b	l_1	l_2	f
MWLN R/L 2020-43 (K08)			20	20	20	125	32	25
MWLN R/L 2525-43 (M08)	❑	❑	25	25	25	150	32	32
MWLN R/L 3225-43 (P08)	❑	❑	32	32	25	170	32	32
MWLN R/L 2525-54 (M10)			25	25	25	150	37	32
MWLN R/L 3225-54 (P10)			32	32	25	170	37	32

Spare Parts

Wedge	Shim pin	Shim	Clamp bold	Nut	Ring	Wrench	Insert
MWW40	MP416	SWW433	BHA0625	CPM43S	ER05	LH030 LH040	❶,❷
	MP420		4,5 (N·m)	CPM43N			
MWW50	MP531	SWW544	BHA0834	CPM54N	ER07	LH040 LH050	
	MP534						

P Type Lever Lock Holders

PWLN



Inserts

Eg.



N-SU

❶ WNMG 060408 N–SU

Holders

Above figures show right hand tools.

Ordering No.	Stock R	Stock L	h	h_1	b	l_1	l_2	f
PWLN R/L 2020 K06 (PWLN R/L 2020 -33)	❑	❑	20	20	20	125	27	25
PWLN R/L 2525 M06 (PWLN R/L 2525 -33)	❑	❑	25	25	25	150	27	32

Spare Parts

Lever pin	Clamp bolt	Shim	Shim pin	Wrench	Insert
LCL3SD	LCS3TB-SD	LSW317	LSP3SD	LH025	❶

● = Eurostock ❑ = Delivery on request (N·m) Recommended Tightening Torque (N·m)



C Type Top Clamp Holders

CCLN

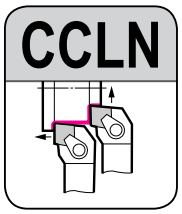


Fig.1

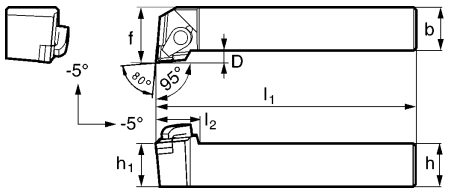
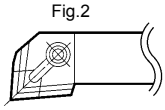


Fig.2

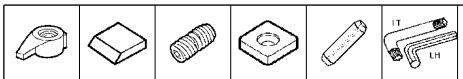


Inserts



❶ CNGN0903**
❷ CNGN1203 **
❸ CNGN1204 **

Spare Parts



Holders

Above figures show right hand tools.

Ordering No.	Stock R	Stock L	Dimensions (mm) h=h_1	b	l_1	l_2	f	D	Fig.	Clamp	Insert protector	Clamp bolt	Shim	Shim pin	Wrench		Insert
CCLN R/L 2525 M09	❑		25	25	150	25	32	7	1	CCM8UL	CBC0903	WB8-22T	SCN0903	SPP3	LT27		❶
CCLN R/L 2525 M12-03	❑		25	25	150	30	32	7	1		CBC4		SCND433				❷
CCLN R/L 2525 M12-04	❑		25	25	150	30	32	7	2	CCM8-LONG	CBC4	WB8-30	SCND433	SPP3	LH040		❸

CSBN

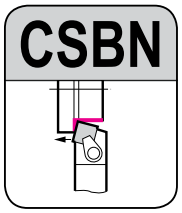


Fig.1

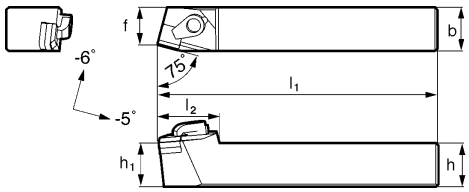
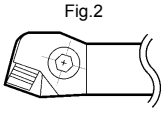


Fig.2

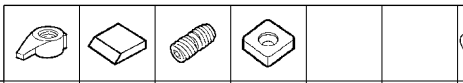


Inserts



❶ SNGN0903**
❷ SNGN1203**
❸ SNGN1204**

Spare Parts



Holders

Above figures show right hand tools.

Ordering No.	Stock R	Stock L	Dimensions (mm) h=h_1	b	l_1	l_2	f	D	Fig.	Clamp	Insert protector	Clamp bolt	Shim	Shim pin	Spring	Wrench	Insert
CSBN R/L 2525 N09	❑		25	25	160	30	21,5	–	1	CCM8UL	CBS13	WB8-22T	SSN0903	–	–	LH040	❶
CSBN R/L 2525 N12-03	❑		25	25	160	35	21,5	–	1		CBS14		SSND423				❷
CSBN R/L 2525 N12-04	❑		25	25	160	33	21,5	–	2	DC-R/L 1	CBD 4 R/L	BH 0830 R/L	SSND423	SPP3	DSP5	LH040	❸

CSKN

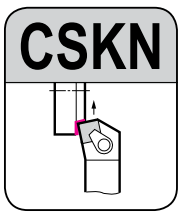


Fig.1

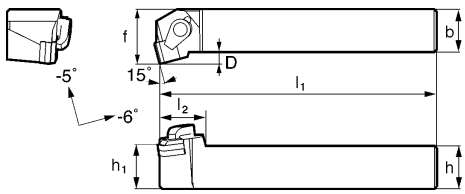
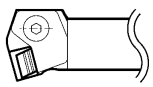


Fig.2

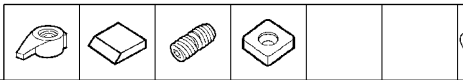


Inserts



❶ SNGN0903**
❷ SNGN1203**
❸ SNGN1204**

Spare Parts



Holders

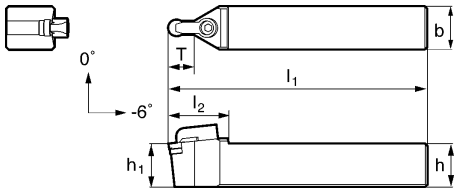
Above figures show right hand tools.

Ordering No.	Stock R	Stock L	Dimensions (mm) h=h_1	b	l_1	l_2	f	D	Fig.	Clamp	Insert protector	Clamp bolt	Shim	Shim pin	Spring	Wrench	Insert
CSKN R/L 2525 N09	❑		25	25	160	25	32	7	1	CCM8UL	CBS13	WB8-22T	SSN0903	–	–	LH040	❶
CSKN R/L 2525 N12-03	❑		25	25	160	25	32	7	1		CBS14		SSND423				❷
CSKN R/L 2525 N12-04	❑		25	25	160	21	32	7	2	DC-L/R 1	CBD 4 L/R	BH 0830 L/R	SSND423	SPP3	DSP5	LH040	❸

C Type Top Clamp Holders



CRDN



■ Inserts



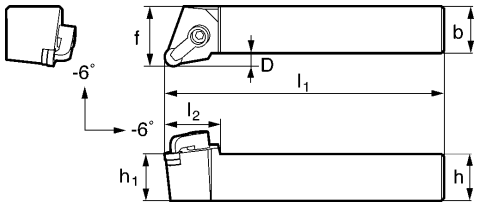
❶ RNGN0903**
❷ RNGN1203 **
❸ RNGN1204 **

■ Spare Parts

■ Holders

Ordering No.	Stock	Dimensions (mm)							Clamp	Double screw	Shim	Shim pin	Wrench	Insert
		h	h_1	b	l_1	l_2	f	T						
CRDNN 2525 M09	●	25	25	25	150	35	–	15	CCM8-LONG	WB8-22T	SRND32	SPP3	LT27	❶
CRDNN 2525 M12-03	●	25	25	25	150	35	–	20			SRND42			❷
CRDNN 2525 M12-04	●	25	25	25	150	35	–	20						❸

CRSN



■ Inserts



❶ RNGN0903**
❷ RNGN1203 **
❸ RNGN1204 **

■ Spare Parts

■ Holders

Above figures show right hand tools.

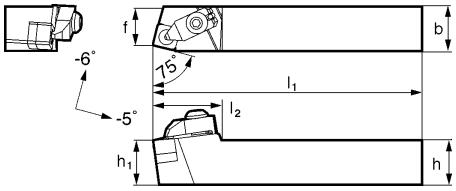
Ordering No.	Stock		Dimensions (mm)							Clamp	Double screw	Shim	Shim pin	Wrench	Insert
	R	L	h	h_1	b	l_1	l_2	f	D						
CRSN R/L 2525 M09	●	●	25	25	25	150	30	32	7	CCM8-LONG	WB8-22T	SRND32	SPP3	LT27	❶
CRSN R/L 2525 M12-03	●	●	25	25	25	150	30	32	7			SRND42			❷
CRSN R/L 2525 M12-04	●	●	25	25	25	150	30	32	7						❸

● = Eurostock

X Type Dimple Lock Holders



XSBN



Inserts



❶ SNGX1204 **

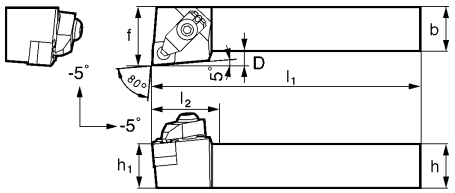
Spare Parts

Holders

Above figures show right hand tools.

Ordering No.	Stock		Dimensions (mm)							Clamp	Clamp bolt	Shim	Shim pin	Spring	Wrench		Insert
	R	L	h	h_1	b	l_1	l_2	f	D								
XSBN R/L 2525 N12	●		25	25	25	160	38	21,5	7	DSLX8	BH0825	SSND423	SPP3	GSP10	LH050		❶

XCLN



Inserts



❶ CNGX1204 **

Spare Parts

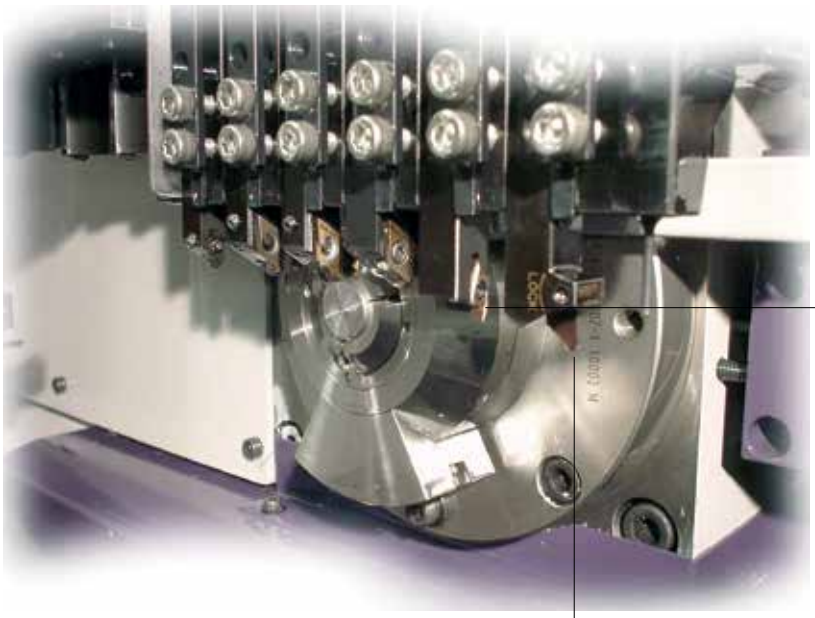
Holders

Above figures show right hand tools.

Ordering No.	Stock		Dimensions (mm)							Clamp	Clamp bolt	Shim	Shim pin	Spring	Wrench		Insert
	R	L	h	h_1	b	l_1	l_2	f	D								
XCLN R/L 2525 M12	●		25	25	25	150	33	32	7	DSLX8	BH0825	SCND433	SPP3	GSP10	LH050		❶

External Mini Holders







Back-Turning Tool Holder SBT Type

Sharp cutting edges with good surface finish.
Max. reach of insert 8,0mm, edge width 2,5mm

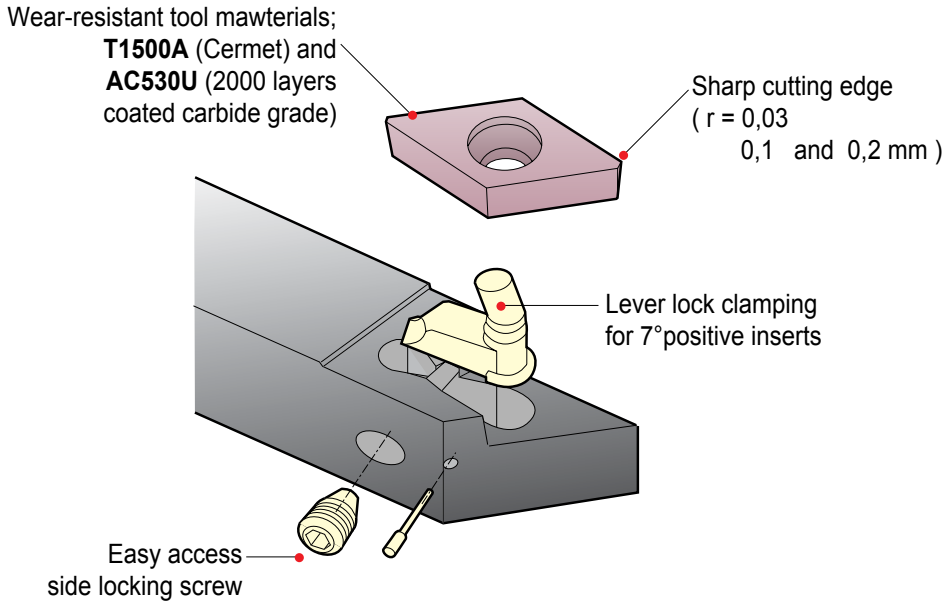


Cut-off Tool Holder SCT Type

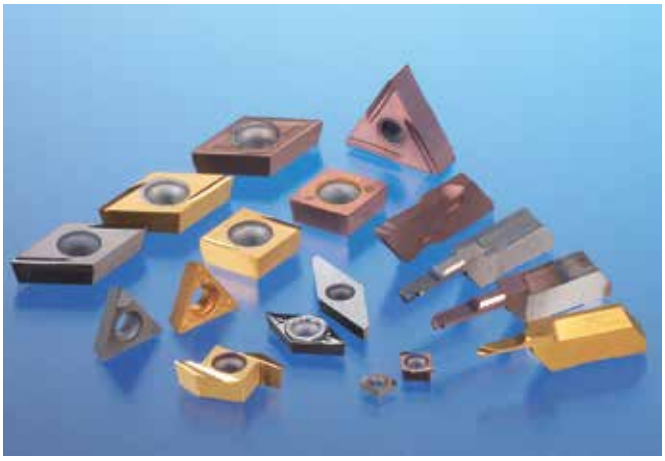
Easy insert change by just loosening the screw from the back.
Max. cut-off dia. Ø5mm, Ø12mm, Ø16mm



PDJCR type
lever lock holder



External Mini Holders



In 1984, Sumitomo Electric Hardmetal first released the Mini Tool Holder series for the machining of small components in small NC autolathes.
A full range of insert grades comprising of the Cermet T1500A, SUMIBORON BN2000, SUMIDIA DA1000 and especially AC530U, was also introduced to meet a variety of machining requirements.

■ Grade Selection

Category	Application Range			Work Material					
	High Precision	Finish-Light Cut	Medium Cut	General Steel	Stainless Steel	Cast Iron	Heat Resistant Steel	Hardenend Steel	Non-Ferrous Metal
Coated Carbide (PVD)	AC510U			○	◎	○	◎		
	AC520U			○	◎	○	◎		
	AC530U			◎	◎	○	○		○
Cermet/Coated Cermet	T1000A			◎	○	◎			○
	T1500A / T1500Z			◎	○	○			○
Carbide	H1			○	○	○			◎
	EH510			○	○	○	◎		○
CBN (SUMIBORON)	BN1000 / BN2000							◎	
SUMIDIA	DA1000								◎
	DA2200								◎

◎ Preferred Choice ○ Suitable

■ Recommended Cutting Conditions

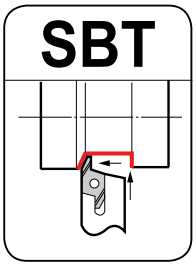
Work Material / Grade	P Free Cutting Steel		P Carbon Steel		M Stainless Steel		H Hardened Steel		N Aluminium		N Brass	
	v_c (m/min)	f (mm/rev)	v_c (m/min)	f (mm/rev)	v_c (m/min)	f (mm/rev)	v_c (m/min)	f (mm/rev)	v_c (m/min)	f (mm/rev)	v_c (m/min)	f (mm/rev)
AC510U	50 - 200	0,02 - 0,15	50 - 200	0,02 - 0,10	*50 - 200	*0,02 - 0,10					70 - 300	0,05 - 0,20
AC520U	50 - 200	0,02 - 0,15	50 - 200	0,02 - 0,10	*50 - 200	*0,02 - 0,10					70 - 300	0,05 - 0,20
AC530U	50 - 200	0,02 - 0,15	50 - 200	0,02 - 0,10	*50 - 200	*0,02 - 0,10					70 - 300	0,05 - 0,20
T1000A	50 - 200	0,02 - 0,15	50 - 200	0,02 - 0,10	*50 - 150	*0,02 - 0,10			70 - 300	0,05 - 0,20	70 - 300	0,05 - 0,20
T1500A	50 - 200	0,02 - 0,15	50 - 200	0,02 - 0,10	*50 - 150	*0,02 - 0,10			70 - 300	0,05 - 0,20	70 - 300	0,05 - 0,20
T1500Z	50 - 200	0,02 - 0,15	50 - 200	0,02 - 0,10	*50 - 150	*0,02 - 0,10			70 - 300	0,05 - 0,20	70 - 300	0,05 - 0,20
BN1000							50 - 200	0,02 - 0,10				
BN2000							50 - 120	0,02 - 0,10				
DA1000									70 - 300	0,02 - 0,10	70 - 300	0,02 - 0,10
DA2200									70 - 300	0,02 - 0,10	70 - 300	0,02 - 0,10

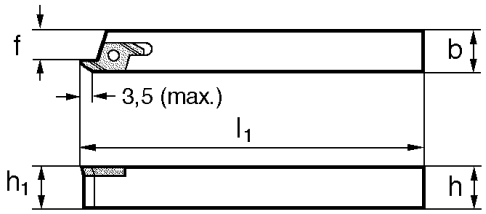
* Please use maximal possible C/speed

SBT Type

Special Mini Holders for Back Facing







Holders

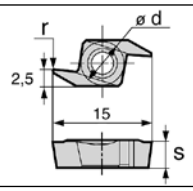
Above figures show right hand tools.

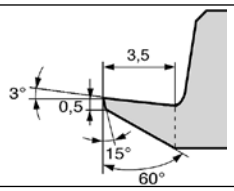
Ordering No.	Stock	Dimensions (mm)							Spare Parts				Insert
		h	h_1	b	l_1	f			Screw	N·m	Wrench		
SBT 35-R 1010	●	10	10	10	120	7,5			BFTX0307N	**2,0**	TRX10		BTR 35_ _
SBT 35-R 1212	●	12	12	12	120	9,5							
SBT 35-R 1616	●	16	16	16	120	13,5							

INSERTS

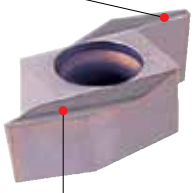
Coated carbide Uncoated Cermet

BTR	Ordering No.	Stock AC530U	Stock ACZ310	Stock T1500A	Dimensions (mm) d	s	r
	**BTR 3505**	❑	●	❑	6,8	3,8	0,05
	BTR 3515	❑	●	❑			0,15



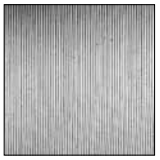


Sharp cutting edge with 15° rake angle

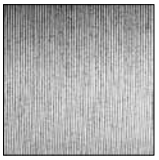


Wide groove breaker for smooth chip evacuation

● Surface roughness comparision



BTR 3505



P10 des Wettbewerbs

Work Material: C45
Insert: BTR3505 (ACZ310)
Cutting Data: v_c = 80 m/min, f = 0,04 mm/rev
d_{oc} = 3,0 mm, Wet

Recommended cutting data (SBT type)

Work Material	Tooling	v_c (m/min)	f (mm/rev)
General steel	Grooving	50 ~ 150	0,02 ~ 0,05
	Back facing		0,02 ~ 0,10
Free-cutting steel	Grooving	50 ~ 150	0,02 ~ 0,10
	Back facing		0,02 ~ 0,15
Stainless steel	Grooving	50 ~ 150	0,02 ~ 0,04
	Back facing		0,02 ~ 0,06

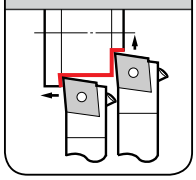
● = Eurostock ❑ = Delivery on request N·m Recommended Tightening Torque (N·m)

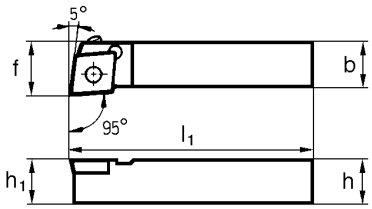
External Mini Tool Holders
PC/SC Type



P Type Lever Lock Holders

PCLC





■ Inserts

Eg.



❶ CCGT 060202 R-FX
❷ CCMT 09T304 N-SU

R-FX N-SU

■ Spare Parts

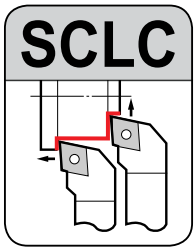
■ Holders

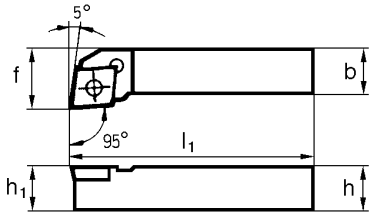
Above figures show right hand tools.

Ordering No.	Stock R	Stock L	Dimensions (mm) h	h_1	b	l_1	f	Lever pin	Clamp screw	Side pin	Wrench	Insert
PCLC R/L 0810 K06	❑	❑	8	8	10	125	10,5	LCL 06	BTT 0407	LP 07	TH 020	❶
PCLC R/L 1010 K06	●	❑	10	10	10	125	10,5					
PCLC R/L 1212 M09	●	●	12	12	12	150	12,5	LCL 09	BTT 0411	LP 06		❷
PCLC R/L 1616 M09	●		16	16	16	150	16,5					

S Type Screw Lock Holders

SCLC





■ Inserts

Eg.



❶ CCGT 060202 R-FX
❷ CCMT 09T304 N-SU
❸ CCMT 120408 N-SU

R-FX N-SU

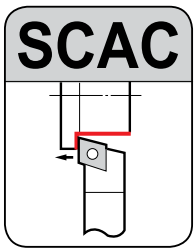
■ Spare Parts

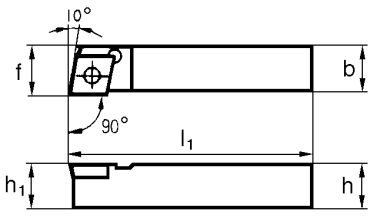
■ Holders

Above figures show right hand tools.

Ordering No.	Stock R	Stock L	Dimensions (mm) h	h_1	b	l_1	f	Screw	N·m	Wrench		Insert
SCLC R/L 0808 D06	●	●	8	8	8	60	10	BFTX02506N	**1,5**	TRX08		❶
SCLC R/L 1010 E06	●	●	10	10	10	70	12					
SCLC R/L 1212 F09	●	●	12	12	12	80	16	BFTX0409N	**3,4**	TRX15		❷
SCLC R/L 1616 H09	●	●	16	16	16	100	20					
SCLC R/L 2020 H09	●	❑	20	20	20	100	25					
SCLC R/L 2020 K09	●	●	20	20	20	125	25					
SCLC R/L 2020 K12	●	●	20	20	20	125	25	BFTX0511N	**5,0**	TRX20		❸
SCLC R/L 2525 M12	●	●	20	25	25	150	32					

SCAC





■ Inserts

Eg.



❶ CCGT 060202 R-FX
❷ CCMT 09T304 N-SU

R-FX N-SU

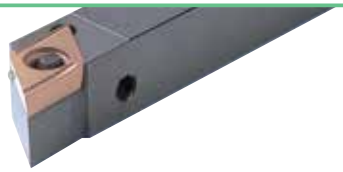
■ Spare Parts

■ Holders

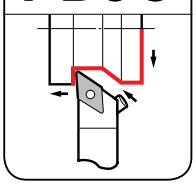
Above figures show right hand tools.

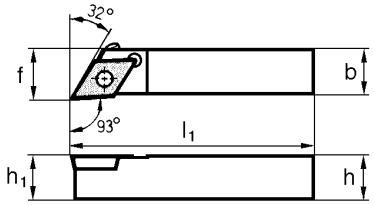
Ordering No.	Stock R	Stock L	Dimensions (mm) h	h_1	b	l_1	f	Screw	N·m	Wrench		Insert
SCAC R/L 0808 D06	●	❑	8	8	8	60	8,5	BFTX02506N	**1,5**	TRX08		❶
SCAC R/L 1010 E06	●	❑	10	10	10	70	10,5					
SCAC R/L 1212 F09	●	❑	12	12	12	80	12,5	BFTX0409N	**3,4**	TRX15		❷

P Type Lever Lock Holders



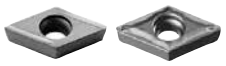
PDJC





Inserts

Eg.



R-FX N-SU

❶ DCGT 070202 R-FX
❷ DCMT 11T304 N-SU

Spare Parts

Holders

Above figures show right hand tools.

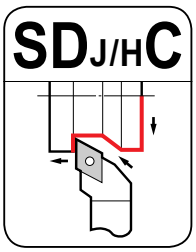
Ordering No.	Stock		Dimensions (mm)					Lever pin	Clamp screw	Side pin	Wrench	Insert
	R	L	h	h_1	b	l_1	f					
PDJC R/L 0810 K07	●	❑	8	8	10	125	10,5	LCL 06	BTT 0407	LP 04	TH 020	❶
PDJC R/L 1010 K07	●	●	10	10	10	125	10,5					
PDJC R/L 1212 M11	●	●	12	12	12	150	12,5	LCL 09		LP 07		❷
PDJC R/L 1616 M11	●	❑	16	16	16	150	16,5		BTT 0411			

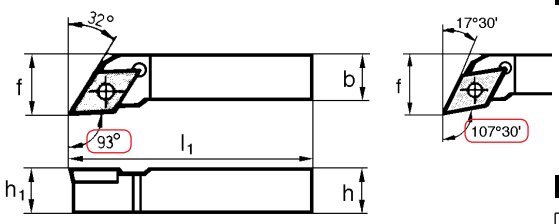
S Type Screw Lock Holders

SDJC R/L

SDHC R/L

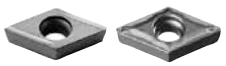
SDJ/HC





Inserts

Eg.



R-FX N-SU

❶ DCGT 070202 R-FX
❷ DCMT 11T304 N-SU

Spare Parts

Holders

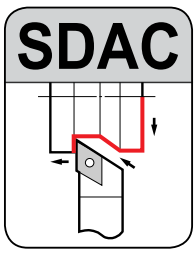
Above figures show right hand tools.

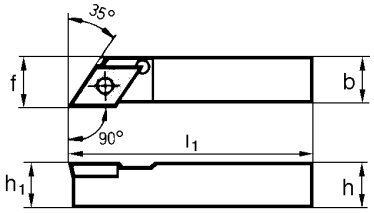
Ordering No.	Stock		Dimensions (mm)					Screw	N·m	Wrench		Insert
	R	L	h	h_1	b	l_1	f					
SDJC R/L 0808 D07	●	●	8	8	8	60	10	BFTX02506N	**1,5**	TRX08		❶
SDJC R/L 1010 E07	●	●	10	10	10	70	12					
SDJC R/L 1212 F07	●	●	12	12	12	80	16					
SDJC R/L 1616 H07	●	●	16	16	16	100	20					
SDJC R/L 2020 K07	●	●	20	20	20	125	25					
SDJC R/L 1212 F11	●	●	12	12	12	80	16	BFTX0409N	**3,4**	TRX15		❷
SDJC R/L 1616 H11	●	●	16	16	16	100	20					
SDJC R/L 2020 K11	●	●	20	20	20	125	25					
SDJC R/L 2525 M11	●	●	25	25	25	150	32					
SDHC R/L 1616 H11	●	●	16	16	16	100	20	BFTX0409N	**3,4**	TRX15		❷
SDHC R/L 2020 K11	●	●	20	20	20	125	25					
SDHC R/L 2525 M11	●	●	25	25	25	150	32					

● = Eurostock ❑ = Delivery on request N·m Recommended Tightening Torque (N·m)



S Type Screw Lock Holders





Inserts

Eg.



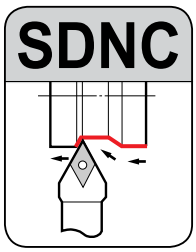
❶ DCGT 070202 R-FX
❷ DCMT 11T304 N-SU

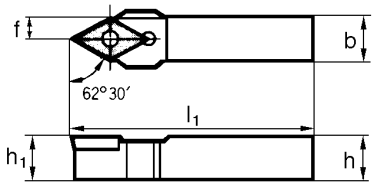
Spare Parts

Holders

Above figures show right hand tools.

Ordering No.	Stock		Dimensions (mm)					Screw	N·m	Wrench		Insert
	R	L	h	h_1	b	l_1	f					
SDAC R/L 0808 D07	❑	●	8	8	8	60	8,5	BFTX02506N	**1,5**	TRX08		❶
SDAC R/L 1010 E07	●	●	10	10	10	70	10,5					
SDAC R/L 1212 F11	●	●	12	12	12	80	12,5	BFTX0409N	**3,4**	TRX15		❷





Inserts

Eg.



❶ DCGT 070202 R-FX
❷ DCMT 11T304 N-SU

Spare Parts

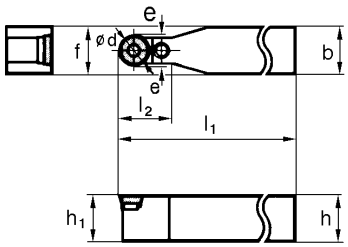
Holders

Ordering No.	Stock	Dimensions (mm)					Screw	N·m	Wrench		Insert
		h	h_1	b	l_1	f					
SDNCN 0808 D07	●	8	8	8	60	4,2	BFTX02506N	**1,5**	TRX08		❶
SDNCN 1010 E07	●	10	10	10	70	5,2					
SDNCN 1212 F07	●	12	12	12	80	6,2					
SDNCN 1616 H07	●	16	16	16	100	8,2					
SDNCN 2020 K07	●	20	20	20	125	10,2					
SDNCN 1212 F11	●	12	12	12	80	6,5	BFTX0409N	**3,4**	TRX15		❷
SDNCN 1616 H11	●	16	16	16	100	8,5					
SDNCN 2020 K11	●	20	20	20	125	10,5					
SDNCN 2525 M11	●	25	25	25	150	13					



P Type Lever Lock Holders

PRDCN



■ Inserts

Eg.



N-RP

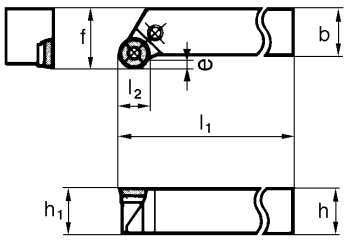
❶ RCOO 0906M0
❷ RCOO 1003M0 N–RO
❸ RCOO 1204M0 N–RO
❹ RCOO 1606M0 N–RO
❺ RCOO 2006M0 N–RO

■ Spare Parts

■ Holders

Ordering No.	Stock	Dimensions (mm)							Lever pin	Clamp screw	Shim	Shim pin	Wrench	Insert
		h	h_1	b	l_1	l_2	f	e						
PRDC N 3225 P9	❑	32	32	25	170	25	12,5	0,5	LCL3S	LCS 3	LSR817	LSP3D	LH025	❶
PRDC N 2020 M10	●	20	20	20	150	22	15,0	1,0	LCL10	LCS10	LSR10	LSP10	LH020	❷
PRDC N 2525 M10	●	25	25	25	150	22	17,5	1,0						
PRDC N 2525 M12	●	25	25	25	150	24	18,5	1,2	LCL12	LCS12	LSR12	LSP10	LH025	❸
PRDC N 3225 Q12	●	32	32	25	180	24	18,5	1,2						
PRDC N 3225 Q16	●	32	32	25	180	28	20,5	1,5	LCL16	LCS16	LSR16	LSP16	LH025	❹
PRDC N 3232 Q20	●	32	32	32	180	32	26,0	1,7	LCL20	LCS20	LSR20	LSP20	LH030	❺

PRGC



■ Inserts

Eg.



N-RP

❶ RCOO 0906M0
❷ RCOO 1003M0 N–RO
❸ RCOO 1204M0 N–RO
❹ RCOO 1606M0 N–RO
❺ RCOO 2006M0 N–RO

■ Spare Parts

■ Holders

Above figures show right hand tools.

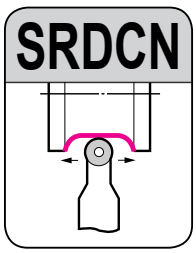
Ordering No.	Stock		Dimensions (mm)							Lever pin	Clamp screw	Shim	Shim pin	Wrench	Insert
	R	L	h	h_1	b	l_1	l_2	f	ød						
PRGC R/L 3225 P9	❑	❑	32	32	25	170	10	32	–	LCL3S	LCS 3	LSR817	LSP3D	LH025	❶
PRGC R/L 2020 K10	●	❑	20	20	20	125	-	25	1,5	LCL10	LCS10	LSR10	LSP10	LH020	❷
PRGC R/L 2525 M10	●	●	25	25	25	150	-	32	1,5						
PRGC R/L 2020 K12	●	❑	20	20	20	125	-	25	2,5	LCL12	LCS12	LSR12	LSP10	LH025	❸
PRGC R/L 2525 M12	❑	●	25	25	25	150	-	32	2,5						
PRGC R/L 3225 P12	❑	❑	32	32	25	170	-	32	2,5						
PRGC R/L 2525 M16	●	❑	25	25	25	150	-	32	3	LCL16	LCS16	LSR16	LSP16	LH025	❹
PRGC R/L 3225 P16	●	❑	32	32	25	170	-	32	3						
PRGC R/L 3232 P20	●	❑	32	32	32	170	-	40	4	LCL20	LCS20	LSR20	LSP20	LH030	❺

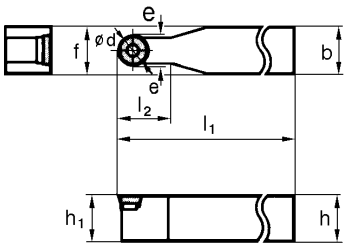
● = Eurostock ❑ = Delivery on request (N·m) Recommended Tightening Torque (N·m)

External Tool Holders
SR Type



S Type Screw Lock Holders





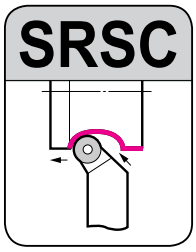
Inserts

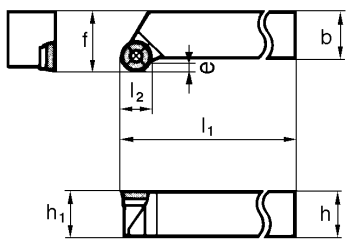


Spare Parts

Holders

Ordering No.	Stock	Dimensions (mm)							Screw	Shim	Screw	Wrench	Wrench	Insert
		h	h_1	b	l_1	l_2	f	e						
SRDC N 2020 K10T3	●	20	20	20	125	25	15,0	1,0	BFTX 03510-SD 2,0 Nm	SRNS 103-SD	BW 0508F-SD	TRX 15 IP-35	LH 035	❶
SRDC N 2525 M10T3	●	25	25	25	150	25	17,5	1,0						
SRDC N 2525 M12	●	25	25	25	150	28	18,5	1,2	BFTX 03512-SD 2,0 Nm	SRNS 123-SD				❷
SRDC N 3225 P12	●	32	32	25	170	28	18,5	1,2						
SRDC N 2525 M16	❑	25	25	25	150	35	20,5	1,5	BFTX 0517-SD 5,0 Nm	SRNS 164-SD	BW 0810F-SD	LT 20 IP	LH 050	❸
SRDC N 3225 P16	●	32	32	25	170	35	20,5	1,5						
SRDC N 3232 P16	❑	32	32	32	170	35	20,5	1,5						
SRDC N 3232 P20	●	32	32	32	170	40	26,0	1,7	BFTX 0618-SD 7,5 Nm	SRNS 204-SD	BW 0912F-SD	LT 25 IP	LH 060	❹





Inserts

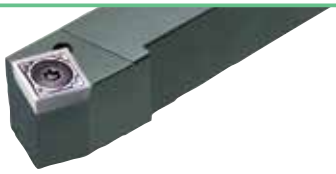


Spare Parts

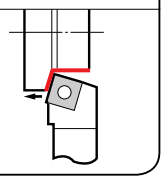
Holders

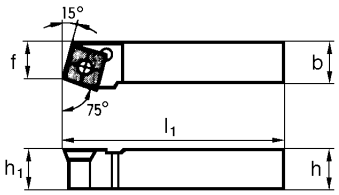
Ordering No.	Stock		Dimensions (mm)							Screw	Shim	Screw	Wrench	Wrench	Insert
	R	L	h	h_1	b	l_1	l_2	f	e						
SRSC R/L 2020 K10T3	●	●	20	20	20	125	–	25	1,5	BFTX 03510-SD 2,0 Nm	SRNS 103-SD	BW 0508F-SD	TRX 15 IP-35	LH 035	❶
SRSC R/L 2525 M10T3	●	●	25	25	25	150	–	32	1,5						
SRSC R/L 2525 M12	●	●	25	25	25	150	–	32	2,5	BFTX 03512-SD 2,0 Nm	SRNS 123-SD				❷
SRSC R/L 3225 P12	●	●	32	32	25	170	–	32	2,5						
SRSC R/L 3225 M16	❑	❑	25	25	25	150	–	32	3,0	BFTX 0517-SD 5,0 Nm	SRNS 164-SD	BW 0810F-SD	LT 20 IP	LH 050	❸
SRSC R/L 3225 P16	●	●	32	32	25	170	–	32	3,0						
SRSC R/L 3232 P16	❑	❑	32	32	32	170	–	40	3,0						
SRSC R/L 3232 P20	●	●	32	32	32	170	–	40	4,0	BFTX 0618-SD 7,5 Nm	SRNS 204-SD	BW 0912F-SD	LT 25 IP	LH 060	❹

S Type Screw Lock Holders



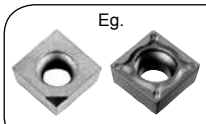
SSBC





Inserts

Eg.



SUMIDIA N-SU

❶ SCMT 070202
❷ SCMT 09T304 N-SU
❸ SCMT 120408 N-SU

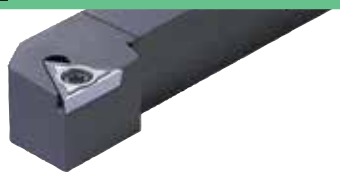
Spare Parts

Holders

Above figures show right hand tools.

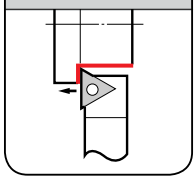
Ordering No.	Stock		Dimensions (mm)					Spare Parts				
	R	L	h	h_1	b	l_1	f	Screw	N·m	Wrench		Insert
SSBC R/L 1010 E07	❑	❑	10	10	10	70	9	BFTX0307N	**2,0**	TRX10		❶
SSBC R/L 1212 F09	❑	●	12	12	12	80	11	BFTX0409N	**3,4**	TRX15		❷
SSBC R/L 1616 H09	●	●	16	16	16	100	13					
SSBC R/L 2020 K12	❑	❑	20	20	20	125	17	BFTX0511N	**5,0**	TRX20		❸
SSBC R/L 2525 M12	❑	❑	25	25	25	150	22					

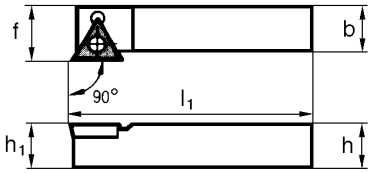
● = Eurostock ❑ = Delivery on request N·m Recommended Tightening Torque (N·m)



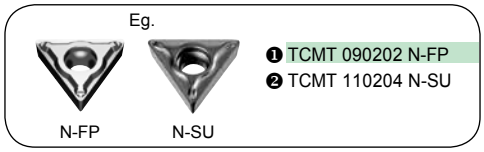
S Type Screw Lock Holders

STAC





■ Inserts



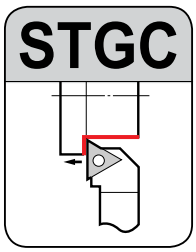
■ Spare Parts

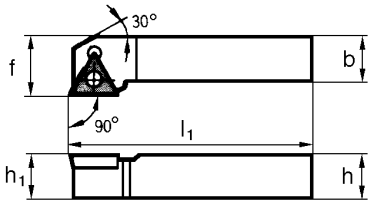
■ Holders

Above figures show right hand tools.

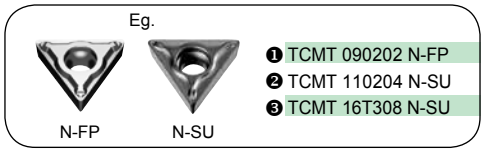
Ordering No.	Stock		Dimensions (mm)					Screw	N·m	Wrench		Insert
	R	L	h	h_1	b	l_1	f					
STAC R/L 0808 D09	●		8	8	8	60	8,5	BFTX02205N	**1,1**	TRX06		❶
STAC R/L 1010 E09	❑		10	10	10	70	10,5					
STAC R/L 1212 F11	●	❑	12	12	12	80	12,5	BFTX02506N	**1,5**	TRX08		❷

STGC





■ Inserts



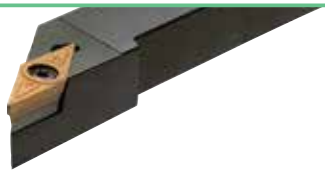
■ Spare Parts

■ Holders

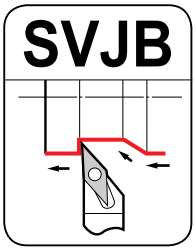
Above figures show right hand tools.

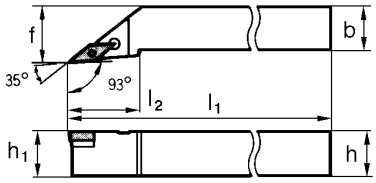
Ordering No.	Stock		Dimensions (mm)					Screw	N·m	Wrench		Insert
	R	L	h	h_1	b	l_1	f					
STGC R/L 0808 D09	❑		8	8	8	60	10	BFTX02205N	**1,1**	TRX06		❶
STGC R/L 1010 E09	●	●	10	10	10	70	12					
STGC R/L 1212 F11	●	●	12	12	12	80	16	BFTX02506N	**1,5**	TRX08		❷
STGC R/L 1616 H11	●	●	16	16	16	100	20					
STGC R/L 1616 H16	●	●	16	16	16	100	20	BFTX0409N	**3,4**	TRX15		❸
STGC R/L 2020 K16	●	●	20	20	20	125	25					
STGC R/L 2525 M16	❑	❑	25	25	25	150	32					

S Type Screw Lock Holders



SVJB





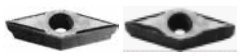
Holders

Above figures show right hand tools.

Ordering No.	Stock R	Stock L	h	h_1	b	l_1	l_2	f	Stopper	Nut	Shim	Wrench	Scew	Wrench	Insert
SVJB R/L 1212 F11	●	●	12	12	12	80	25	16	–	–	–	–	BFTX 02506N 1,5 (N·m)	TRX08	❶
SVJB R/L 1616 H11	●	●	16	16	16	100	25	20							
SVJB R/L 2020 K16	●	●	20	20	20	125	41	25	VP20	CPV33N	SVP32	LH025	BFTX 03508 2,0 (N·m)	TRX10	❷
SVJB R/L 2525 M16	●	●	25	25	25	150	41	32	VP25						
SVJB R/L 3225 P16	●	●	32	32	25	170	41	32	VP32						

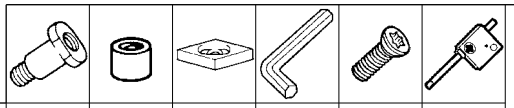
Inserts

Eg.

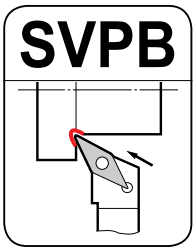


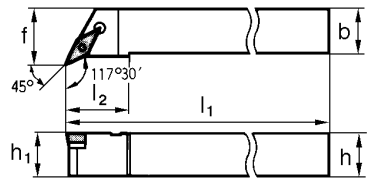
❶ VBMT 110202 N-FP
❷ VBMT 160404 N-SU

Spare Parts



SVPB





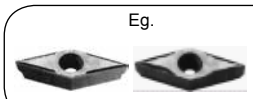
Holders

Above figures show right hand tools.

Ordering No.	Stock R	Stock L	h	h_1	b	l_1	l_2	f	Stopper	Nut	Shim	Wrench	Scew	Wrench	Insert
SVPB R/L 1212 F11	●	❑	12	12	12	80	25	16	–	–	–	–	BFTX 02506N 1,5 (N·m)	TRX08	❶
SVPB R/L 1616 H11	●	●	16	16	16	100	25	20							
SVPB R/L 2020 K16	●	●	20	20	20	125	36	25	VP20	CPV33N	SVP32	LH025	BFTX 03508 2,0 (N·m)	TRX10	❷
SVPB R/L 2525 M16	●	●	25	25	25	150	36	32	VP25						
SVPB R/L 3225 P16	●	●	32	32	25	170	36	32	VP32						

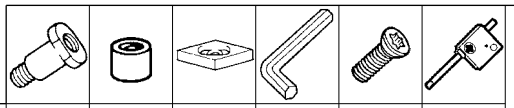
Inserts

Eg.

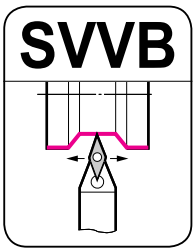


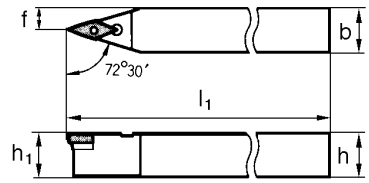
❶ VBMT 110202 N-FP
❷ VBMT 160404 N-SU

Spare Parts



SVVB



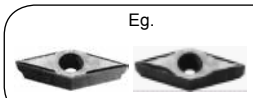


Holders

Ordering No.	Stock	h	h_1	b	l_1	l_2	f	Stopper	Nut	Shim	Wrench	Scew	Wrench	Insert
SVVB N 1212 F11	●	12	12	12	80	-	6	–	–	–	–	BFTX 02506N 1,5 (N·m)	TRX08	❶
SVVB N 1616 H11	●	16	16	16	100	-	8							
SVVB N 2020 K16	●	20	20	20	125	-	10	VP20	CPV33N	SVP32	LH025	BFTX 03508 2,0 (N·m)	TRX10	❷
SVVB N 2525 M16	●	25	25	25	150	-	12,5	VP25						
SVVB N 3225 P16	●	32	32	25	170	-	12,5	VP32						

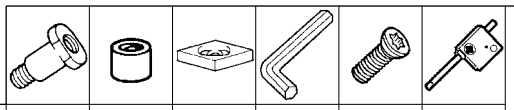
Inserts

Eg.



❶ VBMT 110202 N-FP
❷ VBMT 160404 N-SU

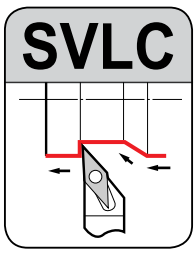
Spare Parts

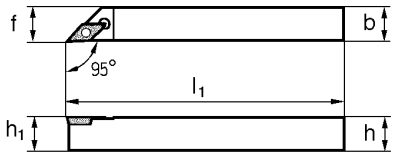


● = Eurostock ❑ = Delivery on request (N·m) Recommended Tightening Torque (N·m)



S Type Screw Lock Holders





Inserts

Eg.



R-FX

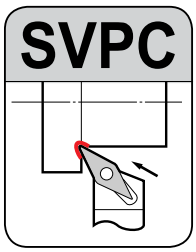
❶ VCGT 110302 R-FX

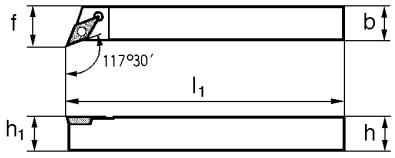
Spare Parts

Holders

Above figures show right hand tools.

Ordering No.	Stock		Dimensions (mm)					Screw	N·m	Wrench		Insert
	R	L	h	h_1	b	l_1	f					
SVLC R/L 1010 H11	●	●	10	10	10	100	10,5	BFTX02506N	**1,5**	TRX08		❶
SVLC R/L 1212 H11	●	●	12	12	12	100	12,5					
SVLC R/L 1616 H11	●	●	16	16	16	100	16,5					
SVLC R/L 2525 M11	●		25	25	25	150	25,5					





Inserts

Eg.



R-FX

❶ VCGT 110302 R-FX

Spare Parts

Holders

Above figures show right hand tools.

Ordering No.	Stock		Dimensions (mm)					Screw	N·m	Wrench		Insert
	R	L	h	h_1	b	l_1	f					
SVPC R/L 1010 H11	❑	❑	10	10	10	100	14,5	BFTX02506N	**1,5**	TRX08		❶
SVPC R/L 1212 H11	●	●	12	12	12	100	16,5					
SVPC R/L 1616 H11	●	●	16	16	16	100	20,5					

Polygon - Shank Holder

New



Features

The Sumitomo polygon shank holders enable an extremely high stiffness connection between machine and tool. The conical polygon can take high bending and torque moments based on the combination of the face contact to the spindle.
This self-guiding coupling system offers high precision and a repeatability of ± 2µm in X, Y and Z axis.
While using this easy and quick coupling system it is possible to gain higher machine utilization time as the set-up and tool change times are reduced.
The compact design and the high stiffness connection to the spindle offer a versatile use e.g. on multi-task machines, machining centers and turning-milling centers.

Characteristics

- original SUMITOMO D-type double clamping system
- compact design
- monoblock system - no additional interfaces
- precise positioning; self-guiding with high repeatability
- high stiffness supported by face contact of holder
- carbide shims to prevent holders from damage
- simple tool holder change and low-maintenance operation
- internal coolant supply directly to the cutting edge
- Polygon shank and insert seat hardened for long holder life

Polygon - shank holder - produced according to ISO 26623-1

Negative Insert Type



Positive Insert Type

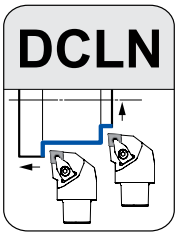


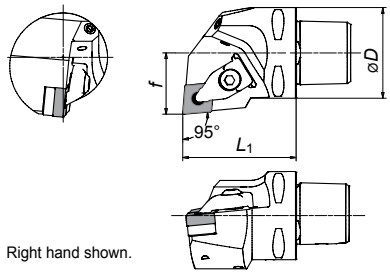
Classification System for Polygon - Shank Holder

P	S	C	4	0	-	D	C	L	N	R	2	7	0	5	0	-	1	2
Polygon Shank			Size (ø*D*)			Clamping System D: Double Clamp S: Screw Clamp	Insert Shape	Holder Style	Seat Clearance Angle N = 0° C = 7° P = 11°	Feed Direction R: Right Hand L: Left Hand N: Neutral		Size (*f*)		Holder Length (L_1)			Insert Cutting Edge Length	

General Turning, Copying and Facing

DCLN





Right hand shown.

■ **Inserts**



CNMG1204_ _ NGE (Representative example)

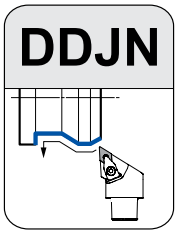
■ **Spare Parts**

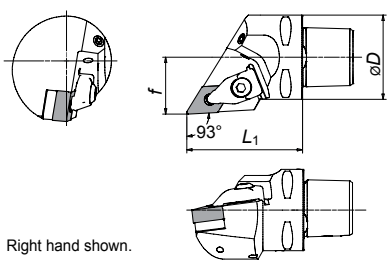


■ **Holders**

Cat. No.	Stock R	Stock L	Dimensions (mm) L_1	Dimensions (mm) f	Dimensions (mm) øD	Applicable Insert	Clamp Set	Recomm. Torque (N·m)	Shim	Shim Screw	Shim Wrench	Wrench
PSC40 DCLN R/L 27050-12	●	●	50	27	40	CN□□ 1204	SCP-2	5.0	CNS1204	BFTX0409N	TRX15 (*)	LH040
PSC50 DCLN R/L 35060-12	●	●	60	35	50							

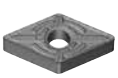
DDJN





Right hand shown.

■ **Inserts**



DNMG1506_ _ NGE (Representative example)

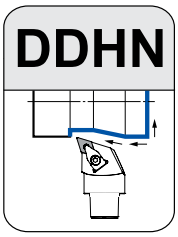
■ **Spare Parts**

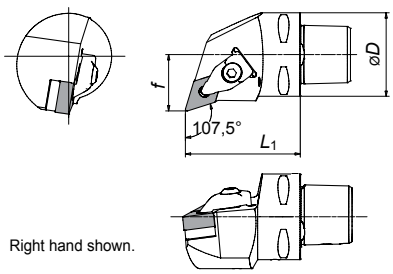


■ **Holders**

Cat. No.	Stock R	Stock L	Dimensions (mm) L_1	Dimensions (mm) f	Dimensions (mm) øD	Applicable Insert	Clamp Set	Recomm. Torque (N·m)	Shim	Shim Screw	Shim Wrench	Wrench
PSC40 DDJN R/L 27055-15	●	●	55	27	40	DN□□ 1506	SCP-2	5.0	DNS1506	BFTX0409N	TRX15 (*)	LH040
PSC50 DDJN R/L 35060-15	●	●	60	35	50							

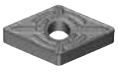
DDHN





Right hand shown.

■ **Inserts**



DNMG1506_ _ NGE (Representative example)

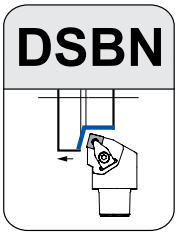
■ **Spare Parts**

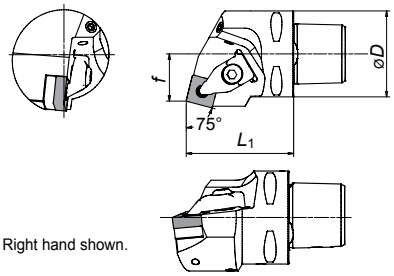


■ **Holders**

Cat. No.	Stock R	Stock L	Dimensions (mm) L_1	Dimensions (mm) f	Dimensions (mm) øD	Applicable Insert	Clamp Set	Recomm. Torque (N·m)	Shim	Shim Screw	Shim Wrench	Wrench
PSC40 DDHN R/L 27055-15	●	●	55	27	40	DN□□ 1506	SCP-2	5.0	DNS1506	BFTX0409N	TRX15 (*)	LH040
PSC50 DDHN R/L 35060-15	●	●	60	35	50							

DSBN





Right hand shown.

■ **Inserts**



SNMG1204_ _ NGE (Representative example)

■ **Spare Parts**



■ **Holders**

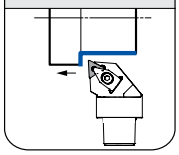
Cat. No.	Stock R	Stock L	Dimensions (mm) L_1	Dimensions (mm) f	Dimensions (mm) øD	Applicable Insert	Clamp Set	Recomm. Torque (N·m)	Shim	Shim Screw	Shim Wrench	Wrench
PSC40 DSBN R/L 22050-12	●	●	50	22	40	SN□□ 1204	SCP-2	5.0	SNS1204	BFTX0409N	TRX15 (*)	LH040
PSC50 DSBN R/L 27060-12	●	●	60	27	50							

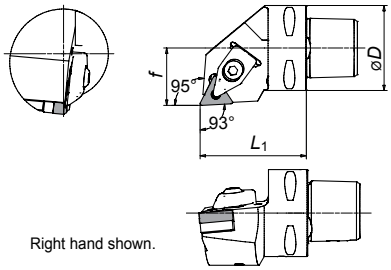
(*) Item is sold separately.

● Euro stock

General Turning and Facing

DTJN





Right hand shown.

■ **Inserts**



TNMG1604_ _ NGE
(Representative example)

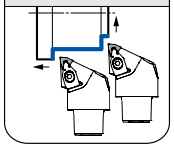
■ **Spare Parts**

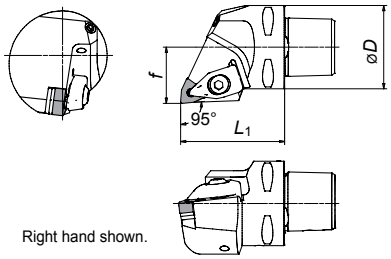


■ **Holders**

Cat. No.	Stock		Dimensions (mm)			Applicable Insert	Clamp Set	Recomm. Torque (N·m)	Shim	Shim Screw	Shim Wrench	Wrench
	R	L	L_1	f	øD							
PSC40 DTJN R/L 27050-16	●	●	50	27	40	TN□□ 1604	SCP-1	5.0	TNS1604	BFTX0307N	TRX15 (*)	LH040
PSC50 DTJN R/L 35060-16	●	●	60	35	50							

DWLN





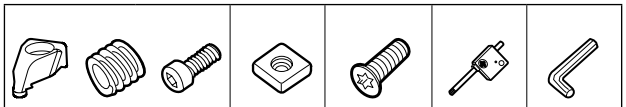
Right hand shown.

■ **Inserts**



WNMG0804_ _ NSE
(Representative example)

■ **Spare Parts**



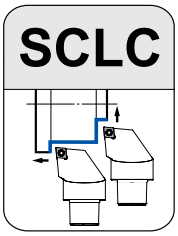
■ **Holders**

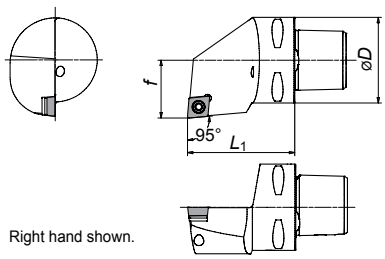
Cat. No.	Stock		Dimensions (mm)			Applicable Insert	Clamp Set	Recomm. Torque (N·m)	Shim	Shim Screw	Shim Wrench	Wrench
	R	L	L_1	f	øD							
PSC40 DWLN R/L 27050-06	●	●	50	27	40	WN□□ 06	SCP-1	5.0	WNS0604	BFTX0307N	TRX15 (*)	LH040
PSC50 DWLN R/L 35060-06	●	●	60	35	50							
PSC40 DWLN R/L 27050-08	●	●	50	27	40	WN□□ 08	SCP-2	5.0	WNS0804	BFTX0409N	TRX15 (*)	LH040
PSC50 DWLN R/L 35060-08	●	●	60	35	50							

(*) Item is sold separately. ● Euro stock

General Turning, Copying and Facing

SCLC





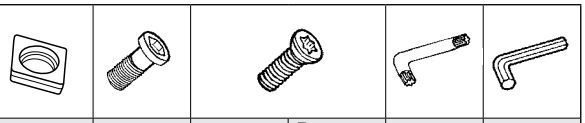
Right hand shown.

■ **Inserts**



CCMT09T3_ _ NSU
(Representative example)

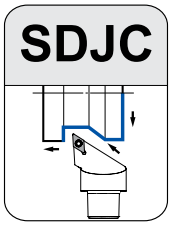
■ **Spare Parts**

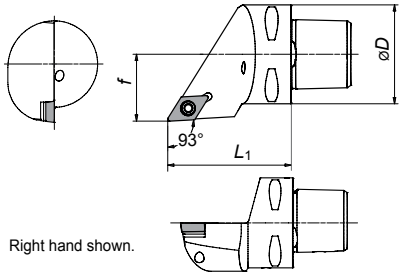


■ **Holders**

Cat. No.	Stock			Dimensions (mm)			Applicable Insert	Shim	Shim Screw	Insert Screw	Recomm. Torque (N·m)	Wrench	Shim Wrench
	R	L	N	L_1	f	øD							
PSC40 SCLC R/L 27050-09	●	●		50	27	40	CC□□ 09T3	CCS09T3	KGBS1111	KSS1111	3,5	LT15K	LH035K*
PSC50 SCLC R/L 35060-09	●	●		60	35	50							

SDJC





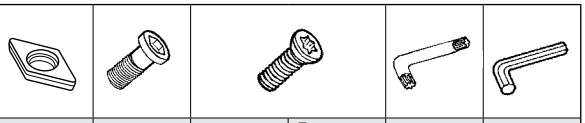
Right hand shown.

■ **Inserts**



DCMT11T3_ _ NMU
(Representative example)

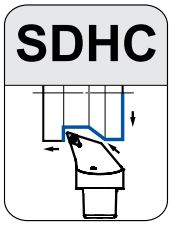
■ **Spare Parts**

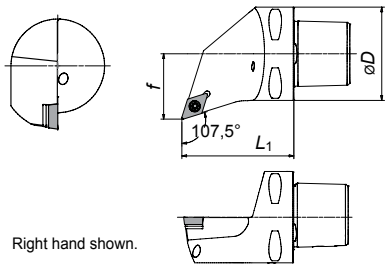


■ **Holders**

Cat. No.	Stock			Dimensions (mm)			Applicable Insert	Shim	Shim Screw	Insert Screw	Recomm. Torque (N·m)	Wrench	Shim Wrench
	R	L	N	L_1	f	øD							
PSC40 SDJC R/L 27050-11	●	●		50	27	40	DC□□ 11T3	DCS11T3	KGBS1111	KSS1111	3,5	LT15K	LH035K*
PSC50 SDJC R/L 35060-11	●	●		60	35	50							

SDHC





Right hand shown.

■ **Inserts**



DCMT11T3_ _ NMU
(Representative example)

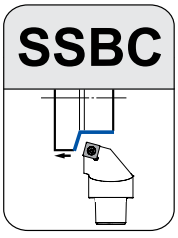
■ **Spare Parts**

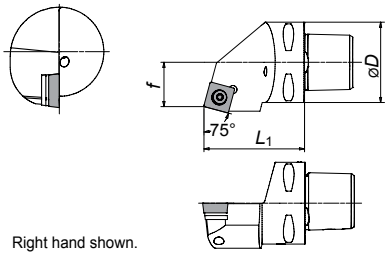


■ **Holders**

Cat. No.	Stock			Dimensions (mm)			Applicable Insert	Shim	Shim Screw	Insert Screw	Recomm. Torque (N·m)	Wrench	Shim Wrench
	R	L	N	L_1	f	øD							
PSC40 SDHC R/L 27050-11	●	●		50	27	40	DC□□ 11T3	DCS11T3	KGBS1111	KSS1111	3,5	LT15K	LH035K*
PSC50 SDHC R/L 35060-11	●	●		60	35	50							

SSBC





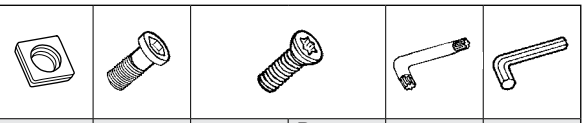
Right hand shown.

■ **Inserts**



SCMT1204_ _ NMU
(Representative example)

■ **Spare Parts**



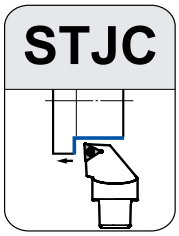
■ **Holders**

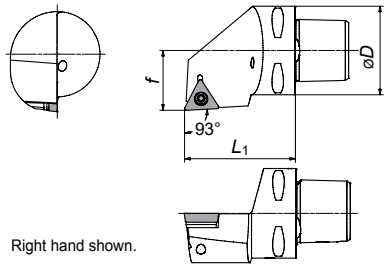
Cat. No.	Stock			Dimensions (mm)			Applicable Insert	Shim	Shim Screw	Insert Screw	Recomm. Torque (N·m)	Wrench	Shim Wrench
	R	L	N	L_1	f	øD							
PSC40 SSBC R/L 22050-12	●	●		50	22	40	SC□□ 1204	SCS1204	KGBS1221	KSS1221	4,5	LT15K	LH045K*
PSC50 SSBC R/L 27060-12	●	●		60	27	50							

(*) Item is sold separately. ● Euro stock

General Turning, Copying and Facing

STJC





Right hand shown.

■ **Inserts**



TCMT16T3_ _ NSU (Representative example)

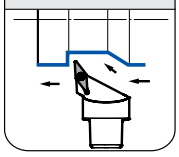
■ **Spare Parts**

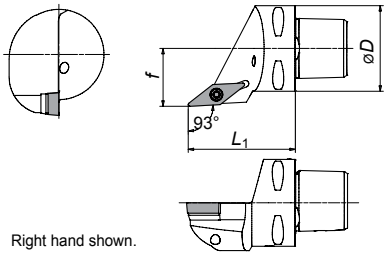


■ **Holders**

Cat. No.	Stock			Dimensions (mm)			Applicable Insert	Shim	Shim Screw	Insert Screw	Recomm. Torque (N·m)	Wrench	Shim Wrench
	R	L	N	L_1	f	øD							
PSC40 STJC R/L 27050-16	●	●		50	27	40	TC□□ 16T3	TCS16T3	KGBS1111	KSS1111	3,5	LT15K	LH035K*
PSC50 STJC R/L 35060-16	●	●		60	35	50							

SVJB





Right hand shown.

■ **Inserts**



VBMT1604_ _ NSU (Representative example)

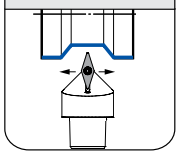
■ **Spare Parts**

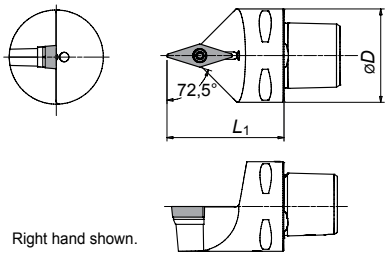


■ **Holders**

Cat. No.	Stock			Dimensions (mm)			Applicable Insert	Shim	Shim Screw	Insert Screw	Recomm. Torque (N·m)	Wrench	Shim Wrench
	R	L	N	L_1	f	øD							
PSC40 SVJB R/L 27050-16	●	●		50	27	40	VB□□ 1604	VCS1604	KGBS1111	KSS1111	3,5	LT15K	LH035K*
PSC50 SVJB R/L 35060-16	●	●		60	35	50							

SVVB





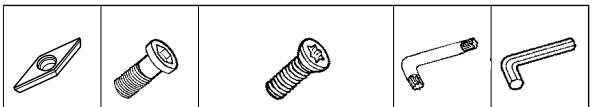
Right hand shown.

■ **Inserts**



VBMT1604_ _ NSU (Representative example)

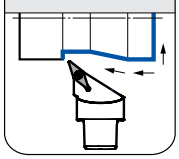
■ **Spare Parts**

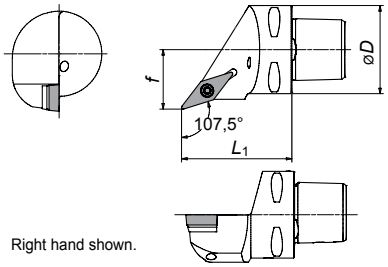


■ **Holders**

Cat. No.	Stock			Dimensions (mm)			Applicable Insert	Shim	Shim Screw	Insert Screw	Recomm. Torque (N·m)	Wrench	Shim Wrench
	R	L	N	L_1	f	øD							
PSC40 SVVB N 00050-16			●	50		40	VB□□ 1604	VCS1604	KGBS1111	KSS1111	3,5	LT15K	LH035K*
PSC50 SVVB N 00060-16			●	60		50							

SVHB





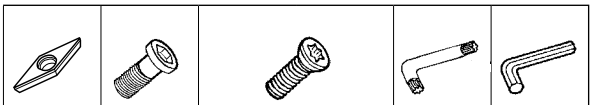
Right hand shown.

■ **Inserts**



VBMT1604_ _ NSU (Representative example)

■ **Spare Parts**



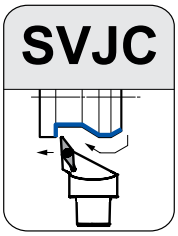
■ **Holders**

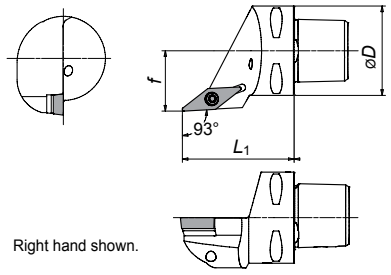
Cat. No.	Stock			Dimensions (mm)			Applicable Insert	Shim	Shim Screw	Insert Screw	Recomm. Torque (N·m)	Wrench	Shim Wrench
	R	L	N	L_1	f	øD							
PSC40 SVHB R/L 27050-16	●	●		50	27	40	VB□□ 1604	VCS1604	KGBS1111	KSS1111	3,5	LT15K	LH035K*
PSC50 SVHB R/L 35060-16	●	●		60	35	50							

(*) Item is sold separately. ● Euro stock

General Turning, Copying and Facing

SVJC





Right hand shown.

■ **Inserts**



VCMT1604_ _ NSU
(Representative example)

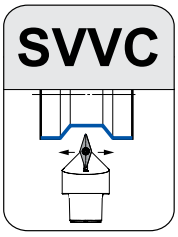
■ **Spare Parts**

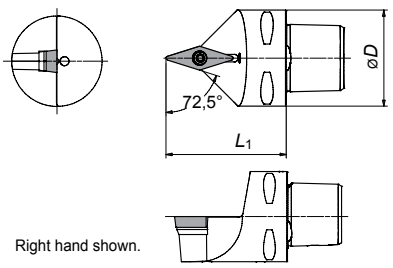


■ **Holders**

Cat. No.	Stock			Dimensions (mm)			Applicable Insert	Shim	Shim Screw	Insert Screw	Recomm. Torque (N·m)	Wrench	Shim Wrench
	R	L	N	L_1	*f*	ø*D*							
PSC40 SVJC R/L 27050-16	●	●		50	27	40	VC□□ 1604	VCS1604	KGBS1111	KSS1111	3,5	LT15K	LH035K*
PSC50 SVJC R/L 35060-16	●	●		60	35	50							

SVVC





Right hand shown.

■ **Inserts**



VCMT1604_ _ NSU
(Representative example)

■ **Spare Parts**

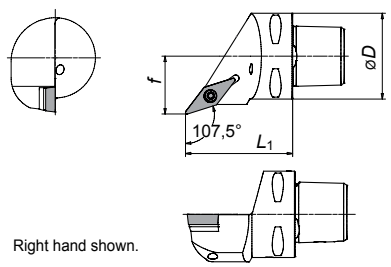


■ **Holders**

Cat. No.	Stock			Dimensions (mm)			Applicable Insert	Shim	Shim Screw	Insert Screw	Recomm. Torque (N·m)	Wrench	Shim Wrench
	R	L	N	L_1	*f*	ø*D*							
PSC40 SVVC N 00050-16			●	50		40	VC□□ 1604	VCS1604	KGBS1111	KSS1111	3,5	LT15K	LH035K*
PSC50 SVVC N 00060-16			●	60		50							

SVHC





Right hand shown.

■ **Inserts**



VCMT1604_ _ NSU
(Representative example)

■ **Spare Parts**



■ **Holders**

Cat. No.	Stock			Dimensions (mm)			Applicable Insert	Shim	Shim Screw	Insert Screw	Recomm. Torque (N·m)	Wrench	Shim Wrench
	R	L	N	L_1	*f*	ø*D*							
PSC40 SVHC R/L 27050-16	●	●		50	27	40	VC□□ 1604	VCS1604	KGBS1111	KSS1111	3,5	LT15K	LH035K*
PSC50 SVHC R/L 35060-16	●	●		60	35	50							

(*) Item is sold separately. ● Euro stock

Boring Bars

E

E1 ~ E24





Selection	Boring Tool Selection Table	E2 - 4
ISO	Boring Tool Identification Table	E5
Features	Boring Tool Series	E6 - 7

Boring Bars for Negative Insert Type :

CN_ _:	**D…DCLN / S…PCLN**	E8
DN_ _:	**D…DDUN / S…PDUN**	E9
SN_ _:	**S…PSKN**	E10
SumiTurn T-Rex	**S…DTR**	E11
TN_ _:	**D…DTFN / S…PTFN**	E12
WN_ _:	**D…DWLN / S…WMLN**	E13

Boring Bars for Positive Insert Type :

X-Bar for CC_ _:	**B/D…SCLC**	E14
CC_ _:	**S … SCLC**	E14
CP_ _:	**S/C…SCLP**	E15
X-Bar for DC_ _:	**B/D…SDUC / SDQC**	E16-17
DC_ _:	**S … SDQC / SDUC**	E16-17
SP_ _:	**S/C…SSKP**	E18
TC_ _:	**S … STFC**	E19
X-Bar for TP_ _:	**B/D…STUP**	E20
TP_ _:	**S/C…STUP**	E20
X-Bar for VB_ _:	**D … SVUB / SVZB**	E21
VB_ _:	**S … SVQB / SVUB / SVZB**	E22
WB_ _:	**S/C…SWUB**	E23

Very Small Dia. Boring	**BXBR**…R(-NB)	E24

Boring Tools Selection

According to Applications / Boring - øD

■ BORING TOOLS

Coloured boxes indicate available size.

Application	Type	Boring Depth (L/D) Shank: Steel	Shank: Carbide	Shank: X-Bar (Steel)	Applicable Insert	Tooling	Min. Boring øD (mm) (Min. cutting diameter is shown when not matched in this table.)
Very Small Dia. Boring	BXBR ⇨ E24		~ 5		Special boring bar		○ ○ ○ ○ ○ ○ ○
	DABB ⇨M37		~2		Sumidia brazed		● ● ● ●
Stop Boring	BMSE New ⇨M28-M30		~4		Sumiboron brazed		● ● ● ● ● ●
	SEXC New ⇨M28,29,31		~3		Sumiboron insert		● ● ●
	BNBB ⇨M32		~ 5		Sumiboron brazed		● 3,5 ● 4,5 ● 5,5 ● 6,5 ● 8,5
	BNB ⇨M33		~ 4		Sumiboron insert		● ● ● ● ●
	S/C-SWUB ⇨ E23	~ 3	~ 8		Trigon Type 5° Pos.		● 5,5
	S-STFC ⇨ E19	~ 3			Triangle Type 5° & 11° Pos.		● ● ● ● ● ● 32 ● 40 ● 50
	B/D-STUP ⇨ E20			~ 6			● ● ● ● ● ● ● 40
	S-STUP(B) ⇨ E20	~ 3					● ● ● ● ● ● ●
	C-STUP ⇨ E20		~ 8				● ● ● ● ● ● ● ●
	CTFP ⇨ Stock in Japan	~ 3			Triangle 11° Pos.		○ ○ ○ ○ 32
	D-DTFN ⇨ E12	~ 3		~ 6	Triangle Neg. Type		● 32 ● 40 ● 50
	S-PTFN ⇨ E12						● 32 ● 40 ● 50
Bottom Facing	BNZ ⇨M33		~ 5		Sumiboron insert		● ● 9 ● 11 ● ● ●
	S-SCLP ⇨ E15	~3			80 ° Diamond 11° Pos. Type		● ● ● ● ●
	B-SCLP ⇨ Stock in Japan			~ 6			○ ○ ○
	C-SCLP ⇨ E15		~ 8				● ● ●
	B/D-SCLC ⇨ E14			~ 6	80 ° Diamond 7° Pos. Type		● ● ● ● ● ● 32 ● 40
	S-SCLC ⇨ E14	~ 3					● ● ● ● ● 32 ● 40 ● 50
	C-SCLC ⇨ Stock in Japan		~ 8				○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
	D-DCLN ⇨ E8			~ 6	80 ° Diamond Neg. Type		● 32 ● 40 ● 50
	S-PCLN ⇨ E8	~ 3					● ● 30 ● 32 ● 40 ● 50 ● 63
	D-DWLN ⇨ E13			~ 6	Trigon Neg. Type		● 32 ● 40 ● 50
	S-MWLN ⇨ E13	~ 3					● 32 ● 40 ● 50

2 2,5 3 3,5 4 4,5 5 6 7 8 10 12 13 14 16 18 20 22 25 28 35 44 54 70

● = Eurostock
○ = Japanstock

■ BORING TOOLS

Coloured boxes indicate available size.

Application	Type	Boring Depth (L/D) Shank: Steel	Carbide	X-Bar (Steel)	Applicable Insert	Tooling	Min. Boring øD (mm) 6	8	10	12	13	14	16	18	20	22	25	28	32	34	35	40	44	50	54	70
Copying	B/D-SDUC ⇨ E16			~ 6	55 ° Diamond 7° Pos. Type						●		●		●		●		●			●				
	S-SDUC ⇨E16	~ 3									●		●		●		●		●			●				
	C-SDUC ⇨ Stock in Japan		~ 8								❍		❍		❍		❍									
	B/D-SDQC ⇨ E17			~ 6							●		●		●		●		●			●				
	S-SDQC ⇨E17	~ 3									●		●		●		●		●							
	D-SVUB ⇨ E21			~ 6	35 ° Diamond Type 5° & 7° Pos.											●		● 27			●	●				
	S-SVUB ⇨ E22	~ 3														●		● 27			●	●				
	S-SVQB ⇨ E22	~ 3														●		● 27			●	●				
	B/C-SVQB ⇨ Stock in Japan		~ 8	~ 6											❍		❍									
	D-SVZB ⇨ E21			~ 6												●		● 27			●	●				
	S-SVZB ⇨ E22															●		● 27			●	●				
	D-DDUN ⇨ E9			~ 6	55 ° Diamond Neg. Type														●			●				
	S-PDUN ⇨ E9	~ 3																	●			●		●		❍ 63
Through Boring	S-SSKP ⇨ E18	~ 3			55 ° Diamond Neg. Type								●		●		●	●								
	C-SSKP ⇨ E18		~ 8										●		●											
	SSKC ⇨ Stock in Japan	~ 3			Square Type 7° Pos.										❍		❍		❍			❍				
	CSKP ⇨ Stock in Japan	~ 3			Square Type 11° Pos.										❍		❍									
	S-PSKN ⇨ E10	~ 3			Square Neg. Type														●			●		●		● 63

Boring Tool Series

■ TOOLING SELECTION

Application		Stop Boring		Bottom Facing		Trough Boring	Copying		
Insert Type / System		Triangle	Poligon / Others	80° Diamond		Square	55° T-REX	55° Diamond	35° Diamond
Screw Lock	Steel	S-STFC ⇨E19 S-STUP(B)⇨E20	S-SWUB ⇨ E23	S-SCLC ⇨ E14	S-SCLP ⇨ E15	S-SSKP ⇨ E18	–	S-SDUC ⇨E16 S-SDQC ⇨E17	S-SVUB (S-SVQB / S-SVZB) ⇨ E22
	Anti-vibration	B-STUP ⇨ E20	–	B-SCLC ⇨ E14	–		–	B-SDUC ⇨E16 B-SDQC ⇨E17	–
	Anti-vibration with Oil Hole	D-STUP ⇨ E20	–	D-SCLC ⇨ E14			–	D-SDUC ⇨E16 D-SDQC ⇨E17	D-SVUB ⇨E21 D-SVZB ⇨E21
	Carbide	C-STUP (C-STUB) ⇨ E20	C-SWUB ⇨ E23	–	C-SCLP ⇨ E15	C-SSKP ⇨ E18	–	–	–
Lever Lock	Steel	S-PTFN ⇨ E12	–	S-PCLN ⇨ E8	–	S-PSKN ⇨ E10	–	S-PDUN ⇨ E9	–
Top Clamp	Anti-vibration with Oil Hole	D-DTFN ⇨ E12	D-DWLN ⇨E13	D-DCLN ⇨ E8			–	D-DDUN ⇨E9	–
	Steel	–	S-MWLN ⇨ E13	–	–	–	S-DTR ⇨ E11	–	–
CBN	Carbide	BNB ⇨ M	BNBB ⇨ M	BNZ ⇨ M					
		New BSME ⇨ M	New SEXC ⇨ M						
	Carbide					BXBR ⇨ E24			



■ Catalogue Classification System For Boring Holders

S 16 R – S T U P R 11 03 - 18

①	②		③	④	⑤	⑥	⑦			※
Shank Material, Chart 1	Shank Length, Chart 2	Shank Diameter, (mm)	Clamping System, Chart 3	Insert Shape, Chart 4	Holder Style, Chart 5	Seat Clearance Angle, Chart 6	Feed Direction, Chart 7	Insert Cutting Edge Length, (mm)	※ Insert Thickness, (mm)	Min. Bore Diameter, (mm)

※ This code may only be included in some of the catalogue nos.

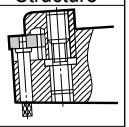
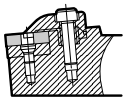
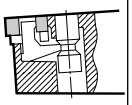
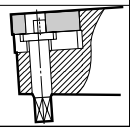
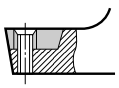
① Chart 1

Shank Material	
S	Steel
B	Steel with Anti-vibration Mechanism without Oil Hole
C	Carbide
D	Steel with Anti-vibration Mechanism with Oil Hole
E	Carbide with Oil Hole

② Chart 2

Shank Length			
Symbol	Length (mm)	Symbol	Length (mm)
F	80	P	170
G	90	Q	180
H	100	R	200
J	110	S	250
K	125	T	300
L	140	U	350
M	150	V	400
N	160	W	450

③ Chart 3

Clamping System					
Symbol	System	Structure	Symbol	System	Structure
C	Top Clamp		M	Top & Hole Clamp Type	
D	Double Clamp		P	Lever Lock Type (Insert is Supported by 1 face)	
E	Pin Lock Type (Insert is supported by 1 face)		S	Screw Clamp Type	

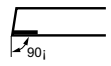
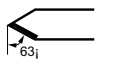
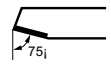
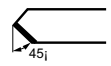
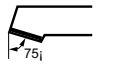
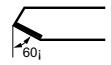
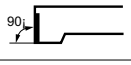
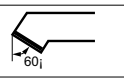
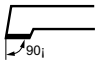
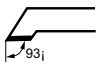
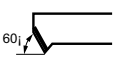
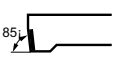
⑦ Chart 7

Feed Direction	
Symbol	Feed Direction
R	Right Hand Feed
L	Left Hand Feed
N	Neutral Feed

④ Chart 4

Insert Shape			
Symbol	Insert Shape	Symbol	Insert Shape
A	Parallellogram 85°	M	Rhombic 86°
B	Parallelogram 82°	O	Octagonal
C	Diamond 80°	P	Pentagonal
D	Diamond 55°	R	Round
E	Diamond 75°	S	Square
F	Diamond 50°	T	Triangular
H	Hexagonal	V	Diamond 35°
K	Parallelogram 55°	W	Trigon
L	Rectangular		

⑤ Chart 5

Holder Style					
Symbol	Shape	Offset	Symbol	Shape	Offset
A		Nil	N		Nil
B		Nil	Q		With Offset
D		Nil	R		With Offset
E		Nil	S		With Offset
F		With Offset	T		With Offset
G		With Offset	U		With Offset
J		With Offset	W		With Offset
K		With Offset	Y		With Offset
L		With Offset	Z		With Offset

⑥ Chart 6

Seat Clearance Angle	
Symbol	Relief Angle
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
O	Special Angle

Boring Tool Series



General Features

Since being the first in 1976 to introduce indexable boring bars, Sumitomo Electric has been continuously developing a comprehensive range which includes the SEC-Small Hole boring bar series, high rigidity boring head series, with either steel / carbide shanks, and the latest anti-vibration mechanism - SumiTurn X-Bar series coupled with a wide variety of insert grades and chipbreakers, cover a whole range of process requirements.

Features

- Wide selection for various boring operations
- Minimum bore diameter from ø5,5mm onwards
- New anti-vibration boring bars, SumiTurn X-Bar.
- High rigidity head-design for small boring bars
- Wide selection of grades and chipbreakers available for various processes and work materials

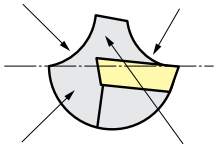
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Series SumiTurn X Bar

Good Chip Evacuation
from new head design

Evacuates long chips

Evacuates short chips



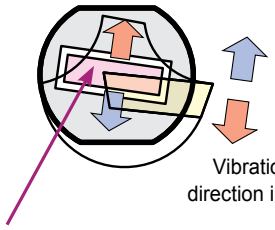
Strong cross section to withstand high cutting force

Ribbed structure for maximum rigidity



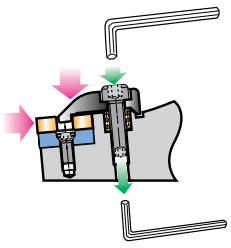
Chatter Killer System
- Eliminates Vibration

Unique structure of X-Bar head



The damper resists vibration

- New negative type "X Bar" with high performance double clamping system



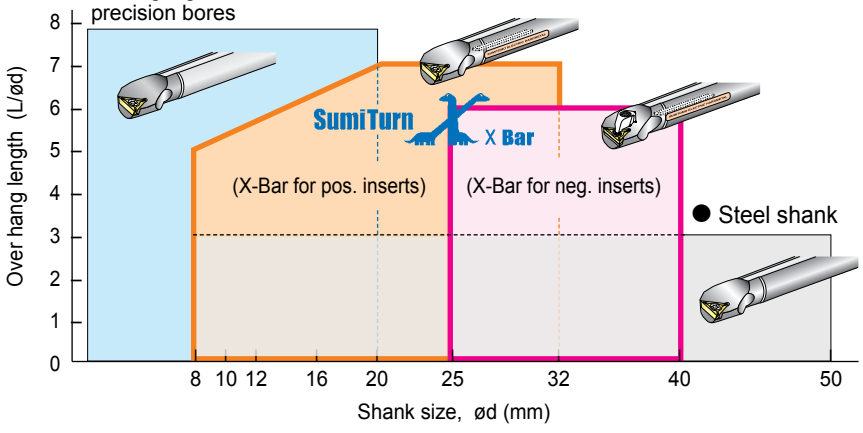
Application Guide

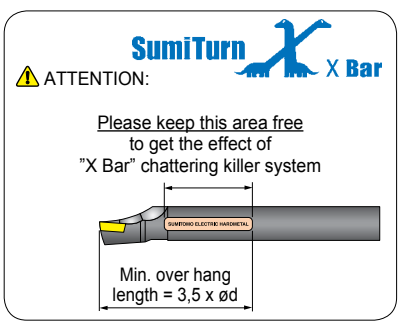
- Carbide shank

Rigid shank for long high precision bores

- Anti-Vibration Steel Shank

Low cost solution for long precision bores - eliminates chatter - improves productivity and surface finish





Boring Tool Series

■ Recommended Over Hang Length / Shank Diameter (L/D)

Type of boring bar	Over hang length (L/D) 1 2 3 4 5 6 7 8 9 10
● Steel Shank Rigid head design for low cost hole boring.	
● Anti-Vibration Type Shank Chatter killer system eliminates vibration - improves productivity - improves quality	(X-Bar for pos. inserts) (X-Bar for neg. inserts) SumiTurn X Bar
● Carbide Shank High rigidity shank for high accuracy hole boring.	

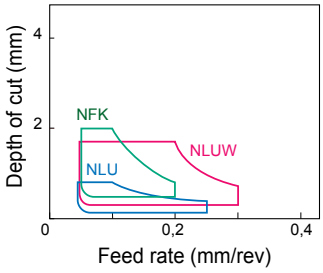
■ Grades

Tool Material		Process: High Precision	Process: Finish~Light Cut	Process: Medium Cut	Work Material: P General Steel	M Stainless Steel	K Cast Iron	S Heat Resistive Alloy	H Hardened Steel	N Non-Ferrous Metal	Powder Metal
Coated Carbide	CVD		AC805P		◎						
			AC810P		◎	○	○				
			AC820P		◎	○					
			AC830P		◎						
			AC6030M (AC630M) New		○						
			AC405K				◎				
			AC415K				◎				
			AC420K				◎				
	PVD		ACZ150		◎	◎				○	
			AC510U		◎	◎	○	◎			○
			AC520U		◎	◎	○	◎			
			AC530U		◎	○	○	○		○	
			AC6040M New			◎					
Cermet			T1000A New		◎	○	◎			○	○
Coated Cermet			T1500A/T1500Z New		◎	○	○			○	
			T3000Z		◎	○	○				
Carbide			G10E				◎			○	
SumiBoron			BN1000						◎		
			BN2000						◎		
			BNC2010 New						◎		
			BNC2020 New						◎		
			BN7000 (BN700)				◎	○			○
			BN7500								◎
SumiDia			DA1000							◎	
			DA150							◎	

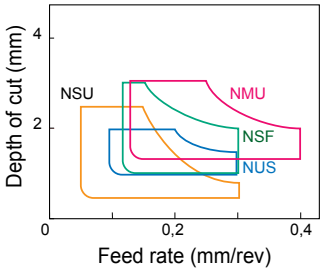
◎ Preferred choice ○ Suitable

■ Recommended Chip Breakers

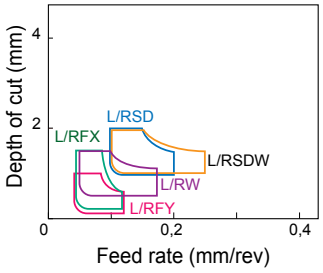
● M-Class Finish-Light-Cut



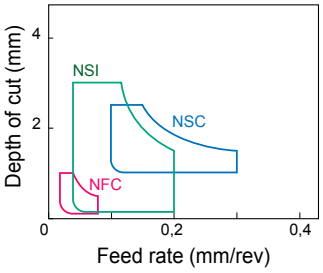
● M-Class Light-Medium-Cut



● G-Class Ground Typ



● G-Class Breaker

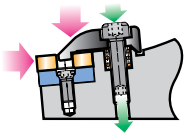


D...DCLN / S...PCLN Type

For Negative CN_ _ - Inserts (α = 0°)

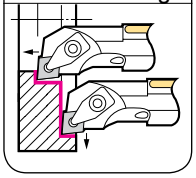


SumiTurn X Bar

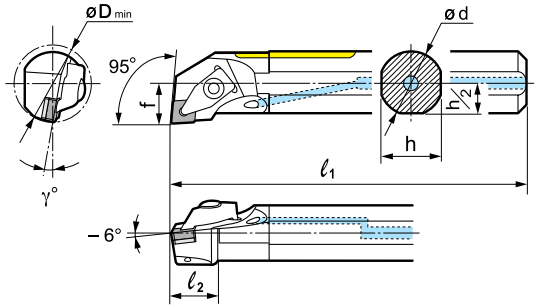


D-DCLN

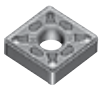
Bottom facing



Anti-vibration D type with oil hole



Insert (eg.)



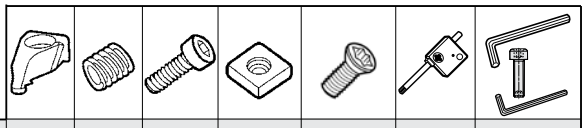
N-GU

■ Holders

Above figures show right hand tools.

Ordering No.	Stock R	Stock L	øD min	Dimensions (mm) ød	h	ℓ1	ℓ2	f	γ	Insert (eg.)
D25T - DCLN R/L 1204-32	●	●	32	25	23	300	26	17	-12°	CN□□1204○○
D32T - DCLN R/L 1204-40	●	●	40	32	30	300	26	22	-10°	
D40U - DCLN R/L 1204-50	●	●	50	40	37	350	26	27	-10°	

■ Spare Parts

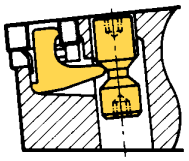


Clamp	Spring	Clamp bolt	Shim	Shim screw	Wrench	Wrench	
SCP-2			CNS1203B	BFTX0307N	TRX10(*)	LH040	LH025
			CNS1204B	BFTX0409N	TRX15(*)		

(*) Note: Wrench (TRX type) for shim screw is not included.

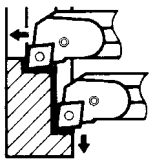
Remarks: Right handed tool holders are applicable with left handed or neutral inserts.
Left handed tool holders are applicable with right handed or neutral inserts.

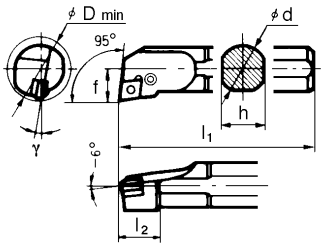
■ Holders



Tool holders (P type) with lever-lock system

S - PCLN R/L



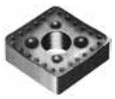
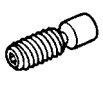


Ordering No.	Stock R	Stock L	øDmin	Dimensions (mm) d	h	l1	l2	f	γ	
S20S - PCLN R/L09	●	●	25	20	18	250	29	13	-11°	CN_ _ 0903_ _
S25T - PCLN R/L09	●	●	30	25	23	300	33	17	-10°	
S25T - PCLN R/L12	●	●	32	25	23	300	42	17	-10°	CN_ _ 1204_ _
S32U - PCLN R/L12	●	●	40	32	30	350	49	22	-11°	
S40V - PCLN R/L12	●	●	50	40	37	400	56	27	-10°	
S32U - PCLN R/L16	●	●	40	32	30	350	56	22	-11°	CN_ _ 1606_ _
S40V - PCLN R/L16	●	●	50	40	37	400	56	27	-10°	
S50W - PCLN R/L16	❑	❑	63	50	47	450	56	35	-11°	
S50W - PCLN R/L19	❑	❑	63	50	47	450	63	35	-11°	CN_ _ 1906_ _

All figures show right hand tools.

■ Applicable Inserts

■ Spare Parts

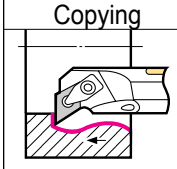
Holder	Carbides, Cermets: Double sided	Carbides, Cermets: One sided	CBN, PCD	Lever pin	Clamp bolt	Shim	Shim pin	Wrench	
S - PCLN R/L									
S.....09	CNMG 0903_ _ NGU	-	-	LCL3C-SD	LCS3B-SD	-	-	LH020	
S25T.....12	CNMG 1204_ _ NGU	CNMM 1204_ _ NMP	CNGA 1204_ _	LCL4C-SD	LCS4B-SD	-	-	LH025	
S32U.....12	CNMG 1204_ _ NGU	CNMM 1204_ _ NMP	CNGA 1204_ _	LCL4T-SD	LCS41BS-SD	LSC42SD	LSP4SD	LH030	
S40V.....12	CNMG 1204_ _ NGU	CNMM 1204_ _ NMP	CNGA 1204_ _	LCL4SD	LCS42BS-SD	LSC42SD	LSP4SD	LH030	
S.....16	CNMG 1606_ _ NGU	CNMM 1606_ _ NMP	-	LCL5SD	LCS5B-SD	LSC53SD	LSP5SD	LH030	
S.....19	CNMG 1906_ _ NGU	CNMM 1906_ _ NMP	-	LCL5C-SD	LCS6B-SD	LSC63SD	LSP6SD	LH040	

● = Eurostock
❑ = Delivery on request

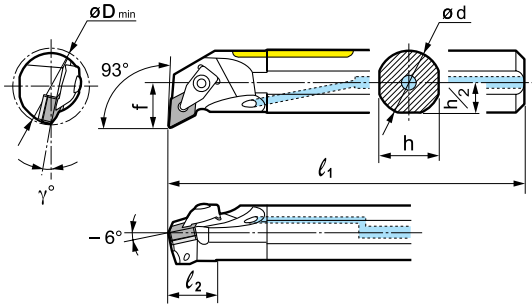
Boring Bars
D...DDUN / S...PDUN Type



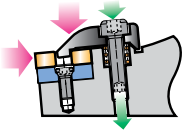
D-DDUN
Copying



Anti-vibration D type
with oil hole



SumiTurn X Bar

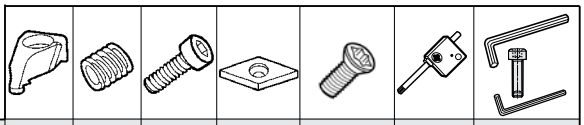


Insert (eg.)



N-GU

■ Spare Parts



■ Holders

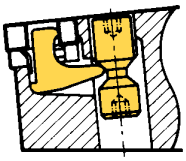
Above figures show right hand tools.

Ordering No.	Stock R	Stock L	øD min	Dimensions (mm) ød	h	ℓ_1	ℓ_2	f	γ	Insert (eg.)	Clamp	Spring	Clamp bolt	Shim	Shim Screw	Wrench	Wrench	
D32T - DDUN R/L 1104-40	●	●	40	32	30	300	26	22	-10°	DN□□1104○○	SCP-1			DNS1104B	BFTX0307N	TRX10 (*)	LH040	LH025
D32T - DDUN R/L 1506-40	●	●	40	32	30	300	26	22	-12°	DN□□1506○○	SCP-2			DNS1506B	BFTX0409N	TRX15 (*)		
D40U - DDUN R/L 1506-50	●	●	50	40	37	350	26	27	-12°									

(*) Note: Wrench (TRX type) for shim screw is not included.

Remarks: Right handed tool holders are applicable with left handed or neutral inserts.
Left handed tool holders are applicable with right handed or neutral inserts.

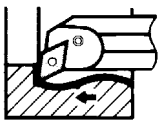
■ Holders

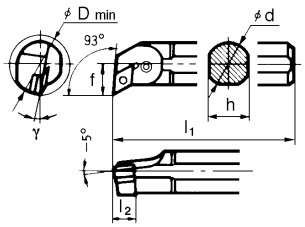


Tool holders (P type)
with lever-lock system



S - PDUN R/L



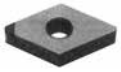


Ordering No.	Stock R	Stock L	øD min	Dimensions (mm) d	h	l_1	l_2	f	γ	
S25T - PDUN R/L 11	●	●	32	25	23	300	35	17	-11°	DN_ _ 1104_ _
S32U - PDUN R/L 15 04	●	●	40	32	30	350	40	22	-11°	DN_ _ 1504_ _
S40V - PDUN R/L 15	●	●	50	40	37	400	56	27	-11°	DN_ _ 1506_ _
S50W - PDUN R/L 15	❑	❑	63	50	47	450	63	35	-10°	

All figures show right hand tools.

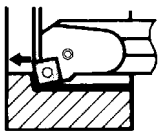
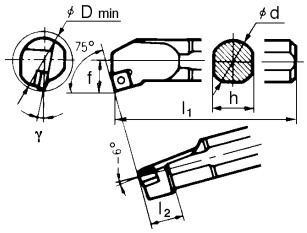
■ Applicable Inserts

■ Spare Parts

Holder	Carbides, Cermets: Double sided	Carbides, Cermets: One sided	CBN, PCD	Lever pin	Clamp bolt	Shim	Shim pin	Wrench	
S - PDUN R/L									
S25T 11	DNMG 1104_ _ NGU	-	DNGA 1104_ _	LCL3DB-SD	LCS3DB-SD	–	–	LH020	
S32U 15 04	DNMG 1504_ _ NGU	DNMM 1504_ _ NMP	DNGA 1504_ _	LCL4D-SD	LCS5DB-SD	LSD42SD	LSP4SD	LH030	
S40V 15	DNMG 1506_ _ NGU	DNMM 1506_ _ NMP	DNGA 1506_ _	LCL4D-SD	LCS5DB-SD	LSD42SD	LSP4SD	LH030	
S50W....15	DNMG 1506_ _ NGU	DNMM 1506_ _ NMP	DNGA 1506_ _	LCL4D-SD	LCS5DB-SD	LSD42SD	LSP4SD	LH030	

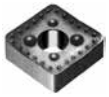


Holders

	Tool holders (P type) with lever-lock system	Ordering No.	Stock		Dimensions (mm)							
			R	L	$øD_{min}$	d	h	l_1	l_2	f	γ	
S - PSKN R/L 		S25T - PSKN R/L 12	●	●	32	25	23	300	42	17	-11°	SN_ _ 1204_ _
		S32U - PSKN R/L 12	●	●	40	32	30	350	45	22	-10°	
		S40V - PSKN R/L 12	●	●	50	40	37	400	50	27	-10°	
		S40V - PSKN R/L 15	●	❑	63	40	47	400	60	35	-10°	SN_ _ 1506_ _
		S50W - PSKN R/L 15	❑	❑	63	50	47	450	60	35	-10°	
		S50W - PSKN R/L 19	❑	❑	63	50	47	450	60	35	-9°	SN_ _ 1906_ _

All figures show right hand tools.

Applicable Inserts

Holder	Carbides, Cermets		CBN
	Double sided	One sided	
S - PSKN R/L 			
S25T....12	SNMG 0903_ _ NGU	-	-
S32U....12	SNMG 1204_ _ NGU	SNMM 1204_ _ NMP	SNGA 1204_ _
S40V....12	SNMG 1204_ _ NGU	SNMM 1204_ _ NMP	SNGA 1204_ _
S....15	SNMG 1506_ _ NGU	SNMM 1506_ _ NMP	-
S....19	SNMG 1906_ _ NGU	SNMM 1906_ _ NMP	-

Spare Parts

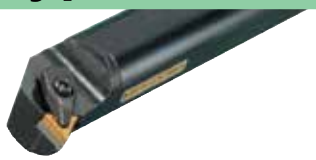
Holder	Lever pin	Clamp bolt	Shim	Shim pin	Wrench	
S - PSKN R/L 						
S25T....12	LCL4C-SD	LCS4B-SD	–	–	LH025	
S32U....12	LCL4T-SD	LCS41BS-SD	LSS42SD	LSP4SD	LH030	
S40V....12	LCL4SD	LCS42BS-SD	LSS42SD	LSP4SD	LH030	
S....15	LCL5SD	LCS5B-SD	LSS53SD	LSP5SD	LH030	
S....19	LCL5C-SD	LCS6B-SD	LSS63SD	LSP6SD	LH040	

● = Eurostock
❑ = Delivery on request
○ = Japanstock

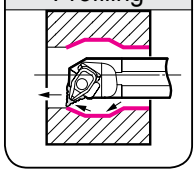
Boring Bars "T-REX" Type

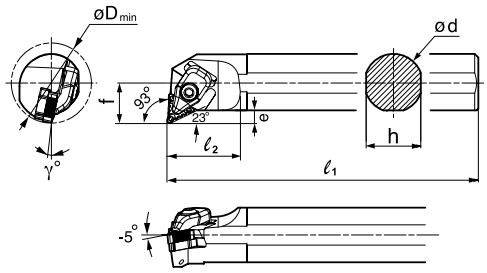
Internal Turning & Copying

SumiTurn T-REX



S-DTR
Profiling



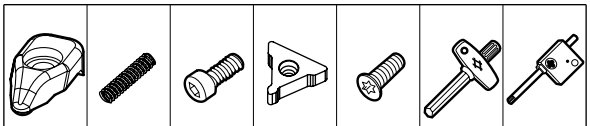


Holders

Above figures show right hand tools.

Ordering No.	Stock R	Stock L	øD min	ød	h	ℓ1	ℓ2	f	γ	e	Clamp	Spring	Screw	Shim	Screw	Wrench	Wrench
S32S-DTR55C R/L-17	●	❑	44	32	30	250	40	22	-12°	7	TRCP3	S-SP4-20	BX0520	TRW5505	BFTX0307N	TSW040	TRX10(*)
S40T-DTR55C R/L-17	●	❑	50	40	37	300	40	25	-10°	6,2							

Spare Parts



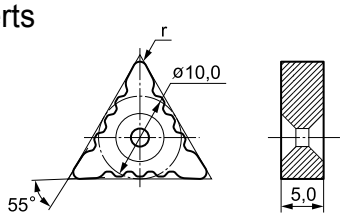
(*) Note: Wrench (TRX10) for shim is not included.

Advantages

● T-REX Inserts for Maximum Economy

With 6 cutting edges and a 55 degree included angle - T-Rex is the intelligent alternative to profile turning with a traditional 4 edge DNMG insert.

Inserts

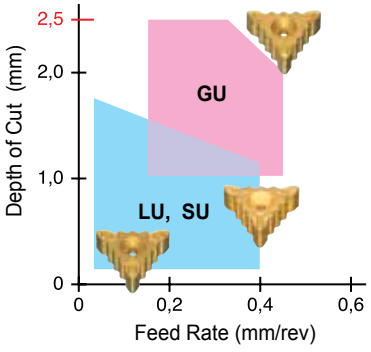


Application P Steel
M Stainles steel

	Shape	Ordering No.	r	Coated Carbide AC900G	AC810P	AC820P	AC830P	AC2000	AC3000	AC610M	AC630M	Coated Cermet T2000Z	T3000Z
Finishing	Type -LU	TRM 551704 -LU	0,4	▲	●	●		▲	▲			▲	❍
		TRM 551708 -LU	0,8	▲	●	●		▲	▲			▲	❍
		TRM 551712 -LU	1,2	▲	●	●			▲			▲	❍
	Type -SU	TRM 551704 -SU	0,4			❍				●	●	▲	❍
		TRM 551708 -SU	0,8			❍				●	●	▲	❍
		TRM 551712 -SU	1,2			❍				●	●	▲	❍
Light Cut	Type -GU	TRM 551704 -GU	0,4	▲	●	●	●	▲	▲		●		
		TRM 551708 -GU	0,8	▲	●	●	●	▲	▲		●		
		TRM 551712 -GU	1,2	▲	●	●	●	▲	▲		❍		

▲ To be replaced by new item

● Application Range



● Recommended Cutting Conditions

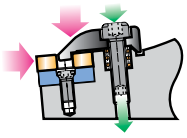
Cutting speed (m/min)

Grade		Coated Carbide AC810P	AC820P (AC2000)	AC830P (AC3000)	AC610M	AC630M	Coated Cermet T2000Z	T3000Z
Work materials	Low carbon steel	220 400	150 350	120 300	180 350	120 300	100 400	100 350
	Alloy steel	150 300	100 250	80 200	180 300	80 230	100 300	100 250
	Stainless steel			50 150	130 210	100 160		
Application range	Finishing	◎	○	○	◎	○	◎	◎
	Medium cutting	○	◎	○	○	◎	○	○
	Interrupted cutting		○	◎		○		○

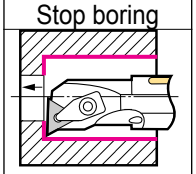
◎ Preferred choice ○ Suitable



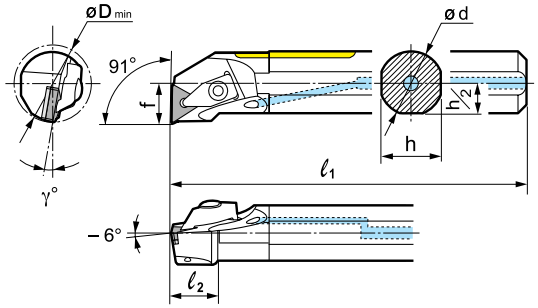
SumiTurn X Bar



D-DTFN
Stop boring



Anti-vibration D type with oil hole

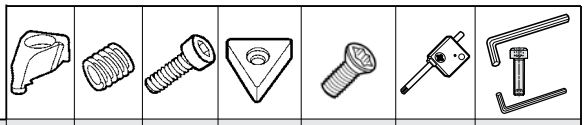


Insert (eg.)



N-GU

Spare Parts



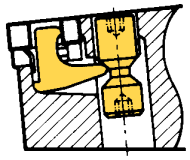
Holders

Above figures show right hand tools.

Ordering No.	Stock R	Stock L	øDmin	Dimensions (mm) ød	h	ℓ1	ℓ2	f	γ	Insert (eg.)	Clamp	Spring	Clamp bolt	Shim	Shim Screw	Wrench	Wrench
D25T - DTFN R/L 1604-32	●	●	32	25	23	300	21	17	-12°	TN□□1604○○	SCP-1			TNS1603B	BFTX0307N	TRX10 (*)	LH040	LH025
D32T - DTFN R/L 1604-40	●	●	40	32	30	300	26	22	-10°					TNS1604B				
D40U - DTFN R/L 1604-50	●	●	50	40	37	350	26	27	-10°									

(*) Note: Wrench (TRX type) for shim screw is not included.

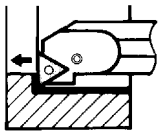
Holders

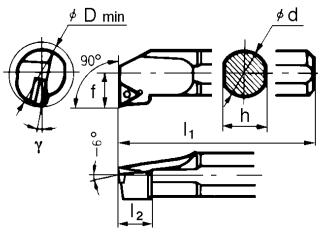


Tool holders (P type) with lever-lock system



S - PTFN R/L





Ordering No.	Stock R	Stock L	øDmin	d	h	l1	l2	f	γ	
S20S - PTFN R/L 11	●	●	25	20	18	250	30	13	-12°	TN_ _ 1103_ _
S25T - PTFN R/L 16	●	●	32	25	23	300	43,3	17	-13°	TN_ _ 1604_ _
S32U - PTFN R/L 16	●	●	40	32	30	350	49,6	27	-12°	
S40V - PTFN R/L 16	●	❑	50	40	37	400	49,5	27	-11°	
S50W - PTFN R/L 16	❑	❑	63	50	47	450	56	35	-10°	
S40V - PTFN R/L 22	●	●	50	40	37	400	59	27	-11°	TN_ _ 2204_ _
S50W - PTFN R/L 22	❑	❑	63	50	47	450	66	35	-10°	

All figures show right hand tools.

Applicable Inserts

Holder	Carbides, Cermets Double sided	Carbides, Cermets One sided	CBN
S - PTFN R/L			
S....11	-	-	-
S....16	TNMG 1604_ _ NGU	TNMM 1604_ _ NMP	TNGA 1604_ _
S....22	TNMG 2204_ _ NGU	TNMM 2204_ _ NMP	TNGA 2204_ _

Spare Parts

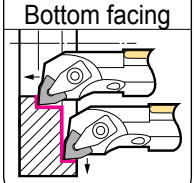
Lever pin	Clamp bolt	Shim	Shim pin	Wrench	
					
LCL3T-SD	LCS3B-SD	–	–	LH020	
LCL3SD	LCS3TB-SD	LST317SD	LSP3SD	LH025	
LCL4SD	LCS42BS-SD	LST42SD	LSP4SD	LH030	

● = Eurostock
❑ = Delivery on request

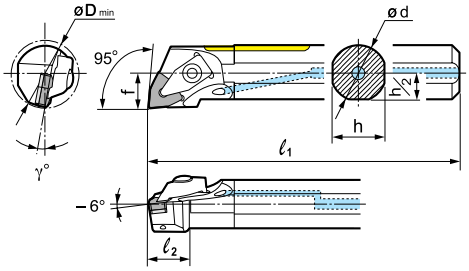
Boring Bars
D...DWLN / S...MWLN Type



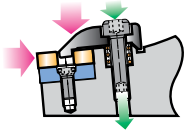
D-DWLN
Bottom facing



Anti-vibration D type
with oil hole



SumiTurn X Bar

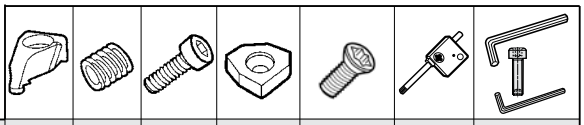


Insert (eg.)



N-GU

■ Spare Parts



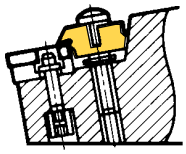
■ Holders

Above figures show right hand tools.

Ordering No.	Stock R	Stock L	øD$_{min}$	Dimensions (mm) ød	h	ℓ_1	ℓ_2	f	γ	Insert (eg.)	Clamp	Spring	Clamp bolt	Shim	Shim Screw	Wrench	Wrench	
D25T - DWLN R/L 0804-32	●	●	32	25	23	300	26	17	-12°	WN□□0804○○	SCP-2			WNS0803B	BFTX0307N	TRX10 (*)	LH040	LH025
D32T - DWLN R/L 0804-40	●	●	40	32	30	300	26	22	-10°					WNS0804B	BFTX0409N	TRX15 (*)		
D40U - DWLN R/L 0804-50	●	●	50	40	37	350	26	27	-10°									

(*) Note: Wrench (TRX type) for shim screw is not included.

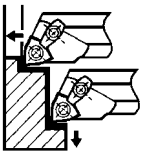
■ Holders

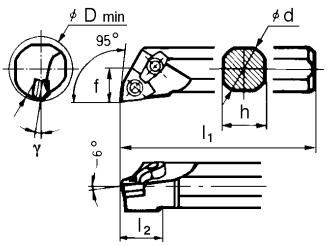


Tool holders (M type)
with wedge clamp system



S - MWLN R/L





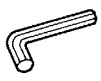
Ordering No.	Stock R	Stock L	øD$_{min}$	Dimensions (mm) d	h	l_1	l_2	f	γ	
S25R - MWLN R/L 08	●	●	32	25	23	200	28	17	-15°	WNMG 0804_ _
S32S - MWLN R/L 08	●	●	40	32	30	250	28	22	-14°	
S40T - MWLN R/L 08	●	●	50	40	37	300	28	27	-12°	

All figures show right hand tools.

■ Applicable Inserts

Holder	Carbides, Cermets: Double sided	Carbides, Cermets: One sided	
S - MWLN R/L			
S....08	WNMG 0804_ _ NGU	WNMM 0804_ _ NMP	

■ Spare Parts

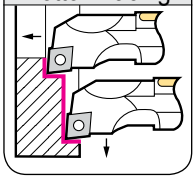
Clamp	Double screw	Pin	Shim	Wrench	
					
HE060011W	WB 6-16	HE060011P	HE060011E	LH025, LH030	

For Positive CC_ _- Inserts (α = 7°)

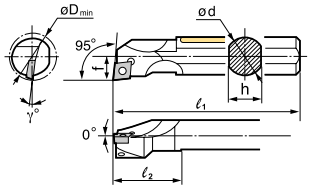


SumiTurn X Bar

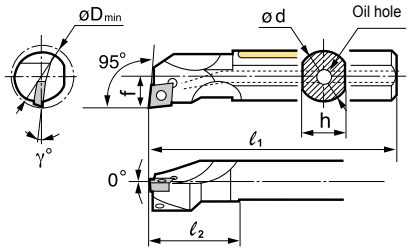
B/D-SCLC
Bottom facing



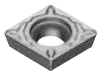
***B* Type** (Fig.1)
Min. Bore Dia.



***D* Type** (Fig.2)



Insert (ex.)



Spare Parts



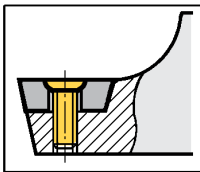

Holders

Steel shank	Ordering No.	Stock R	Stock L	øDmin	Dimensions (mm) ød	h	ℓ1	f	ℓ2	γ	Fig.	Insert (ex.)	Screw	Wrench
Anti-vibration B type	**B08H - SCLC R/L 0602-10**	●	●	10	8	7	100	5,5	19	-13°	1.	CC□T 0602○○	BFTX02505N	TRX08
	B10K - SCLC R/L 0602-12	●	●	12	10	9	125	6	21	-12°			BFTX02506N	
Anti-vibration D type with oil hole	**D12M - SCLC R/L 0602-14**	●	●	14	12	11	150	7	25	-10°	2.	CC□T 09T3○○	BFTX0407N	TRX15
	D16R - SCLC R/L 09T3-18	●	●	18	16	15	200	11	30	-8°			BFTX0409N	
	D20S - SCLC R/L 09T3-22	●	●	22	20	18	250	13	30	-7°				
	D25T - SCLC R/L 1204-32	●	●	32	25	23	300	17	38	-6°		CC□T 1204○○	BFTX0511N	TRX20
	D32T - SCLC R/L 1204-40	●	●	40	32	30	300	20	53	-6°				

All figures show right hand tools.

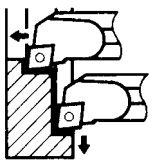
Remarks: Right handed tool holders are applicable with left handed or neutral inserts.
Left handed tool holders are applicable with right handed or neutral inserts.

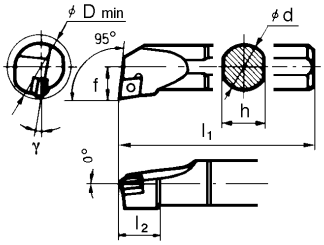
Holders



Tool holders (S type) with screw-lock system

S - SCLC R/L





Ordering No.	Stock R	Stock L	Dimensions (mm) øDmin	d	h	l1	l2	f	γ	
S10K - SCLC R/L 06	●	●	13	10	9	125	9	7	-12°	CC_ _ 0602_ _
S12M - SCLC R/L 06	●	●	16	12	11	150	11	9	-10°	
S16R - SCLC R/L 06	●	●	20	16	15	200	15	11	-8°	
S16R - SCLC R/L 09	●	●	20	16	15	200	15	11	-8°	CC_ _ 09T3_ _
S20S - SCLC R/L 09	●	●	25	20	18	250	20	13	-7°	
S25T - SCLC R/L 12	●	●	32	25	23	300	20	17	-6°	CC_ _ 1204_ _
S32U - SCLC R/L 12	●	●	40	32	30	350	25	22	-10°	
S40V - SCLC R/L 12	❑	●	50	40	37	400	25	27	-8°	

All figures show right hand tools.

Applicable Inserts

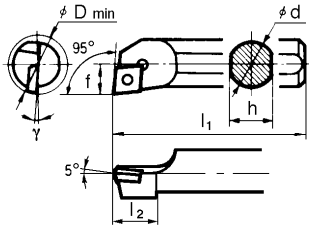
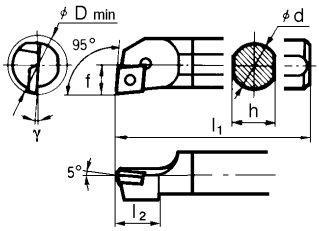
Holder	Carbides, Cermets			Screw	Wrench
S - SCLC R/L					
S.....06	CCMT 0602_ _ NFP	CCGW 0602_ _	-	BFTX02505N	TRX08
S16R.....09	CCMT 09T3_ _ NFP	CCGW 09T3_ _	-	BFTX0407N	TRX15
S20S.....09	CCMT 09T3_ _ NFP	CCGW 09T3_ _	-	BFTX0409N	TRX15
S.....12	CCMT 1204_ _ NFP	CCGW 1204_ _	-	BFTX0511N	TRX20

● = Eurostock
❑ = Delivery on request

Boring Bars
S/C...SCLP Type

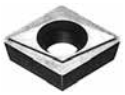


■ Holders

	Tool holders (S type) with screw-lock system	Ordering No.	Stock R	Stock L	Dimensions (mm) øD$_{min}$	d	h	l_1	l_2	f	γ	
S - SCLP R/L Steel shank		S10K - SCLP R/L 08	●	●	12	10	9	125	12	6	-5°	CP_ T 0802_ _
		S12M - SCLP R/L 08	●	●	16	12	11	150	15	8	-3°	
		S16R - SCLP R/L 09	●	●	20	16	15	200	18	10	-3°	CP_ T 0903_ _
		S20S - SCLP R/L 09	●	●	25	20	18	250	18	12,5	0	
		S25T - SCLP R/L 12	●	●	28	25	22	300	17,4	14	-3°	CP_ T 1204_ _
C - SCLP R/L Carbide shank		C10Q - SCLP R/L 08	●	❑	12	10	9	180	15	6	-5°	CP_ T 0802_ _
		C12R - SCLP R/L 08	❑	❑	16	12	11	200	15	8	-2°	
		C16S - SCLP R/L 09	●	❑	20	16	15	250	15	10	-2°	CP_ T 0903_ _

All figures show right hand tools.

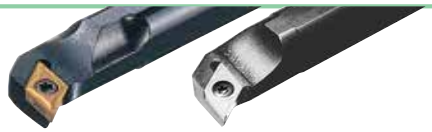
■ Applicable Inserts

Holder	Carbides, Cermets	CBN	
S/C-SCLP R/L			
S/C 10.....08	CPGT 0802_ _ NSD	CPMW 0802_ _	
S/C 12.....08	CPGT 0802_ _ NSD	CPMW 0802_ _	
S/C 16.....09	CPGT 0903_ _ NSD	CPMW 0903_ _	
S 20.....09	CPGT 0903_ _ NSD	CPMW 0903_ _	
S 25.....12	CPGT 1204_ _ NSD	-	

■ Spare Parts

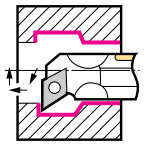
Screw	Wrench				
					
BFTX 0305 A	TRX 10				
BFTX 0305 A	TRX 10				
BFTX 0407 A	TRX 15				
BFTX 0407 A	TRX 15				
BFTX 0509 A	TRX 20				

For Positive DC_ _- Inserts (α = 7°)

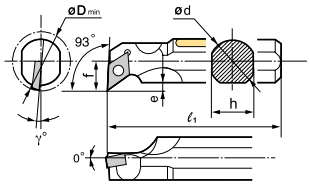


SumiTurn X Bar

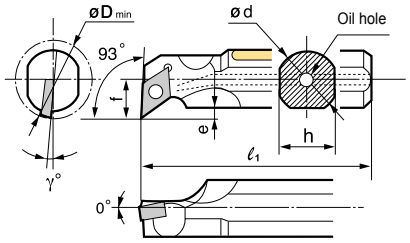
B/D-SDUC
Copying



***B* Type** (Fig.1)
Min. Bore Dia.



***D* Type** (Fig.2)



Insert (ex.)



Spare Parts



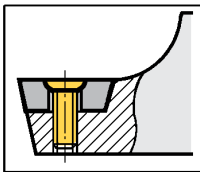

Holders

Steel shank	Ordering No.	Stock R	Stock L	øD$_{min}$	Dimensions (mm) ød	h	ℓ_1	f	e	γ	Fig.	Insert (ex.)	Screw	Wrench
Anti-vibration B type	**B10M - SDUC R/L 0702-13**	●	●	13	10	9	150	7	2,5	-8°	1.	DC□T 0702○○	BFTX02506N	TRX08
Anti-vibration D type with oil hole	**D12M - SDUC R/L 0702-16**	●	●	16	12	11	150	9	3,5	-8°	2.			
	D16R - SDUC R/L 0702-20	●	●	20	16	15	200	11	4,0	-6°				
	D20S - SDUC R/L 11T3-25	●	●	25	20	18	250	13	4,5	-6°		DC□T 11T3○○	BFTX0409N	TRX15
	D25S - SDUC R/L 11T3-32	●	●	32	25	22	250	17	7,0	-6°				
	D32T - SDUC R/L 11T3-40	●	●	40	32	30	300	22	8,0	-6°				

All figures show right hand tools.

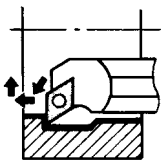
Remarks: Right handed tool holders are applicable with left handed or neutral inserts.
Left handed tool holders are applicable with right handed or neutral inserts.

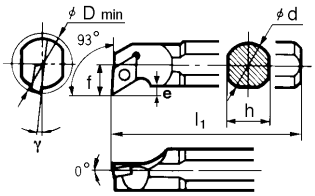
Holders



Tool holders (S type)
with screw-lock system

S - SDUC R/L





Ordering No.	Stock R	Stock L	øD$_{min}$	Dimensions (mm) d	h	l_1	f	e	γ	
S10K - SDUC R/L 07	●	●	13	10	9	125	7	2,5	-8°	DC_ _ 0702_ _
S12M - SDUC R/L 07	●	●	16	12	11	150	9	3,5	-8°	
S16R - SDUC R/L 07	●	●	20	16	15	200	11	4	-6°	
S20S - SDUC R/L 11	●	●	25	20	18	250	13	4,5	-6°	DC_ _ 11T3_ _
S25T - SDUC R/L 11	●	●	32	25	22	300	17	7,5	-6°	
S32U - SDUC R/L 11	●	●	40	32	30	350	22	11	-6°	

All figures show right hand tools.

Applicable Inserts

Spare Parts

Holder	Carbides, Cermets		CBN, PCD	Screw	Wrench				
S - SDUC R/L **S - SDQC R/L**									
S10K.....07	DCMT 0702_ _ NFP	DCMT 0702_ _ NSK	DCGW 0702_ _	BFTX02506N	TRX08				
S12M.....07	DCMT 0702_ _ NFP	DCMT 0702_ _ NSK	DCGW 0702_ _	BFTX02506N	TRX08				
S16R.....07	DCMT 0702_ _ NFP	DCMT 0702_ _ NSK	DCGW 0702_ _	BFTX02506N	TRX08				
S.....11	DCMT 11T3_ _ NFP	DCMT 11T3_ _ NSK	DCGW 11T3_ _	BFTX0409N	TRX15				

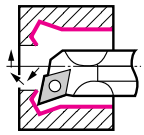
● = Eurostock

Boring Bars
B/D/S...SDQC Type

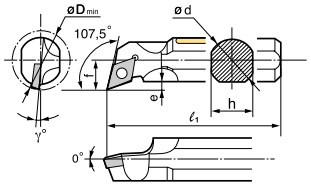


SumiTurn X Bar

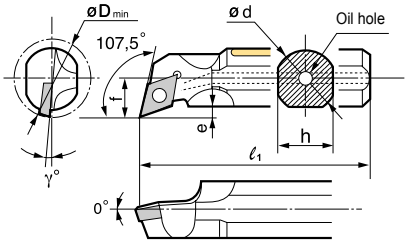
B/D-SDQC
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B Type (Fig.1)
Min. Bore Dia.



D Type (Fig.2)



Insert (ex.)



■ Spare Parts

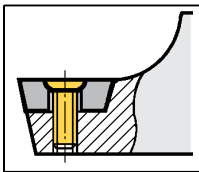
■ Holders

Steel shank	Ordering No.	Stock R	Stock L	øDmin	Dimensions (mm) ød	h	ℓ1	f	e	γ	Fig.	Insert (ex.)	Screw	Wrench
Anti-vibration B type	**B10M - SDQC R/L 0702-13**	●	●	13	10	9	150	7	2,5	-8°	1.	DC□T 0702○○	BFTX02506N	TRX08
Anti-vibration D type with oil hole	**D12M - SDQC R/L 0702-16**	●	●	16	12	11	150	9	3,5	-8°				
	D16R - SDQC R/L 0702-20	●	●	20	16	15	200	11	4,0	-6°				
	D20S - SDQC R/L 11T3-25	●	●	25	20	18	250	13	4,5	-6°	2.	DC□T 11T3○○	BFTX0409N	TRX15
	D25S - SDQC R/L 11T3-32	●	●	32	25	22	250	17	7,0	-6°				
	D32T - SDQC R/L 11T3-40	●	●	40	32	30	300	22	7,0	-10°				

All figures show right hand tools.

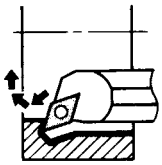
Remarks: Right handed tool holders are applicable with left handed or neutral inserts.
Left handed tool holders are applicable with right handed or neutral inserts.

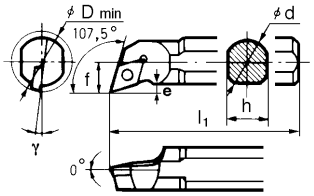
■ Holders



Tool holders (S type)
with screw-lock system

S - SDQC R/L



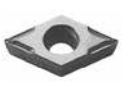


Ordering No.	Stock R	Stock L	øDmin	Dimensions (mm) d	h	l1	f	e	γ	
S10K - SDQC R/L-07	●	●	13	10	9	125	7	2,5	-8°	DC_ _ 0702_ _
S12M - SDQC R/L-07	●	●	16	12	11	150	9	3,5	-8°	
S16R - SDQC R/L-07	●	●	20	16	15	200	11	4	-6°	
S20S - SDQC R/L-11	●	●	25	20	18	250	13	4,5	-6°	DC_ _ 11T3_ _
S25T - SDQC R/L-11	●	●	32	25	22	300	17	7	-6°	

All figures show right hand tools.

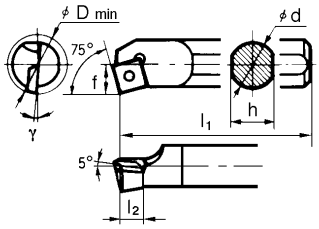
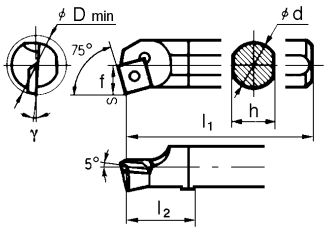
■ Applicable Inserts

■ Spare Parts

Holder	Carbides, Cermets		CBN, PCD	Screw	Wrench
S - SDUC R/L S - SDQC R/L					
S10K.....07	DCMT 0702_ _ NFP	DCMT 0702_ _ NSK	DCGW 0702_ _	BFTX02506N	TRX08
S12M.....07	DCMT 0702_ _ NFP	DCMT 0702_ _ NSK	DCGW 0702_ _	BFTX02506N	TRX08
S16R.....07	DCMT 0702_ _ NFP	DCMT 0702_ _ NSK	DCGW 0702_ _	BFTX02506N	TRX08
S.....11	DCMT 11T3_ _ NFP	DCMT 11T3_ _ NSK	DCGW 11T3_ _	BFTX0409N	TRX15



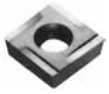
Holders

	Tool holders (S type) with screw-lock system	Ordering No.	Stock R	Stock L	Dimensions (mm) øD$_{min}$	d	h	l_1	l_2	f	γ	
S - SSKP R/L Steel shank		S12M - SSKP R/L 09	●	●	16	12	11	150	9	8	-6°	SP_ T 0903_ _
		S16R - SSKP R/L 09	●	●	20	16	15	200	6,8	10	-4°	
		S20S - SSKP R/L 09	●	❑	25	20	18	250	8,5	12,5	-2°	
		S25T - SSKP R/L 09	●	❑	28	25	22	300	5	14	0	
C - SSKP R/L Carbide shank		C12R - SSKP R/L 09	●	❑	16	12	11	200	25	8	-6°	SP_ T 0903 _ _
		C16S - SSKP R/L 09	●	❑	20	16	15	250	30	10	-4°	

All figures show right hand tools.

Remarks: Right handed tool holders are applicable with left handed or neutral inserts.
Left handed tool holders are applicable with right handed or neutral inserts.
SPGT figure shows left hand tool.

Applicable Inserts

Holder	Carbides, Cermets	CBN	
S/C-SSKP R/L			
S/C 12.....09 S/C 16.....09 S 20.....09 S 25.....09	SPGT 0903_ _ L/R-SD	SPGW 0903_ _	

Spare Parts

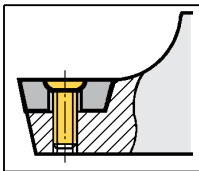
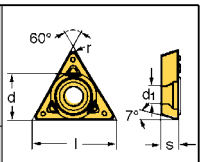
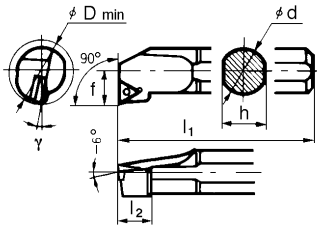
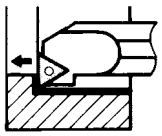
Screw	Wrench				
					
BFTX 0307 A	TRX 10				

● = Eurostock
❑ = Delivery on request

Boring Bars
S ...STFC Type



■ Holders

	Tool holders (S type) with screw-lock system	Ordering No.	Stock		Dimensions (mm)							
			R	L	$øD_{min}$	d	h	l_1	l_2	f	γ	
S - STFC R/L		S10K - STFC R/L 09	●	●	13	10	9	125	-	7	-15°	TC_ _ 0902_ _
		S12M - STFC R/L 11	●	●	16	12	11	150	10	9	-10°	TC_ _ 1102_ _
		S16R - STFC R/L 11	●	●	20	16	15	200	12	11	-6°	
		S20S - STFC R/L 11	●	●	25	20	18	250	14	13	-3°	
		S25T - STFC R/L 16	●	❑	32	25	23	300	18	17	-6°	TC_ _ 16T3_ _
		S32U - STFC R/L 16	●	❑	40	32	30	350	20	22	-10°	
		S40V - STFC R/L 16	❑	❑	50	40	37	400	25	27	-8°	

All figures show right hand tools.

■ Applicable Inserts

Holder	Carbides, Cermets		CBN, PCD
S - STFC R/L			
S.....09	TCMT 0902_ _ NFP	-	TCGW 0902_ _
S.....11	TCMT 1102_ _ NFP	TCMT 1102_ _ NSK	TCGW 1102_ _
S.....16	TCMT 16T3_ _ NFP	TCMT 16T3_ _ NSK	TCGW 16T3_ _

■ Spare Parts

Screw	Wrench
	
BFTX02205N	TRX06
BFTX02506N	TRX08
BFTX0409N	TRX15

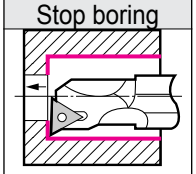
Boring Bars
B/D/S/C...STUP(B) Type

For Positive TB / TP_ _- Inserts (α = 5, 11°)

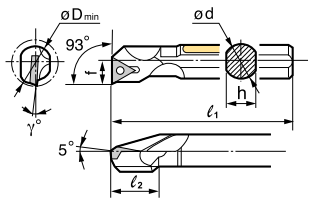


SumiTurn X Bar

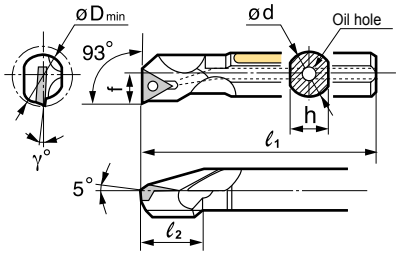
B/D-STUP
Stop boring



B Type (Fig.1)
Min. Bore Dia.



D Type (Fig.2)



Insert (ex.)



■ Spare Parts



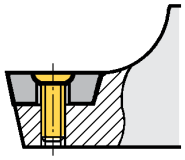

■ Holders

Steel shank	Ordering No.	Stock R	Stock L	øDmin	Dimensions (mm) ød	h	ℓ1	f	ℓ2	γ	Fig.	Insert (ex.)	Screw	Wrench
Anti-vibration B type	**B08H - STUP R/L 0802-10**	●	●	10	8	7	100	5	13	-10°	1.	TP□T 0802○○	BFTX0204A	TRX06
	B10K - STUP R/L 1103-12	●	●	12	10	9	125	6	15	-8°		TP□T 1103○○	BFTX0306A	TRX10
Anti-vibration D type with oil hole	**D12M - STUP R/L 1103-14**	●	●	14	12	11	150	7	17	-7°	2.			
	D16R - STUP R/L 1103-18	●	●	18	16	15	200	9	18	-4°				
	D20S - STUP R/L 1103-22	●	●	22	20	18	250	11	18	-3°			BFTX0307A	
	D25T - STUP R/L 1604-28	●	●	28	25	22	300	14	18	-2°		TP□T 1604○○	BFTX0410A	TRX15
	D32T - STUP R/L 1604-40	●	●	40	32	30	300	20	13	-2°				

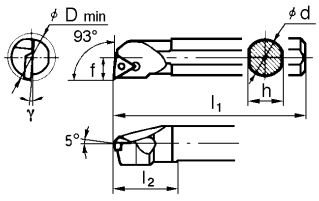
All figures show right hand tools.

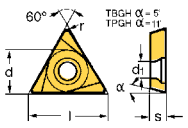
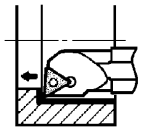
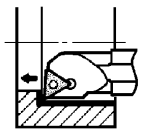
Remarks: Right handed tool holders are applicable with left handed or neutral inserts.
Left handed tool holders are applicable with right handed or neutral inserts.

■ Holders



Tool holders (S type)
with screw-lock system



	Ordering No.	Stock R	Stock L	Dimensions (mm) øDmin	d	h	l1	l2	f	γ	
S - STUP/B R/L Steel shank 	S08H - STUB R/L 06-01	●	●	8	8	7	100	30	4	-12°	TB_T 0601_ _
	S08H - STUP R/L 08-02	●	●	10	8	7	100	13	5	-10°	TP_T 0802_ _
	S10K - STUP R/L 11-03	●	●	12	10	9	125	15	6	-8°	TP_T 1103_ _
	S12M - STUP R/L 11-03	●	●	16	12	11	150	17	8	-6°	
	S16R - STUP R/L 11-03	●	●	20	16	15	200	18	10	-2°	
	S20S - STUP R/L 16	●	●	25	20	18	250	18	12,5	-3°	TP_T 1604_ _
	S25T - STUP R/L 16	●	●	28	25	22	300	18	14	-2°	
C - STUP/B R/L Carbide shank 	C08M - STUB R/L 06	●	●	8	8	7	150	50	4	-12°	TB_T 0601_ _
	C08M - STUP R/L 08	●	●	10	8	7	150	18	5	-10°	TP_T 0802_ _
	C10Q - STUP R/L 11	●	●	12	10	9	180	19	6	-8°	TP_T 1103_ _
	C12R - STUP R/L 11	●	●	16	12	11	200	25	8	-6°	
	C16S - STUP R/L 11	●	❑	20	16	15	250	30	10	-4°	

■ Applicable Inserts

Holder	Carbides, Cermets	CBN, PCD
S/C-STU_ R/L		
S/C 08.....06-01	TBGT 0601_ _L/R-W	-
S/C 08.....08-02	TPGT 0802_ _L/R-W	TPMW 0802_ _
S/C 10.....11-03	TPGT 1103_ _L/R-W	TPGW 1103_ _
S/C 12/16.....11-03	TPGT 1103_ _L/R-W	TPGW 1103_ _
S 20/25.....16	TPGT 1604_ _L/R-W	TPGW 1604_ _

■ Spare Parts

Screw	Wrench
	
BFTX 0204 A	TRX 06
BFTX 0204 A	TRX 06
BFTX 0306 A	TRX 10
BFTX 0307 A	TRX 10
BFTX 0410 A	TRX 15

● = Eurostock
❑ = Delivery on request

SumiTurn X Bar



Anti-vibration D type with oil hole

D-SVUB

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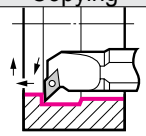


Fig.1

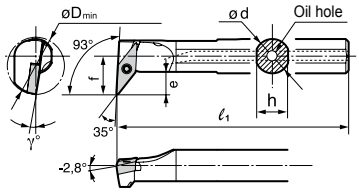
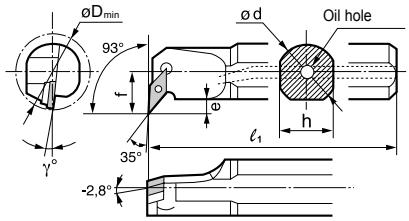


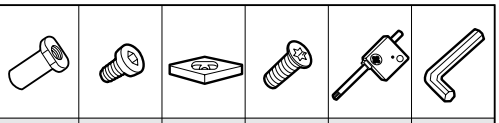
Fig.2



Insert (ex.)



■ Spare Parts



■ Holders

Above figures show right hand tools.

Ordering No.	Stock R	Stock L	øDmin	Dimensions (mm) ød	h	ℓ1	f	e	γ	Fig.	Insert (ex.)	Pin	Clamp screw	Shim	Screw	Wrench	Wrench
D16R - SVUB R/L 1103-22	●	●	22	16	15	200	13	5	-7°	1.	VB□□ 1103○○	–	–	–	BFTX 02506	TRX08	–
D20S - SVUB R/L 1103-27	●	●	27	20	18	250	15	5	-5°								
D25T - SVUB R/L 1604-35	●	●	35	25	23	300	20,5	9	-7,5°	2.	VB□□ 1604○○	VP32B	BH03504	SVP32	BFTX 03508	TRX10	LH020
D32T - SVUB R/L 1604-40	●	●	40	32	30	300	22	9	-7,5°								

Remarks: Right handed tool holders are applicable with left handed or neutral inserts.
Left handed tool holders are applicable with right handed or neutral inserts.

SumiTurn X Bar



Anti-vibration D type with oil hole

D-SVZB

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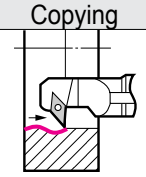


Fig.1

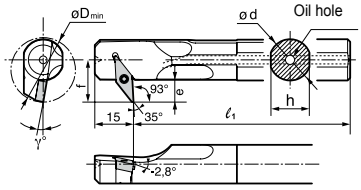
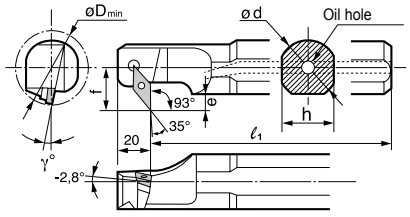


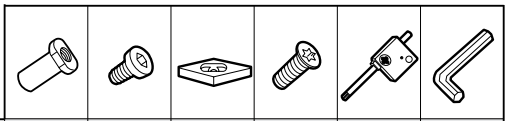
Fig.2



Insert (ex.)



■ Spare Parts



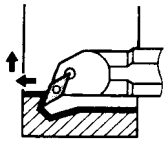
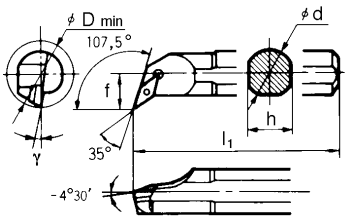
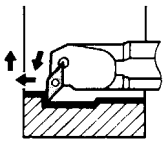
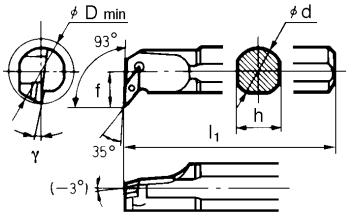
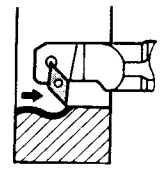
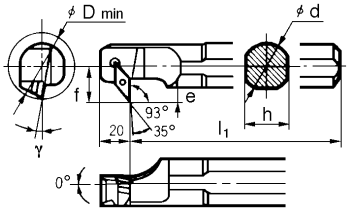
■ Holders

Above figures show right hand tools.

Ordering No.	Stock R	Stock L	øDmin	Dimensions (mm) ød	h	ℓ1	f	e	γ	Fig.	Insert (ex.)	Pin	Clamp screw	Shim	Screw	Wrench	Wrench
D16R - SVZB R/L 1103-22	●	●	22	16	15	200	13	5	-7	1.	VB□□ 1103○○	–	–	–	BFTX 02506	TRX08	–
D20S - SVZB R/L 1103-27	●	●	27	20	18	250	15	5	-5								
D25T - SVZB R/L 1604-35	●	●	35	25	23	300	20,5	9	-7,5	2.	VB□□ 1604○○	VP32B	BH03504	SVP32	BFTX 03508	TRX10	LH020
D32T - SVZB R/L 1604-40	●	●	40	32	30	300	22	9	-7,5								



Holders

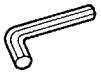
	Tool holders (S type) with screw-lock system	Ordering No.	Stock R	Stock L	Dimensions (mm) øD$_{min}$	d	h	l_1	f	γ	e	
S - SVQB R/L 		S16R - SVQB R/L 11	●	●	22	16	15	200	13	-6,5°		VB_ _ 1102_ _
		S20S - SVQB R/L 11	●	●	27	20	18	250	15	-6,5°		
		S25T - SVQB R/L 16	●	●	35	25	23	300	20,5	-6,5°		VB_ _ 1604_ _
		S32U - SVQB R/L 16	●	●	40	32	30	350	22	-6,5°		
		S40V - SVQB R/L 16	❑	❑	50	40	37	400	27	-6,5°		
S - SVUB R/L 		S16R - SVUB R/L 11	●	●	22	16	15	200	13	-7,5°		VB_ _ 1102_ _
		S20S - SVUB R/L 11	●	●	27	20	18	250	15	-7,5°		
		S25T - SVUB R/L 16	●	●	35	25	23	300	20,5	-7,5°		VB_ _ 1604_ _
		S32U - SVUB R/L 16	●	●	40	32	30	350	22	-7,5°		
		S40V - SVUB R/L 16	❑	❑	50	40	37	400	27	-7,5°		
S - SVZB R/L 		S16R - SVZB R/L 11	●	●	22	16	15	200	13	-7,5°	5	VB_ _ 1102_ _
		S20S - SVZB R/L 11	●	●	27	20	18	250	15	-7,5°	5	
		S25T - SVZB R/L 16	●	●	35	25	23	300	20,5	-7,5°	9	VB_ _ 1604_ _
		S32U - SVZB R/L 16	●	●	40	32	30	350	22	-7,5°	9	
		S40V - SVZB R/L 16	❑	❑	50	40	37	400	27	-7,5°	10	

All figures show right hand tools.

Applicable Inserts

Holder	Carbides, Cermets		CBN
			
S16R	VBMT 1102_ _ NFP	VBMT 1102_ _ NSK	-
S20S	VBMT 1102_ _ NFP	VBMT 1102_ _ NSK	-
S25T	VBMT 1604_ _ NFP	VBMT 1604_ _ NSK	VBGW 1604_ _
S32U	VBMT 1604_ _ NFP	VBMT 1604_ _ NSK	VBGW 1604_ _
S40V	VBMT 1604_ _ NFP	VBMT 1604_ _ NSK	VBGW 1604_ _

Spare Parts

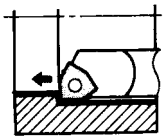
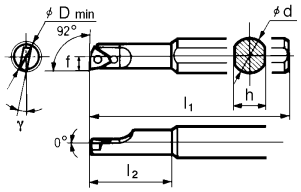
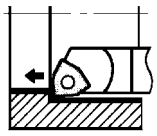
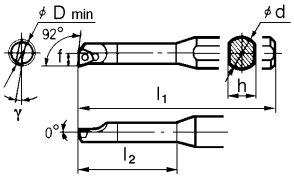
Pin	Clamp bolt	Shim	Screw	Wrench	Wrench
					
-	-	-	BFTX02506N	TRX08	-
-	-	-	BFTX02506N	TRX08	-
-	-	-	BFTX03508	TRX10	-
VP32B	BH03504	SVP32	BFTX03508	TRX10	LH020
VP40B	BH03504	SVP32	BFTX03508	TRX10	LH020

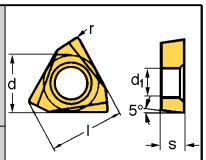
● = Eurostock
❑ = Delivery on request

Boring Bars
S/C...SWUB Type



■ Holders

	Tool holders (S type) with screw-lock system	Ordering No.	Stock R	Stock L	Dimensions (mm) øD$_{min}$	d	h	l_1	l_2	f	γ	
S - SWUB R/L Steel shank	 	S08H - SWUB R/L 06-01	●	●	5,5	8	7	100	18	3	-12°	WBGT 0601_ _
C - SWUB R/L Carbide shank	 	C08K - SWUB R/L 06	●	●	5,5	8	7	125	30	3	-12°	WBGT 0601_ _



All figures show right hand tools.

Remarks: Right handed tool holders are applicable with left handed or neutral inserts.
Left handed tool holders are applicable with right handed or neutral inserts.

■ Applicable Inserts

Holder	Carbides, Cermets	CBN	
S/C-SWUBR/L			
S/C 08.....R 06	WBGT 0601_ _ LW	-	
S/C 08.....L 06	WBGT 0601_ _ RW	-	

■ Spare Parts

Screw	Wrench				
					
BFTX 0203 N	TRX 06				
BFTX 0203 N	TRX 06				

BXBR Type





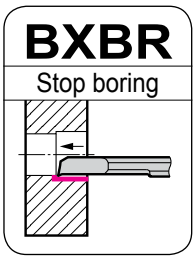
■ Characteristics

SumiSmall

- Economical, two-cornered insert.
- Maximum boring depth 5D (5 times the shank diameter)
- Usable at any desired overhang.
- Shank size = min. bore diameter for easy selection. (Available from ø2 mm to ø5 mm in 0,5 mm increments.)
- KBMX Type cutting edge used, no breaker versions also available in stock.

Small Hole Finishing

BXBR
Stop boring



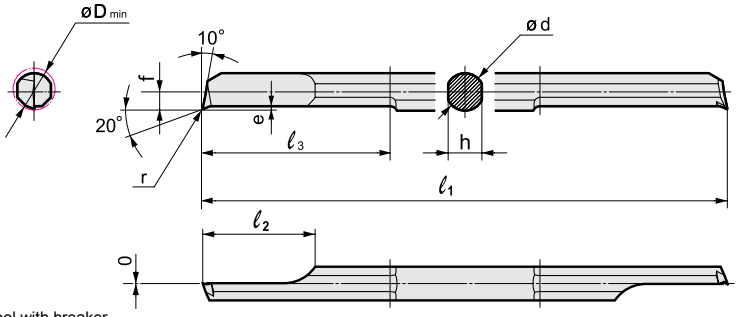


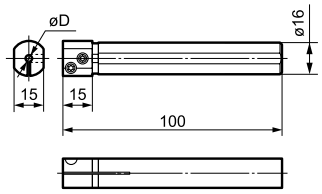
Figure shows tool with breaker.

* ℓ_3 : Max. depth of boring

■ Solid Carbide Bar

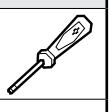
	Cat. No.	Stock		øDmin	Dimensions (mm)								Applicable Sleeve
		ACZ150	AC530U		ød	h	ℓ_1	f	ℓ_2	ℓ_3	e	r	
With Breaker	**BXBR 02005 R**	❍		**2,0**	2,0	1,8	50	0,80	6,0	*10,0*	0,20	0,05	HBX 2016
	02020 R	❍		**2,0**	2,0	1,8	50	0,80	6,0	*10,0*	0,20	0,20	HBX 2016
	BXBR 02505 R	❍		**2,5**	2,5	2,2	50	1,05	7,5	*12,5*	0,20	0,05	HBX 2516
	02520 R	❍		**2,5**	2,5	2,2	50	1,05	7,5	*12,5*	0,20	0,20	HBX 2516
	BXBR 03005 R	❍		**3,0**	3,0	2,7	50	1,30	9,0	*15,0*	0,25	0,05	HBX 3016
	03020 R	❍		**3,0**	3,0	2,7	50	1,30	9,0	*15,0*	0,25	0,20	HBX 3016
	BXBR 03505 R	❍		**3,5**	3,5	3,1	60	1,55	10,5	*17,5*	0,25	0,05	HBX 3516
	03520 R	❍		**3,5**	3,5	3,1	60	1,55	10,5	*17,5*	0,25	0,20	HBX 3516
	BXBR 04005 R	❍		**4,0**	4,0	3,6	60	1,80	12,0	*20,0*	0,35	0,05	HBX 4016
	04020 R	❍		**4,0**	4,0	3,6	60	1,80	12,0	*20,0*	0,35	0,20	HBX 4016
	BXBR 04505 R	❍		**4,5**	4,5	4,1	70	2,05	13,5	*22,5*	0,35	0,05	HBX 4516
	04520 R	❍		**4,5**	4,5	4,1	70	2,05	13,5	*22,5*	0,35	0,20	HBX 4516
	BXBR 05005 R	❍		**5,0**	5,0	4,5	70	2,30	15,0	*25,0*	0,40	0,05	HBX 5016
	05020 R	❍		**5,0**	5,0	4,5	70	2,30	15,0	*25,0*	0,40	0,20	HBX 5016
No Breaker	**BXBR 02005 R-NB**	❍		**2,0**	2,0	1,8	50	0,80	6,0	*10,0*	0,20	0,05	HBX 2016
	02020 R-NB	❍		**2,0**	2,0	1,8	50	0,80	6,0	*10,0*	0,20	0,20	HBX 2016
	BXBR 02505 R-NB	❍		**2,5**	2,5	2,2	50	1,05	7,5	*12,5*	0,20	0,05	HBX 2516
	02520 R-NB	❍		**2,5**	2,5	2,2	50	1,05	7,5	*12,5*	0,20	0,20	HBX 2516
	BXBR 03005 R-NB	❍		**3,0**	3,0	2,7	50	1,30	9,0	*15,0*	0,25	0,05	HBX 3016
	03020 R-NB	❍		**3,0**	3,0	2,7	50	1,30	9,0	*15,0*	0,25	0,20	HBX 3016
	BXBR 03505 R-NB	❍		**3,5**	3,5	3,1	60	1,55	10,5	*17,5*	0,25	0,05	HBX 3516
	03520 R-NB	❍		**3,5**	3,5	3,1	60	1,55	10,5	*17,5*	0,25	0,20	HBX 3516
	BXBR 04005 R-NB	❍		**4,0**	4,0	3,6	60	1,80	12,0	*20,0*	0,35	0,05	HBX 4016
	04020 R-NB	❍		**4,0**	4,0	3,6	60	1,80	12,0	*20,0*	0,35	0,20	HBX 4016
	BXBR 04505 R-NB	❍		**4,5**	4,5	4,1	70	2,05	13,5	*22,5*	0,35	0,05	HBX 4516
	04520 R-NB	❍		**4,5**	4,5	4,1	70	2,05	13,5	*22,5*	0,35	0,20	HBX 4516
	BXBR 05005 R-NB	❍		**5,0**	5,0	4,5	70	2,30	15,0	*25,0*	0,40	0,05	HBX 5016
	05020 R-NB	❍		**5,0**	5,0	4,5	70	2,30	15,0	*25,0*	0,40	0,20	HBX 5016

■ Adaptor Sleeve (Optional)



Cat. No.	Stock	øDs (mm)	Applicable Bar
HBX 2016	❍	2,0	BXBR 020○○ R(-NB)
HBX 2516	❍	2,5	BXBR 025○○ R(-NB)
HBX 3016	❍	3,0	BXBR 030○○ R(-NB)
HBX 3516	❍	3,5	BXBR 035○○ R(-NB)
HBX 4016	❍	4,0	BXBR 040○○ R(-NB)
HBX 4516	❍	4,5	BXBR 045○○ R(-NB)
HBX 5016	❍	5,0	BXBR 050○○ R(-NB)

■ Spare Parts (For sleeve)

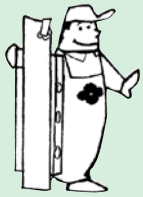
Screw	Required Torque (N·m)	Setting Screw	Wrench
			
BFTX 0409 N	**3,4**	BT 06035 T	TRD 15

* BXBR bars can be used with HBB type sleeves. Commercially available sleeves may also be used.

❍ = Japanstock

Grooving & Parting-Off Threading Holders

F1 ~ F34





GND Type Grooving Tools Selection Guide	**GND**	F 2-11
External Grooving Holders, (Small Tools)	**GNDM / GNDL** New	F12
(Shallow Grooves)	**GNDS** New	F13
	GNDM / GNDMS	F14
	GNDL / GNDLS	F15
Internal Grooving Holders	**GNDI**	F16
	GNDF	F17
Grooving Inserts	**GCM** (-N/R/L)	F18-19
”SumiTurn B-Groove” Inserts	**TGA-BF**	F20
”SumiTurn B-Groove” Holders	**GWC / GWCS / GWCI**	F21
Parting-Off Mini Holders	**SCT**	F22
Sumi-Grip Inserts	**WCF** (-N/R/L)	F23
”Sumi-Grip Jr.” Steel Type	**STFH / STFS** R/L	F24-25
”Sumi-Grip” Carbide Blade Type	**WCFH / WCFS** R/L	F26-28
Threading Tools Selection Guide		F29-30
Cutting Conditions		F31
External Threading Holders	**LTER / STER**	F32
Internal Threading Holders	**STIR**	F33

GND Type



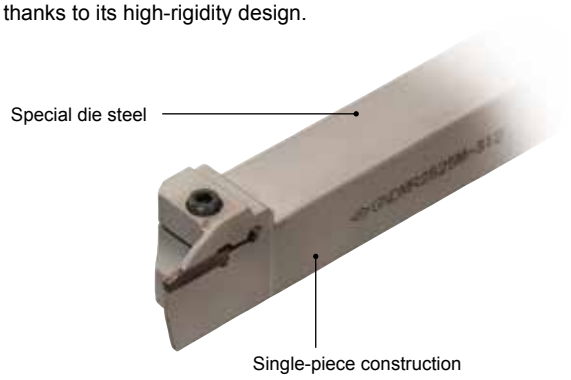
Characteristics

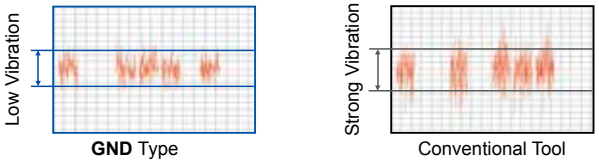
- Wide range of application processes
  Applicable for grooving, turning, copying, facing, boring and cut-off.
- Achieving stable tool life
  An array of chipbreakers improves the efficiency in chip control in various applications and prevents unexpected damages caused by chip blockade.
- Achieving smooth cutting and high efficiency machining
  Holders utilizing one-piece body construction made of special steel, reduce vibration by 30% during machining as compared to conventional types.
- Achieving high precision grooving widths with moulded inserts
  Grooving insert width tolerance of ±0,03mm over the entire range

Cutting Performance

Eliminates Vibration

Reduces vibration up to 30% compared to conventional grades thanks to its high-rigidity design.





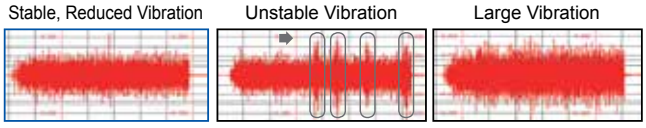
GND Type — Conventional Tool

Work Material:	15CrMo5
Holder:	GNDL R2525M 220
Insert:	GCM N2002 GG
Cutting Conditions:	v_c=100m/min, f=0,10mm/rev, a_p=20mm, wet

Ensures both high rigidity and good chip evacuation

Internal





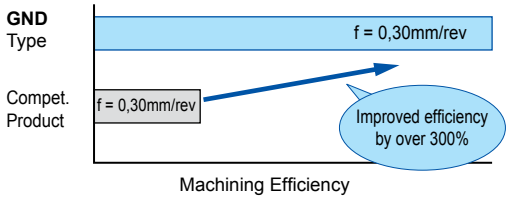
GND Type — Comp. A — Comp. B

Work Material:	15CrMo5
Holder:	GNDI R2532 T306
Insert:	GCM N3002 GG
Cutting Conditions:	v_c=100m/min, f=0,05mm/rev, a_p=3,0mm, wet

Application Examples

Substantially improved machining efficiency!

High rigidity holder enables high load machining at high feed rate.



Work Material:	42CrMo4
Holder:	GNDL R2525M 320
Insert:	GCM N3002 GG (AC530U)
Cutting Conditions:	v_c=130m/min, f=0,30mm/rev, wet

Stable and long tool life ensures reliable functionality even on automatic production lines!

Reduction of chattering prevents unexpected breakage.

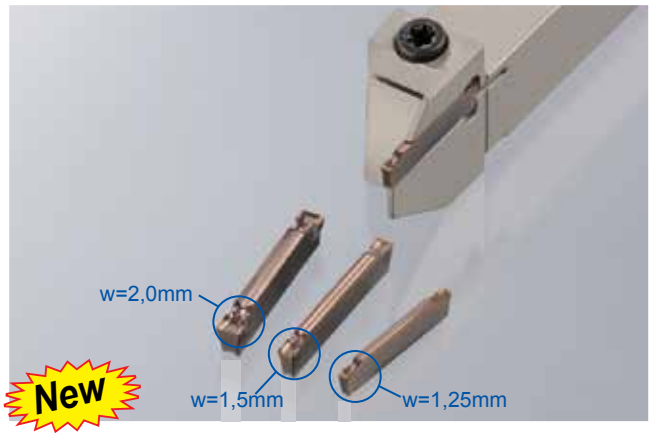


GND Type — Competitor

Work Material:	C53
Holder:	GNDM L2525M 618
Insert:	GCM N6030 RG (AC530U)
Cutting Conditions:	v_c=130m/min, f=0,30mm/rev, wet

GND Type

New

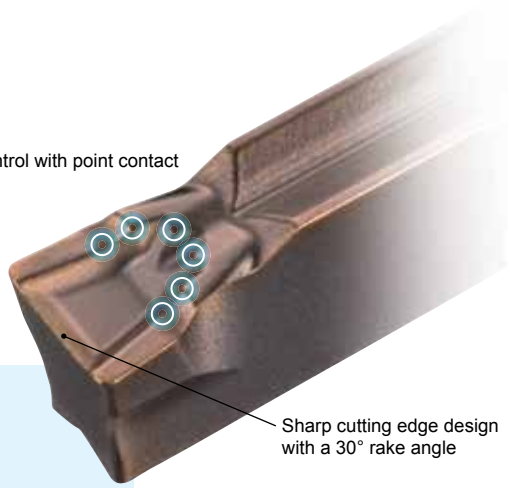


GND Series Expansion for Small Lathes

- Supplementing the holder program with the cross-section 1010, 1212 und 1616.
- The line up includes grooving widths of 1,25mm, 1,5mm, 2,0mm and 3,0mm.
- Reduces chattering and achieves high-efficiency machining
  Reducing vibration during grooving by employing the same high-rigidity holder design of the GND series.

Low Cutting Resistance Chipbreaker GF Type

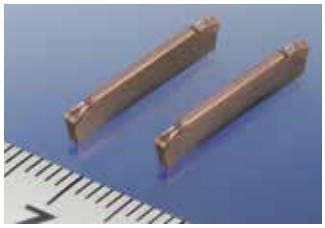
- Reduces chip control problems
  The GF type chipbreaker is added to the current wide selection of chipbreakers to improve chip control under various conditions.
- Reduces chattering during cutting
- Ideal for machining using low-powered equipment such as small lathes
- Reduces adhesion to tools and achieves long tool life in machining of stainless steel, etc.



Achieves excellent chip control and reduced cutting resistance due to the sharp cutting edge design with a 30° rake angle as well as the reduction of frictional resistance through chip control with point contact.

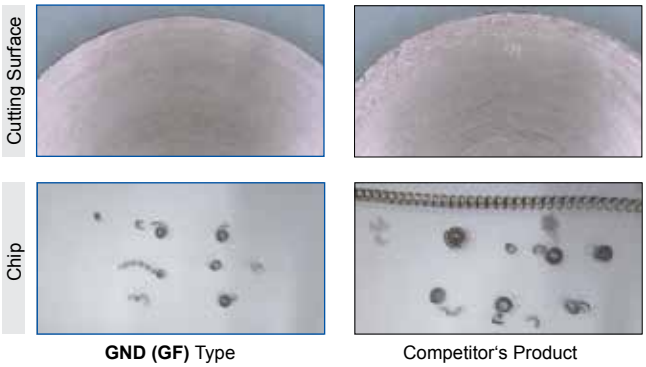
Minimum Groove Width: 1,25mm

Effective for reduction of material costs and for reduction of vibration during cutting off.



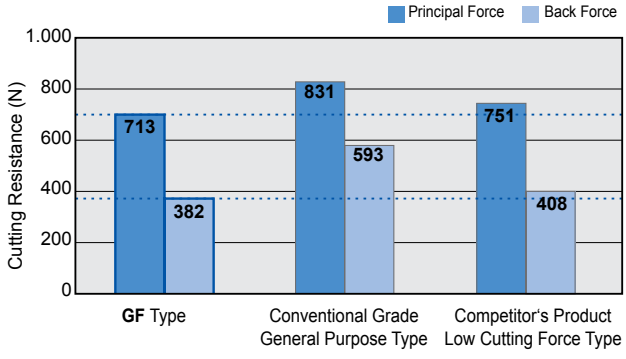
Work Material:	15CrMo5, Ø22mm
Holder:	GNDL R1212JX 1,2512
Insert:	GCM N125005GF (AC530U)
Cutting Conditions:	n=2000min^{-1}, f=0,03mm/rev, wet

Provides Excellent Surface Finish and Chip Control

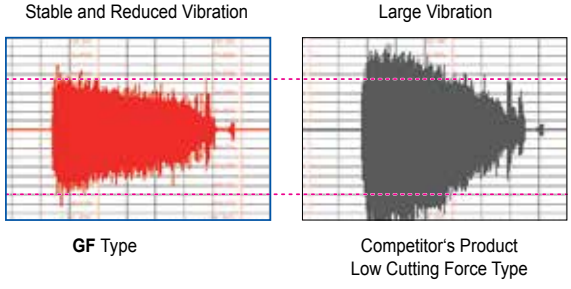


GND (GF) Type | Competitor's Product

Application Examples



Work Material:	C54, Ø30mm, cut off applications
Holder:	GNDL R2525M 320
Insert:	GCM N3002GF (AC530U)
Cutting Conditions:	v_c=80m/min, f=0,10mm/rev, wet

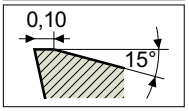
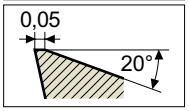
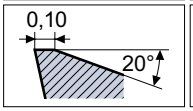
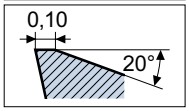
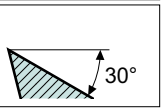
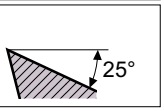
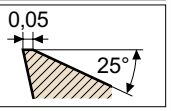


Work Material:	C54, Ø30mm, cut off applications
Holder:	GNDL R2525M 320
Insert:	GCM N3002GF (AC530U)
Cutting Conditions:	v_c=80m/min, f=0,10mm/rev, wet

GND Type

Inserts - Chipbreaker Series

Achieving stability and longer tool life. A variety of chipbreakers ensures outstanding chip control performance in many different types of applications.

Grooving / Turning		Grooving / Cut-Off				Profiling
General Type	Low Feed Type	General Type	Low Feed Type	Low Cutting ForceType	Cut-Off Type	General Type
				New		
MG Type	**ML** Type	**GG** Type	**GL** Type	**GF** Type	**CG** Type	**RG** Type
						
Cross Section of Cutting Edge	Cross Section of Cutting Edge	Cross Section of Cutting Edge	Cross Section of Cutting Edge	Cross Section of Cutting Edge	Cross Section of Cutting Edge	Cross Section of Cutting Edge
						
Grooving Width (mm)	Grooving Width (mm)	Grooving Width (mm)	Grooving Width (mm)	Grooving Width (mm)	Grooving Width (mm)	Grooving Width (mm)
1,25 1,5 2,0	1,25 1,5 2,0	1,25 1,5 2,0	1,25 1,5 2,0	1,25* 1,5* 2,0*	1,25 1,5 2,0	1,25 1,5 2,0
3,0 4,0 5,0	3,0 4,0 5,0	3,0 4,0 5,0	3,0 4,0 5,0	3,0 4,0 5,0	3,0 4,0 5,0	3,0 4,0 5,0
6,0 7,0 8,0	6,0 7,0 8,0	6,0 7,0 8,0	6,0 7,0 8,0	6,0 7,0 8,0	6,0 7,0 8,0	6,0 7,0 8,0
Grade	Grade	Grade	Grade	Grade	Grade	Grade
AC830P AC425K	AC830P AC425K	AC830P AC425K	AC830P AC425K	AC830P AC425K	AC830P AC425K	AC830P AC425K
AC520U AC530U	AC520U AC530U	AC520U AC530U	AC520U AC530U	AC520U AC530U	AC520U AC530U	AC520U AC530U

Stock

* Only AC530U is on stock

Recommended Cutting Conditions

Work Material	P Carbon Steel / Alloy Steel			M Stainless Steel			K Cast Iron			S Exotic Alloy	
Grade	**AC830P**	**AC520U**	**AC530U**	**AC830P**	**AC520U**	**AC530U**	**AC425K**	**AC520U**	**AC530U**	**AC520U**	**AC530U**
Cutting Speed (m/min)	80~200	80~200	50~200	70~150	70~150	50~150	80~200	60~200	50~200	20~80	20~60

Excellent Chip Control

Grooving



GND Type
(**GG** Type Chipbreaker)



Conventional Tool

Work Material:	15CrMo5
Holder:	GNDL R2525M 320
Insert:	GCM N3002 GG
Cutting Conditions:	v_c=100m/min, f=0,15mm/rev, a_p=12,0mm, wet

Turning



GND Type
(**ML** Type Chipbreaker)



Conventional Tool

Work Material:	15CrMo5
Holder:	GNDM R2525M 312
Insert:	GCM N3002 ML
Cutting Conditions:	v_c=100m/min, f=0,10mm/rev, a_p=0,5mm, wet

Cut-Off



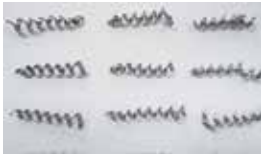
GND Type
(**CG** Type Chipbreaker)



Conventional Tool

Work Material:	X5CrMo17122 (Ø30mm)
Holder:	GNDL R2525M 220
Insert:	GCM R2002 CG 05
Cutting Conditions:	v_c=100m/min, f=0,15mm/rev, wet

Profiling



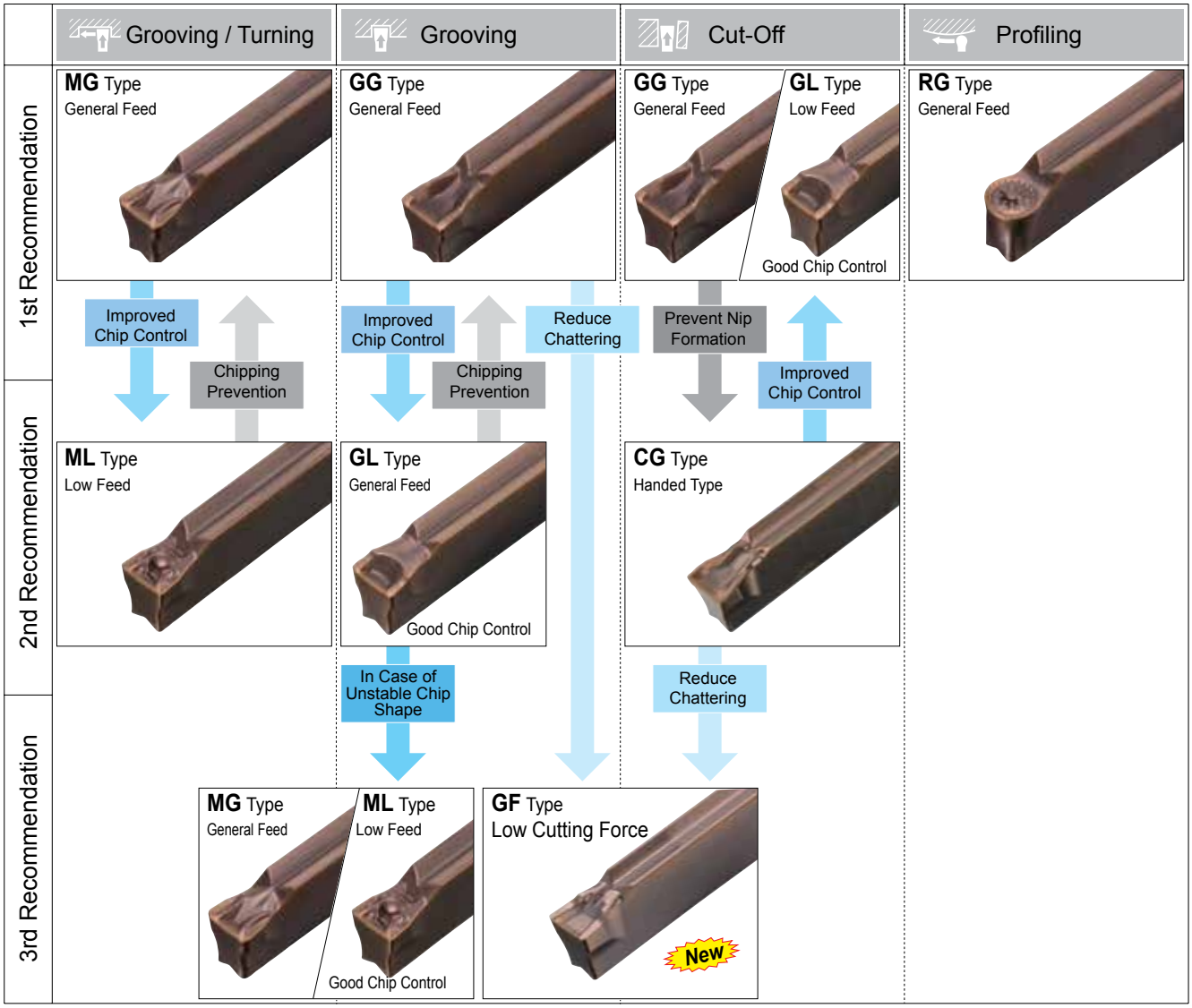
GND Type
(**RG** Type Chipbreaker)



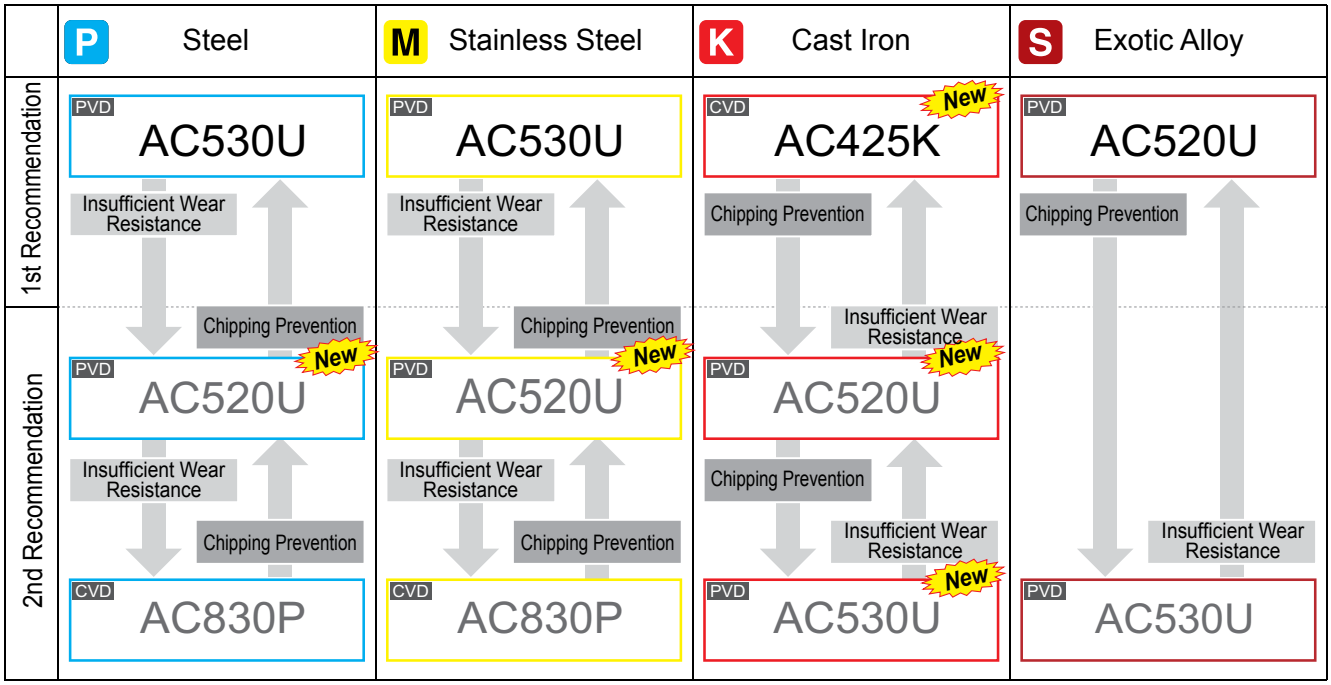
Conventional Tool

Work Material:	15CrMo5
Holder:	GNDM R2525M 312
Insert:	GCM N3015 RG
Cutting Conditions:	v_c=100m/min, f=0,15mm/rev, a_p=0,1mm, wet

■ Chipbreaker Selection



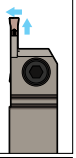
■ Grade Selection



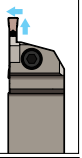
Grooving Tool Holders
GND Type

For External Machining

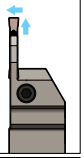
Turning / Profiling

GNDM (Small Tools) — Straight Type

Shank Size
Height x Width
16mm x 16mm
→12

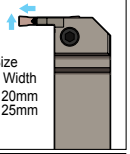
Grooving Width (mm)
1,25 1,5 2,0
3,0 4,0 5,0
6,0 7,0 8,0
Chipbreaker
MG ML GG GL GF RG CG

GNDS (Shallow Grooves) — Straight Type

Shank Size
Height x Width
20mm x 20mm
25mm x 25mm
→13

Grooving Width (mm)
1,25 1,5 2,0
3,0 4,0 5,0
6,0 7,0 8,0
Chipbreaker
MG ML GG GL GF RG CG

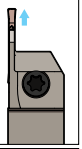
GNDM — Straight Type

Shank Size
Height x Width
20mm x 20mm
25mm x 25mm
32mm x 25mm
32mm x 32mm
→14

Grooving Width (mm)
1,25 1,5 2,0
3,0 4,0 5,0
6,0 7,0 8,0
Chipbreaker
MG ML GG GL GF RG CG

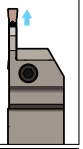
GNDMS — L Type

Shank Size
Height x Width
20mm x 20mm
25mm x 25mm
→14

Grooving Width (mm)
1,25 1,5 2,0
3,0 4,0 5,0
6,0 7,0 8,0
Chipbreaker
MG ML GG GL GF RG CG

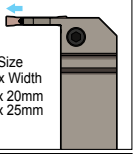
Grooving / Cut-Off

GNDL (Small Tools) — Straight Type

Shank Size
Height x Width
10mm x 10mm
12mm x 12mm
16mm x 16mm
→12

Grooving Width (mm)
1,25 1,5 2,0
3,0 4,0 5,0
6,0 7,0 8,0
Chipbreaker
MG ML GG GL GF RG CG

GNDL — Straight Type

Shank Size
Height x Width
20mm x 20mm
25mm x 25mm
32mm x 25mm
32mm x 32mm
→15

Grooving Width (mm)
1,25 1,5 2,0
3,0 4,0 5,0
6,0 7,0 8,0
Chipbreaker
MG ML GG GL GF RG CG

GNDLS — L Type

Shank Size
Height x Width
20mm x 20mm
25mm x 25mm
→15

Grooving Width (mm)
1,25 1,5 2,0
3,0 4,0 5,0
6,0 7,0 8,0
Chipbreaker
MG ML GG GL GF RG CG

■ Series for External Machining

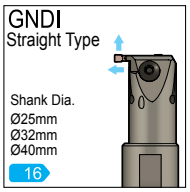
Type	Shank Size Height	Shank Size Width	Cutting Width (mm)	Series	Max. Grooving Depth (mm)	Ref. Page	Applicable Chipbreaker MG	ML	GG	GL	GF	RG	CG
Small Tools	10	10	1,25 1,5	GNDL	10	→12					◎		
			2	GNDL	10	→12			◎	◎	◎		◎
			3	GNDL	10	→12	○	○	◎	◎	◎	◎	◎
	12	12	1,25 1,5	GNDL	12	→12					◎		
			2	GNDL	12,5	→12			◎	◎	◎		◎
			3	GNDL	12,5	→12	○	○	◎	◎	◎	◎	◎
	16	16	1,5	GNDM	10	→12					◎		
			1,5	GNDL	12,5	→12					◎		
			2	GNDM	12	→12			◎	◎	◎		◎
			2	GNDL	16	→12			◎	◎	◎		◎
			3	GNDM	12	→12	◎	◎	◎	◎	◎	◎	◎
			3	GNDL	16	→12	○	○	◎	◎	◎	◎	◎
Straight Type			2	GNDS	6	→13			◎	◎	◎		◎
			2	GNDM	10	→14			◎	◎	◎		◎
			2	GNDL	20	→15			◎	◎	◎		◎
			3	GNDS	6	→13	◎	◎	◎	◎	◎	◎	◎
			3	GNDM	12	→14	◎	◎	◎	◎	◎	◎	◎
			3	GNDL	20	→15	○	○	◎	◎	◎	◎	◎
	20	20	4	GNDS	10	→13	◎	◎	◎	◎	◎	◎	◎
	25	25	4	GNDM	18	→14	◎	◎	◎	◎	◎	◎	◎
			4	GNDL	25	→15	○	○	◎	◎	◎	◎	◎
			5 6	GNDS	10	→13	◎	◎	◎	◎	◎	◎	
			5 6	GNDM	18	→14	◎	◎	◎	◎	◎	◎	
			5 6	GNDL	25	→15	○	○	◎	◎	◎	◎	
			7 8	GNDM	18	→14	◎	◎	◎	◎		◎	
			7 8	GNDL	25	→15	○	○	◎	◎		◎	
			3	GNDM	12	→14	◎	◎	◎	◎	◎	◎	◎
			3	GNDL	20	→15	○	○	◎	◎	◎	◎	◎
			4	GNDM	18	→14	◎	◎	◎	◎	◎	◎	◎
	32	25*	4	GNDL	25	→15	○	○	◎	◎	◎	◎	◎
	32	32	5 6	GNDM	18	→14	◎	◎	◎	◎	◎	◎	
			5 6	GNDL	25	→15	○	○	◎	◎	◎	◎	
			7 8	GNDM	18	→14	◎	◎	◎	◎		◎	
			7 8	GNDL	25	→15	○	○	◎	◎		◎	
L Type			2	GNDLS	16	→15			◎	◎	◎		◎
			3	GNDMS	10	→14	◎	◎	◎	◎	◎	◎	◎
	20	20	3	GNDLS	16	→15	○	○	◎	◎	◎	◎	◎
			4	GNDMS	12	→14	◎	◎	◎	◎	◎	◎	◎
			5	GNDMS	12	→14	◎	◎	◎	◎	◎	◎	
			2	GNDLS	18	→15			◎	◎	◎		◎
			3	GNDMS	12	→14	◎	◎	◎	◎	◎	◎	◎
			3	GNDLS	18	→15	○	○	◎	◎	◎	◎	◎
	25	25	4	GNDMS	14	→14	◎	◎	◎	◎	◎	◎	◎
			4	GNDLS	23	→15	○	○	◎	◎	◎	◎	◎
			5 6	GNDMS	14	→14	◎	◎	◎	◎	◎	◎	
			5 6	GNDLS	23	→15	○	○	◎	◎	◎	◎	

Stock
* Make to order item (32x25mm)
◎ 1st Recommendation
○ 2nd Recommendation

GND Type

For Internal Machining

Grooving / Turning / Copying



Grooving Width (mm)

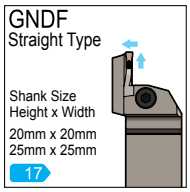
1,25	1,5	2,0
3,0	4,0	5,0
6,0	7,0	8,0

Chipbreaker

MG ML GG GL GF RG CG

For Face Machining

Grooving / Turning / Profiling



Grooving Width (mm)

1,25	1,5	2,0
3,0	4,0	5,0
6,0	7,0	8,0

Chipbreaker

MG ML GG GL GF RG CG

■ Series for Internal Machining

Type	Shank Size øDs (mm)	Cutting Width (mm) 2	3	4	5	6	Series	Max. Grooving Depth (mm)	Min. Bore (mm)	Ref. Page	Applicable Chipbreaker MG	ML	GG	GL	GF	RG	CG
Straight Type	ø32	2					GNDI	6	ø32	→ 16			○	◎	○		
	ø40	2						10	ø40				○	◎	○		
	ø25		3	4				6	ø32		○	◎	○	◎	○	○	
	ø32		3	4				10	ø40		○	◎	○	◎	○	○	
	ø40		3	4				11	ø50		○	◎	○	◎	○	○	
	ø25				5			6	ø32		○	◎	○	◎	○	○	
	ø32				5			10	ø40		○	◎	○	◎	○	○	
	ø40				5			11	ø50		○	◎	○	◎	○	○	
	ø40					6		11	ø50		○	◎	○	◎	○	○	

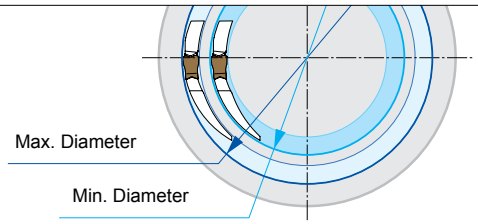
■ Series for Face Machining

Type	Shank Size Height	Width	Cutting Width (mm) 3	4	5	6	7	8	Series	Max. Grooving Depth (mm)	Bore (mm)	Ref. Page	Applicable Chipbreaker MG	ML	GG	GL	GF	RG	CG
Straight Type	20	20	3						GNDF	12	ø35 ø45	→ 17	◎	◎	◎	◎	◎	△	
	25	25	3							12	ø40 ø55		◎	◎	◎	◎	◎	△	
			3							18	ø50 ø70		◎	◎	◎	◎	◎	△	
			3							18	ø65 ø100		◎	◎	◎	◎	◎	△	
			3							18	ø90 ø150		◎	◎	◎	◎	◎	△	
			3							18	ø140 ø200		◎	◎	◎	◎	◎	△	
			3							18	ø180 ø300		◎	◎	◎	◎	◎	△	
				4					GNDF	18	ø40 ø55		◎	◎	◎	◎	◎	△	
				4						23	ø50 ø70		◎	◎	◎	◎	◎	△	
				4						23	ø65 ø90		◎	◎	◎	◎	◎	△	
				4						23	ø85 ø130		◎	◎	◎	◎	◎	△	
				4						23	ø125 ø200		◎	◎	◎	◎	◎	△	
				4						23	ø180 ø300		◎	◎	◎	◎	◎	△	
				4						23	ø280 ø1,000		◎	◎	◎	◎	◎	△	
					5				GNDF	23	ø50 ø70	→ 17	◎	◎	◎	◎	◎	△	
					5					23	ø65 ø90		◎	◎	◎	◎	◎	△	
					5					23	ø85 ø130		◎	◎	◎	◎	◎	△	
					5					23	ø125 ø200		◎	◎	◎	◎	◎	△	
					5					23	ø180 ø300		◎	◎	◎	◎	◎	△	
					5					23	ø280 ø1,000		◎	◎	◎	◎	◎	△	
						6			GNDF	23	ø50 ø75	→ 17	◎	◎	◎	◎	◎	△	
						6				23	ø70 ø110		◎	◎	◎	◎	◎	△	
						6				23	ø100 ø200		◎	◎	◎	◎	◎	△	
						6				23	ø180 ø300		◎	◎	◎	◎	◎	△	
						6				23	ø280 ø1,000		◎	◎	◎	◎	◎	△	

■ Stock ◎ 1st Recommendation ○ 2nd Recommendation △ Inserts and holders need modification in some cases

Key Points for Face Machining

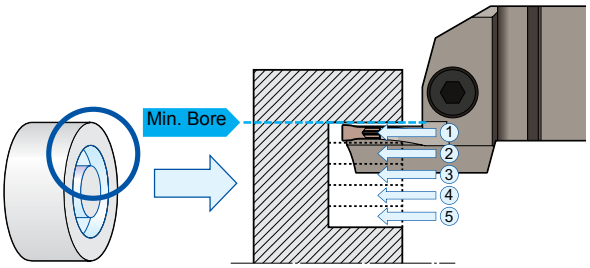
Holder Selection



Select a holder so that the outer diameter of the first groove to be machined comes within the range of maximum and minimum grooving diameter of the holder.

Precautions for Groove Expansion

Recommended Chipbreaker: **MG, ML, GG, GL, GF**

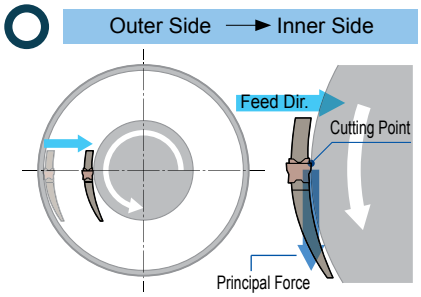


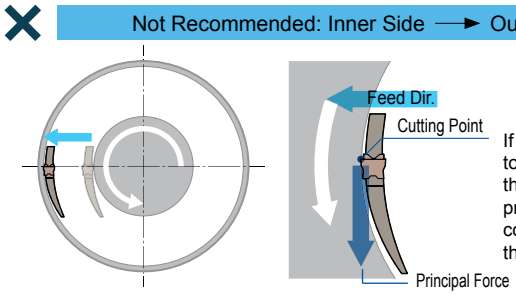
If the first groove meets the range of the effective grooving diameter during groove expansion, the grooving diameter will not be limited for the second and later passes.

Precautions for Turning

Recommended Chipbreaker: **MG, ML**

Considering the rigidity of the holder, we recommend machining from the outside to the inside.





If machining is performed toward the outside, the wall thickness remaining on the principal force side will become thinner, which reduces the rigidity of the holder.

- If the first groove meets the range of the effective grooving diameter in face turning, the grooving diameter will not be limited for the second and later passes.
- Select the chipbreaker of the lower limit side of the recommended cutting conditions and straight chips before evacuation. (In face grooving, broken chips easily get stuck in grooves, which causes problems.)
- When breaking chips, step feed is required.

Key Points for Internal Machining

Precautions for Internal Machining

Recommended Chipbreaker: **ML, GL**

If the prepared hole diameter is small, use an ML or GL low-feed chipbreaker, each of which reduces chip curl diameter, to ensure adequate chip evacuation.



GCMN 3004 MG



GCMN 3002 ML



GCMN 3002 GG



GCMN 3002 GL

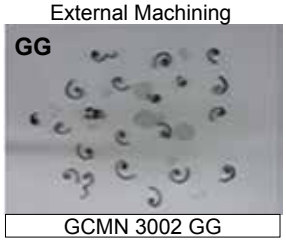
Work Material:	15CrMo5 (Ø25mm)
Holder:	GNDI R2532 T306
Insert:	GCM N300□-□□
Cutting Conditions:	v_c=100m/min, f=0,10mm/rev, a_p=3,0mm, wet

Internal Machining



GCMN 3002 GG

External Machining



GCMN 3002 GG

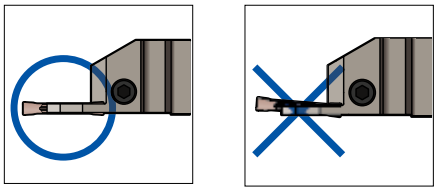
⚠ Chip shapes differ between internal and external machining even under the same cutting conditions.

Work Material:	15CrMo5
Holder:	GNDL R2525M 320
Insert:	GCM N3002 GG
Cutting Conditions:	v_c=100m/min, f=0,10mm/rev, a_p=5mm, wet

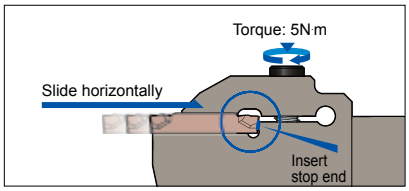
■ Notes on how to Attach Inserts

① Remove any foreign particles or oil from the insert seat before attaching the insert.
② Ensure the seat location is clean and free of damage.
③ Slide the insert level over its seat.
④ Push the insert with its opposite end (the holder side) firmly against the insert stop end.
⑤ The recommended tightening torque is 5N·m. Tightening above the recommended torque may damage the insert or the holder which could cause injury and other accidents.

③ Attach insert on the seat flat.



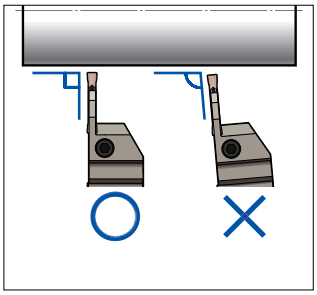
④ Push insert fully into place.



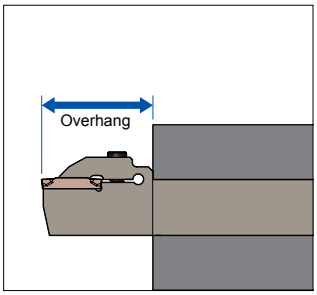
■ Notes on how to Apply Holders

① Remove any foreign particles or oil from the tool post before attaching the holder.
② Ensure the seat location is clean and free of damage.
③ Attach the holder so that the insert is perpendicular to the workpiece.
④ Set holder with shortest possible overhang.
⑤ When grooving or turning, adjust the center height of the cutting edge to as close ±0mm as possible. (Within ±0,1mm is recommended)
⑥ Incorrect center height adjustment may cause chattering. (In cut-off applications, adjust the center height of the cutting edge to a value from 0,0 to +0,2mm).
A lower center height will result in larger nip at the center.

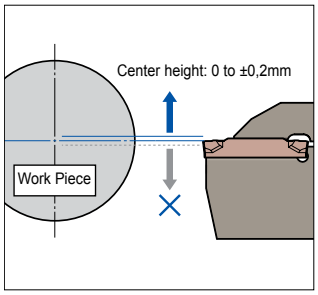
③ Attach at right angle to workpiece.



④ Set with short overhang

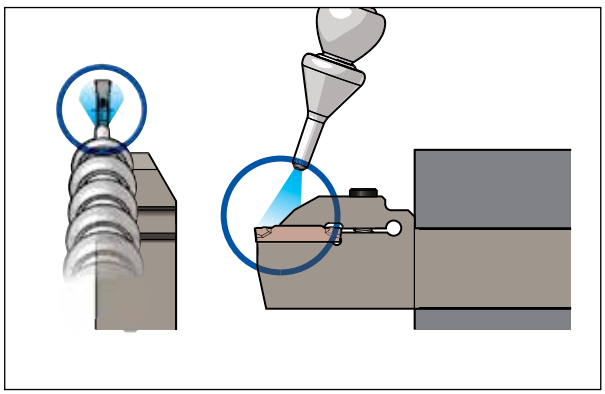


⑥ Center height adjustment in cut-off applications



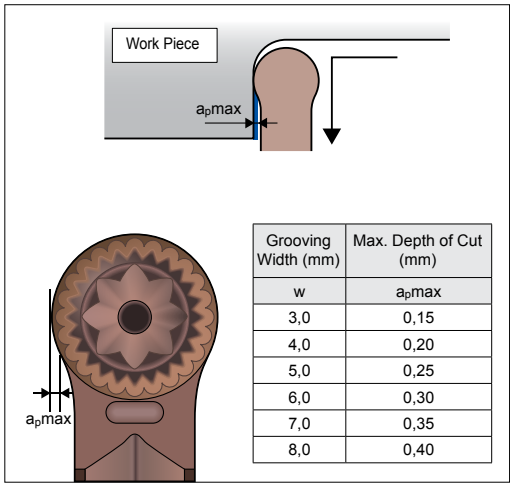
■ Notes on Setting Coolant Supply Nozzle

Set the coolant supply nozzle so that coolant can be supplied from the top of the upper clamp unit.



■ Maximum Depth of Cut

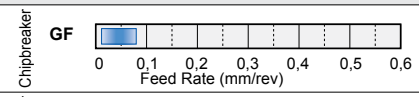
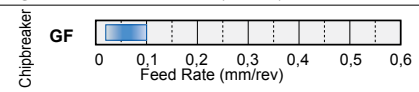
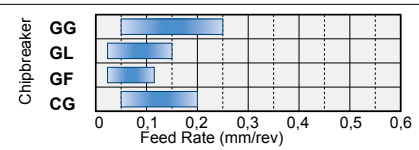
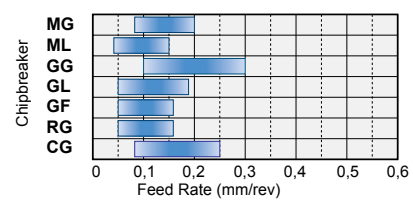
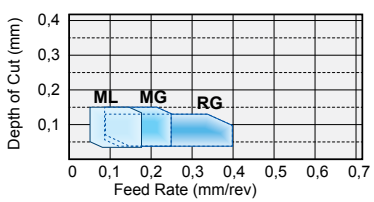
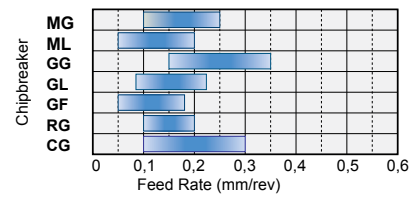
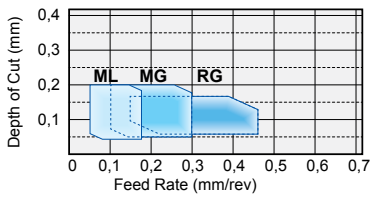
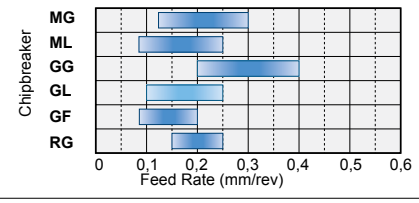
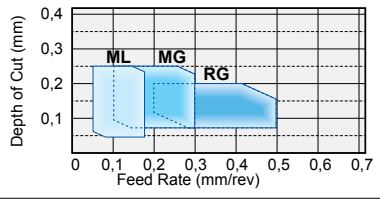
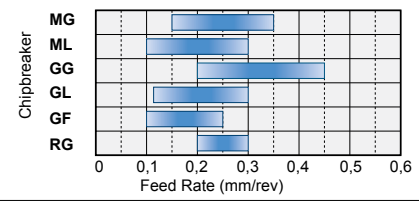
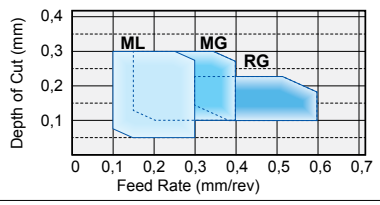
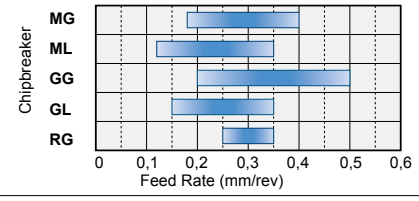
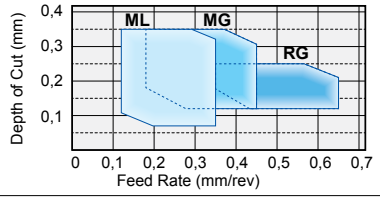
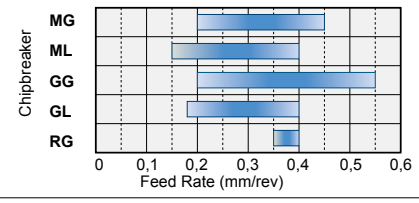
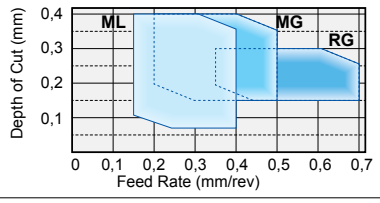
Maximum depth of cut when pulling up with RG chipbreaker



Grooving Width (mm)	Max. Depth of Cut (mm)
w	$a_p$max
3,0	0,15
4,0	0,20
5,0	0,25
6,0	0,30
7,0	0,35
8,0	0,40

GND Type

■ Chipbreaker Selection Guide

Groov. Width (mm)	Recommended Cutting Conditions		Nose Radius (mm)	Inserts
	Grooving	Turning		
1,25			0,2	GCM N12505 **GF**
1,5			0,2	GCM N150005 **GF**
2,0			0,2	GCM N2002 **GG** GCM N2002 **GL** GCM N2002 **GF** GCM R/L2002 **CG**05
3,0			0,2 0,4 1,5	GCM N3002 **ML** GCM N3002 **GG** GCM N3002 **GL** GCM N3002 **GF** GCM R/L3002 **CG**05 GCM N3004 **MG** GCM N3004 **GG** GCM N3015 **RG**
4,0			0,2 0,4 0,8 2,0	GCM N4002 **GG** GCM N4002 **GL** GCM N4002 **GF** GCM R/L4002 **CG**05 GCM N4004 **ML** GCM N4004 **GG** GGCM N 4008 **MG** GCM N4020 **RG**
5,0			0,2 0,4 0,8 2,5	GCM N5002 **GG** GCM N5002 **GL** GCM N5002 **GF** GCM N5004 **ML** GCM N5004 **GG** GCM N5008 **MG** GCM N5025 **RG**
6,0			0,2 0,4 0,8 3,0	GCM N6002 **GG** GCM N6002 **GL** GCM N6002 **GF** GCM N6004 **ML** GCM N6004 **GG** GCM N6008 **MG** GCM N6030 **RG**
7,0			0,4 0,8 3,5	GCM N7004 **ML** GCM N7004 **GG** GCM N7004 **GL** GCM N7008 **MG** GCM N7035 **RG**
8,0			0,4 0,8 4,0	GCM N8004 **ML** GCM N8004 **GG** GCM N8004 **GL** GCM N8008 **MG** GCM N8040 **RG**

■ Recommended Cutting Conditions

Work Material	P Carbon Steel / Alloy Steel			M Stainless Steel			K Cast Iron			S Exotic Alloy	
Grade	**AC830P**	**AC520U**	**AC530U**	**AC830P**	**AC520U**	**AC530U**	**AC425K**	**AC520U**	**AC530U**	**AC520U**	**AC530U**
Cutting Speed (m/min)	80 ~ 200	80 ~ 200	50 ~ 200	70 ~ 150	70 ~ 150	50 ~ 150	80 ~ 200	60 ~ 200	50 ~ 200	20 ~ 80	20 ~ 60

GND Type

■ Identification Details – Holders

G N D M R 25 25 (M) - (T) 3 12 (- 0 3 5)

① Series Symbol	② Application	③ Holder Design	④ Shank Height / Dia.	⑤ Shank Width / Work Dia.	⑥ Shank Length	⑦ Type	⑧ Insert Width	⑨ Max. Grooving Depth	Min. Machining Dia.
GND	Chart 2	Chart 3	Chart 4	Chart 5	Chart 6	Internal Grooving	Chart 7	Chart 8	(mm)

② Application

Symbol	Application	
S	External Multi-Purpose	Grooving / Cut Off / Turning / Profiling
M	External Multi-Purpose	Grooving / Cut Off / Turning / Profiling
L	External Grooving	Grooving / Cut Off
MS	External L-Styled (Side Cut) Multi-Purpose	Grooving / Turning / Profiling
LS	External L-Styled (Side Cut) Deep Grooving	Grooving
I	Internal Grooving	Grooving / Turning / Profiling
F	Face Grooving	Grooving / Turning / Profiling

③ Holder Design

Symbol	Direction
R	Right
L	Left

④ Shank Height / Diameter

Application	Symbol	Height (mm)
External/ Face Grooving (Shank Height)	10	10
	12	12
	16	16
	20	20
	25	25
Internal Grooving (Shank Diameter)	25	25
	32	32
	40	40

⑤ Shank Width / Work Dia.

Application	Symbol	Width (mm)
External/ Face Grooving (Shank Width)	10	10
	12	12
	16	16
	20	20
	25	25
Internal Grooving (Shank Diameter)	32	32
	40	40
	50	50

⑥ Shank Length

Symbol	Length (mm)
JX	120
K	125
M	150
P	170

⑧ Insert Width

Symbol	Groov. Width (mm)
1,25	1,25
1,5	1,5
2	2,0
3	3,0
4	4,0
5	5,0
6	6,0
7	7,0
8	8,0

⑨ Max. Grooving Depth

Symbol	Groov. Depth (mm)
06	6
10	10
11	11
12	12
12,5	12,5
18	18
20	20
21	21
25	25

To ensure maximum rigidity, use the multi-purpose type holder to machine the maximum grooving depth.

■ Identification Details – Inserts

G C M N 30 02 G G - (05)

① Series Symbol	② Front Relief Angle	③ Tolerance	④ Insert Design	⑤ Insert Width	⑥ Nose Radius	⑦ Chipbreaker	⑧ Front Angle
Grooving	**C**: 7°	**M** Class					**05** : 5°

④ Insert Design

Symbol	Direction
N	Neutral
R	Right Hand
L	Left Hand

⑤ Insert Width

Symbol	Groov. Width (mm)
125	1,25
150	1,5
20	2,0
30	3,0
40	4,0
50	5,0
60	6,0
70	7,0
80	8,0

⑥ Nose Radius

Symbol	R (mm)
005	0,05
02	0,2
04	0,4
08	0,8
15	1,5
20	2,0
25	2,5
30	3,0

⑦ Chipbreaker

Symbol	Application
MG	Multi-Purpose: General Feed
ML	Multi-Purpose: Low Feed
GG	Grooving: General Feed
GL	Grooving: Low Feed
GF	Grooving: Low Cutting Forces
CG	Cut-Off
RG	Copying: General Feed

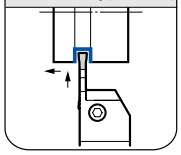
GND Type

New

External Multi-Purpose Small Tools Type (Grooving, Turning, Profiling)

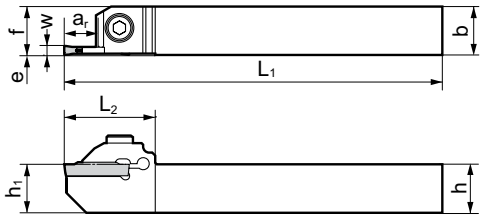
GNDM

External Grooving (Small Tools)



External

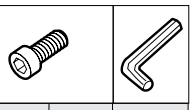
Cut-Off



Use the multi-purpose profiling insert for turning (wide grooves).

Above figures show right hand tools.

Spare Parts



Holders

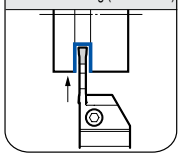
Cat. No.	Stock		Dimensions (mm)							Grooving Width (mm)	Max. Groov. Depth (mm)	Max. Cutt-Off Dia (mm)	Applicable Insert	Cap Screw	Torque (N·m)	Span-ner
	R	L	*h*	*b*	L_1	*f*	h_1	L_2	*e*	*w*	a_r					
GNDM R/L 1616 JX 1.510	●	●	16	16	120	(16)	16	26	0	**1,5**	**10**	**20**	GCM N150005 GF	BX0515	4,0	LH040
GNDM R/L 1616 JX 212	●	●	16	16	120	(16)	16	30	0	**2,0**	**12**	**24**	GCM □20○○-□□			
GNDM R/L 1616 JX 312	●	●	16	16	120	(16)	16	30	0	**3,0**	**12**	**24**	GCM □30○○-□□			

Select holders and inserts with the same grooving width (*w*).

External Grooving / Cut-Off Small Tools

GNDL

External Grooving (Small Tools)



External

Cut-Off

Fig. 1

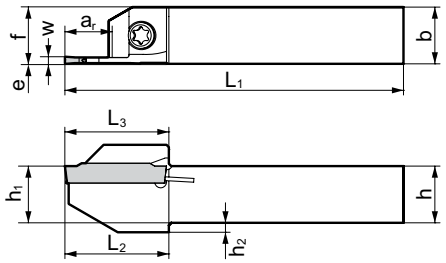
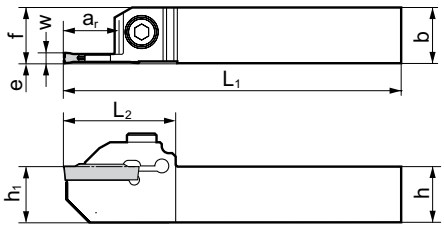
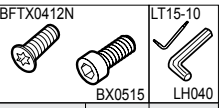


Fig. 2



Above figures show right hand tools.

Spare Parts



Holders

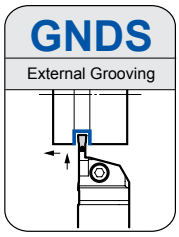
Cat. No.	Stock		Dimensions (mm)									Grooving Width (mm)	Max. Groov. Depth (mm)	Max. Cutt-Off Dia (mm)	Fig.	Applicable Insert	Cap Screw	Torque (N·m)	Span-ner
	R	L	*h*	*b*	L_1	*f*	h_1	h_2	L_2	L_3	*e*	*w*	a_r						
GNDL R/L 1010 JX 1.2510	●	●	10	10	120	(10)	10	2,0	18	18,3	0	**1,25**	**10,0**	**20**		GCM N125005 GF			
GNDL R/L 1010 JX 1.510	●	●	10	10	120	(10)	10	2,0	18	18,3	0	**1,50**	**10,0**	**20**		GCM N150005 GF			
GNDL R/L 1010 JX 210	●	●	10	10	120	(10)	10	2,0	22	22,3	0	**2,00**	**10,0**	**20**	1	GCM □20○○-□□	BFTX0412N	**3,0**	LT15-10
GNDL R/L 1010 JX 310	●	●	10	10	120	(10)	10	2,0	22	22,3	0	**3,00**	**10,0**	**20**		GCM □30○○-□□			
GNDL R/L 1212 JX 1.2512	●	●	12	12	120	(12)	12	2,0	19	19,3	0	**1,25**	12,0	**24**		GCM N125005 GF			
GNDL R/L 1212 JX 1.512	●	●	12	12	120	(12)	12	2,0	19	19,3	0	**1,50**	**12,0**	**24**		GCM N150005 GF			
GNDL R/L 1212 JX 212.5	●	●	12	12	120	(12)	12	2,0	22	22,3	0	**2,00**	**12,5**	**25**	1	GCM □20○○-□□	BFTX0412N	**3,0**	LT15-10
GNDL R/L 1212 JX 312.5	●	●	12	12	120	(12)	12	2,0	22	22,3	0	**3,00**	**12,5**	**25**		GCM □30○○-□□			
GNDL R/L 1616 JX 1.512.5	●	●	16	16	120	(16)	16		28		0	**1,50**	**12,5**	**25**		GCM N150005 GF			
GNDL R/L 1616 JX 216	●	●	16	16	120	(16)	16		32		0	**2,00**	**16,0**	**32**	2	GCM □20○○-□□	BFTX0515	**4,0**	LH040
GNDL R/L 1616 JX 316	●	●	16	16	120	(16)	16		32		0	**3,00**	**16,0**	**32**		GCM □30○○-□□			

Select holders and inserts with the same grooving width (*w*).

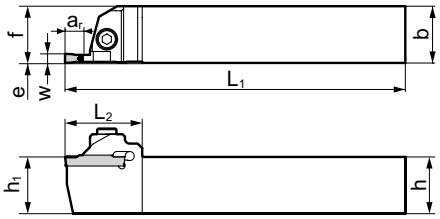
● = Euro stock

New

External Multi-Purpose Shallow Grooves Type (Grooving, Turning, Profiling)



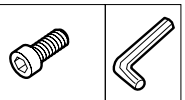




Use the multi-purpose profiling insert for turning (wide grooves).

Above figures show right hand tools.

■ Spare Parts



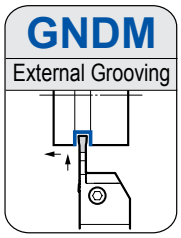
■ Holders

Cat. No.	Stock		Dimensions (mm)						Grooving Width (mm)	Max. Groov. Depth (mm)	Applicable Insert	Cap Screw	Torque (N·m)	Spanner
	R	L	*h*	*b*	L_1	*f*	h_1	L_2	*w*	a_r				
GNDS R/L 2020 K 206	●	●	20	20	125	20	20	30	**2,0**	**6**	GCM □20○○-□□	BX0520	5,0	LH040
GNDS R/L 2020 K 306	●	●	20	20	125	20	20	30	**3,0**	**6**	GCM □30○○-□□			
GNDS R/L 2020 K 410	●	●	20	20	125	20	20	34	**4,0**	**10**	GCM □40○○-□□			
GNDS R/L 2020 K 510	●	●	20	20	125	20	20	34	**5,0**	**10**	GCM N50○○-□□			
GNDS R/L 2020 K 610	●	●	20	20	125	20	20	34	**6,0**	**10**	GCM N60○○-□□			
GNDS R/L 2525 M 206	●	●	25	25	150	25	25	30	**2,0**	**6**	GCM □20○○-□□			
GNDS R/L 2525 M 306	●	●	25	25	150	25	25	30	**3,0**	**6**	GCM □30○○-□□			
GNDS R/L 2525 M 410	●	●	25	25	150	25	25	34	**4,0**	**10**	GCM □40○○-□□			
GNDS R/L 2525 M 510	●	●	25	25	150	25	25	34	**5,0**	**10**	GCM N50○○-□□			
GNDS R/L 2525 M 610	●	●	25	25	150	25	25	34	**6,0**	**10**	GCM N60○○-□□			

Select holders and inserts with the same grooving width (*w*).

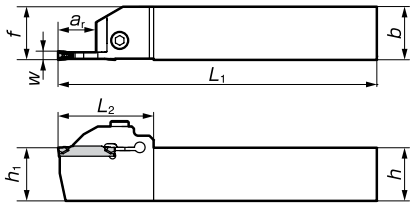
GND Type

External Multi-Purpose Type (Grooving, Turning, Profiling)



External

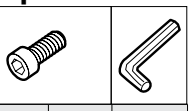
Cut-Off



Use for multi-purpose or profiling insert for turning (wide grooves).

Above figures show right hand tools.

■ Spare Parts

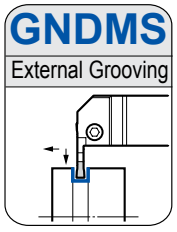


■ Holders

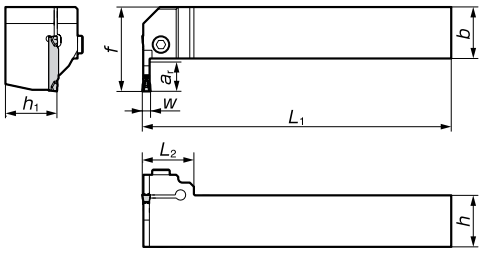
Cat. No.	Stock		Dimensions (mm)						Grooving Width (mm)	Max. Groov. Depth (mm)	Max. Cutt-Off Dia (mm)	Applicable Insert	Cap Screw	Torque (N·m)	Spanner
	R	L	*h*	*b*	L_1	*f*	h_1	L_2	*w*	a_r					
GNDM R/L 2020 K 210	●	●	20	20	125	20	20	33,6	**2,0**	**10**	**20**	GCM □20○○-□□	BX0520	5,0	LH040
GNDM R/L 2020 K 312	●	●	20	20	125	20	20	36,6	**3,0**	**12**	**24**	GCM □30○○-□□			
GNDM R/L 2020 K 418	●	●	20	20	125	20	20	45,0	**4,0**	**18**	**36**	GCM □40○○-□□			
GNDM R/L 2020 K 518	●	●	20	20	125	20	20	45,0	**5,0**	**18**	**36**	GCM N50○○-□□			
GNDM R/L 2020 K 618	●	●	20	20	125	20	20	45,0	**6,0**	**18**	**36**	GCM N60○○-□□			
GNDM R/L 2525 M 210	●	●	25	25	150	25	25	33,6	**2,0**	**10**	**20**	GCM N20○○-□□			
GNDM R/L 2525 M 312	●	●	25	25	150	25	25	36,6	**3,0**	**12**	**24**	GCM □30○○-□□			
GNDM R/L 2525 M 418	●	●	25	25	150	25	25	45,0	**4,0**	**18**	**36**	GCM □40○○-□□			
GNDM R/L 2525 M 518	●	●	25	25	150	25	25	45,0	**5,0**	**18**	**36**	GCM N50○○-□□			
GNDM R/L 2525 M 618	●	●	25	25	150	25	25	45,0	**6,0**	**18**	**36**	GCM N60○○-□□			
GNDM R/L 3225 P 312			32	25	170	25	32	36,6	**3,0**	**12**	**24**	GCM □30○○-□□			
GNDM R/L 3225 P 418			32	25	170	25	32	45,0	**4,0**	**18**	**36**	GCM □40○○-□□			
GNDM R/L 3225 P 518			32	25	170	25	32	45,0	**5,0**	**18**	**36**	GCM N50○○-□□			
GNDM R/L 3225 P 618			32	25	170	25	32	45,0	**6,0**	**18**	**36**	GCM N60○○-□□			
GNDM R/L 3225 P 718			32	25	170	25	32	50,0	**7,0**	**18**	**36**	GCM N70○○-□□	BX0620	6,0	LH050
GNDM R/L 3225 P 818			32	25	170	25	32	50,0	**8,0**	**18**	**36**	GCM N80○○-□□			
GNDM R/L 3232 P 312	●	●	32	32	170	32	32	36,6	**3,0**	**12**	**24**	GCM □30○○-□□			
GNDM R/L 3232 P 418	●	●	32	32	170	32	32	45,0	**4,0**	**18**	**36**	GCM □40○○-□□			
GNDM R/L 3232 P 518	●	●	32	32	170	32	32	45,0	**5,0**	**18**	**36**	GCM N50○○-□□			
GNDM R/L 3232 P 618	●	●	32	32	170	32	32	45,0	**6,0**	**18**	**36**	GCM N60○○-□□			
GNDM R/L 3232 P 718	●	●	32	32	170	32	32	50,0	**7,0**	**18**	**36**	GCM N70○○-□□			
GNDM R/L 3232 P 818	●	●	32	32	170	32	32	50,0	**8,0**	**18**	**36**	GCM N80○○-□□			

Select holders and inserts with the same grooving width (*w*).

External L-Styled (Side Cut) Multi-Purpose Type (Grooving, Turning, Profiling)



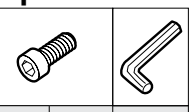
External



Use for multi-purpose or profiling insert for turning (wide grooves).

Above figures show right hand tools.

■ Spare Parts



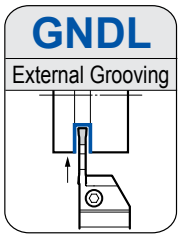
■ Holders

Cat. No.	Stock		Dimensions (mm)						Grooving Width (mm)	Max. Groov. Depth (mm)	Applicable Insert	Cap Screw	Torque (N·m)	Spanner
	R	L	*h*	*b*	L_1	*f*	h_1	L_2	*w*	a_r				
GNDMS R/L 2020 K 310	●	●	20	20	125	32	20	25	**3,0**	**10**	GCM □30○○-□□	BX0520	5,0	LH040
GNDMS R/L 2020 K 412	●	●	20	20	125	34	20	25	**4,0**	**12**	GCM □40○○-□□			
GNDMS R/L 2020 K 512	●	●	20	20	125	34	20	25	**5,0**	**12**	GCM N50○○-□□			
GNDMS R/L 2525 M 312	●	●	25	25	150	39	25	25	**3,0**	**12**	GCM □30○○-□□			
GNDMS R/L 2525 M 414	●	●	25	25	150	41	25	25	**4,0**	**14**	GCM □40○○-□□			
GNDMS R/L 2525 M 514	●	●	25	25	150	41	25	25	**5,0**	**14**	GCM N50○○-□□			
GNDMS R/L 2525 M 614	●	●	25	25	150	41	25	25	**6,0**	**14**	GCM N60○○-□□			

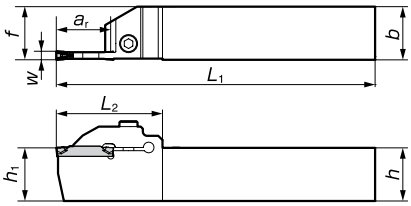
Select holders and inserts with the same grooving width (*w*).

● = Euro stock

External Deep Grooving and Cut-Off

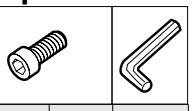






Above figures show right hand tools.

Spare Parts

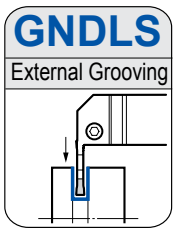


Holders

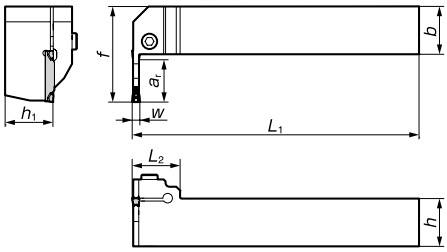
Cat. No.	Stock		Dimensions (mm)						Grooving Width (mm)	Max. Groov. Depth (mm)	Max. Cutt-Off Dia (mm)	Applicable Insert	Cap Screw	Torque (N·m)	Spanner
	R	L	*h*	*b*	L_1	*f*	h_1	L_2	*w*	a_r					
GNDL R/L 2020 K 220	●	●	20	20	125	20	20	44,5	**2,0**	**20**	**40**	GCM □20○○-□□	BX0520	5,0	LH040
GNDL R/L 2020 K 320	●	●	20	20	125	20	20	44,5	**3,0**	**20**(18)	**40**	GCM □30○○-□□			
GNDL R/L 2020 K 425	●	●	20	20	125	20	20	50,0	**4,0**	**25**(23)	**50**	GCM □40○○-□□			
GNDL R/L 2020 K 525	●	●	20	20	125	20	20	50,0	**5,0**	**25**(23)	**50**	GCM N50○○-□□			
GNDL R/L 2020 K 625	●	●	20	20	125	20	20	50,0	**6,0**	**25**(23)	**50**	GCM N60○○-□□			
GNDL R/L 2525 M 220	●	●	25	25	150	25	25	44,5	**2,0**	**20**	**40**	GCM □20○○-□□			
GNDL R/L 2525 M 320	●	●	25	25	150	25	25	44,5	**3,0**	**20**(18)	**40**	GCM □30○○-□□			
GNDL R/L 2525 M 425	●	●	25	25	150	25	25	50,0	**4,0**	**25**(23)	**50**	GCM □40○○-□□			
GNDL R/L 2525 M 525	●	●	25	25	150	25	25	50,0	**5,0**	**25**(23)	**50**	GCM N50○○-□□			
GNDL R/L 2525 M 625	●	●	25	25	150	25	25	50,0	**6,0**	**25**(23)	**50**	GCM N60○○-□□			
GNDL R/L 3225 P 320			32	25	170	25	32	44,5	**3,0**	**20**(18)	**40**	GCM □30○○-□□			
GNDL R/L 3225 P 425			32	25	170	25	32	50,0	**4,0**	**25**(23)	**50**	GCM □40○○-□□			
GNDL R/L 3225 P 525			32	25	170	25	32	50,0	**5,0**	**25**(23)	**50**	GCM N50○○-□□			
GNDL R/L 3225 P 625			32	25	170	25	32	50,0	**6,0**	**25**(23)	**50**	GCM N60○○-□□			
GNDL R/L 3225 P 725			32	25	170	25	32	50,0	**7,0**	**25**(23)	**50**	GCM N70○○-□□	BX0520	6,0	LH050
GNDL R/L 3225 P 825			32	25	170	25	32	50,0	**8,0**	**25**(23)	**50**	GCM N80○○-□□			
GNDL R/L 3232 P 320	●	●	32	32	170	32	32	44,5	**3,0**	**20**(18)	**40**	GCM □30○○-□□			
GNDL R/L 3232 P 425	●	●	32	32	170	32	32	50,0	**4,0**	**25**(23)	**50**	GCM □40○○-□□			
GNDL R/L 3232 P 525	●	●	32	32	170	32	32	50,0	**5,0**	**25**(23)	**50**	GCM N50○○-□□			
GNDL R/L 3232 P 625	●	●	32	32	170	32	32	50,0	**6,0**	**25**(23)	**50**	GCM N60○○-□□	BX0620	6,0	LH050
GNDL R/L 3232 P 725	●	●	32	32	170	32	32	50,0	**7,0**	**25**(23)	**50**	GCM N70○○-□□			
GNDL R/L 3232 P 825	●	●	32	32	170	32	32	50,0	**8,0**	**25**(23)	**50**	GCM N80○○-□□			

Select holders and inserts with the same grooving width (*w*). Dimensions in parentheses are for applications that use copying inserts (RG type breakers).

External L-Styled (Side Cut) Grooving

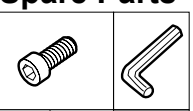






Above figures show right hand tools.

Spare Parts



Holders

Cat. No.	Stock		Dimensions (mm)						Grooving Width (mm)	Max. Groov. Depth (mm)	Applicable Insert	Cap Screw	Torque (N·m)	Spanner
	R	L	*h*	*b*	L_1	*f*	h_1	L_2	*w*	a_r				
GNDLS R/L 2020 K 216	●	●	20	20	125	38	20	25	**2,0**	**16**	GCM □20○○-□□	BX0520	5,0	LH040
GNDLS R/L 2020 K 316	●	●	20	20	125	38	20	25	**3,0**	**16**	GCM □30○○-□□			
GNDLS R/L 2525 M 218	●	●	25	25	150	45	25	25	**2,0**	**18**	GCM □20○○-□□			
GNDLS R/L 2525 M 318	●	●	25	25	150	45	25	25	**3,0**	**18**	GCM □30○○-□□			
GNDLS R/L 2525 M 423	●	●	25	25	150	50	25	25	**4,0**	**23**	GCM □40○○-□□			
GNDLS R/L 2525 M 523	●	●	25	25	150	50	25	25	**5,0**	**23**	GCM N50○○-□□			
GNDLS R/L 2525 M 623	●	●	25	25	150	50	25	25	**6,0**	**23**	GCM N60○○-□□			

Select holders and inserts with the same grooving width (*w*).

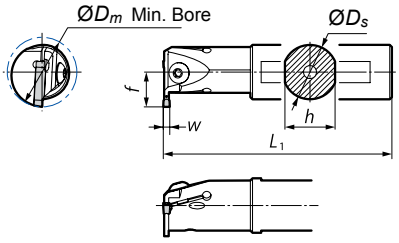
GND Type

Internal Grooving



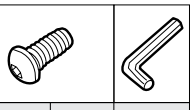


Use for multi-purpose or profiling insert for turning (wide grooves).



Above figures show right hand tools.

■ Spare Parts



■ Holders

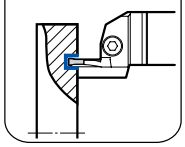
Cat. No.	Stock		Dimensions (mm)				Min. Bore (mm)	Groov. Width (mm)	Max. Groov. Depth (mm)	Applicable Insert	Cap Screw	Tor-que (N·m)	Spanner
	R	L	$ØD_s$	h	L_1	f	$ØD_m$	w	a_r				
GNDI R/L 2532 T 206	●	●	25	23	200	16	32	**2,0**	**6**	GCM N20○○-□□	BH0516	5,0	LH030
GNDI R/L 3240 T 210	●	●	32	30	250	26	40	**2,0**	**10**	GCM N20○○-□□	BH0616	6,0	LH040
GNDI R/L 2532 T 306	●	●	25	23	200	16	32	**3,0**	**6**	GCM N30○○-□□	BH0516	5,0	LH030
GNDI R/L 3240 T 310	●	●	32	30	250	26	40	**3,0**	**10**	GCM N30○○-□□	BH0616	6,0	LH040
GNDI R/L 4050 T 311	●	●	40	38	300	31	50	**3,0**	**11**	GCM N30○○-□□			
GNDI R/L 2532 T 406	●	●	25	23	200	19	32	**4,0**	**6**	GCM N40○○-□□	BH0516	5,0	LH030
GNDI R/L 3240 T 410	●	●	32	30	250	26	40	**4,0**	**10**	GCM N40○○-□□	BH0616	6,0	LH040
GNDI R/L 4050 T 411	●	●	40	38	300	31	50	**4,0**	**11**	GCM N40○○-□□			
GNDI R/L 2532 T 506	●	●	25	23	200	19	32	**5,0**	**6**	GCM N50○○-□□	BH0516	5,0	LH030
GNDI R/L 3240 T 510	●	●	32	30	250	26	40	**5,0**	**10**	GCM N50○○-□□	BH0616	6,0	LH040
GNDI R/L 4050 T 511	●	●	40	38	300	31	50	**5,0**	**11**	GCM N50○○-□□			
GNDI R/L 4050 T 611	●	●	40	38	300	31	50	**6,0**	**11**	GCM N60○○-□□	BH0616	6,0	LH040

Select holders and inserts with the same grooving width (*w*).

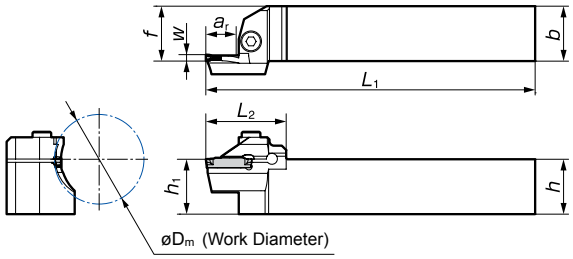
● = Euro stock

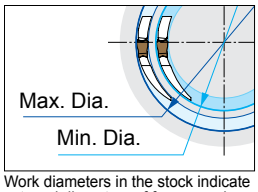
Face Grooving

GNDF
Face Grooving



Face



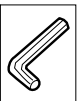


Work diameters in the stock indicate external diameters of face grooving.

Use for multi-purpose or profiling insert for turning (wide grooves).

Above figures show right hand tools.

Spare Parts

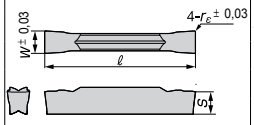
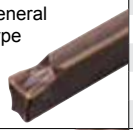
Holders

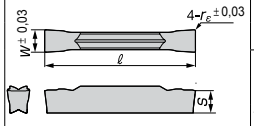
Cat. No.	Stock		Dimensions (mm)						Work Dia. (mm)	Groov. Width (mm)	Max. Cut-off Dia. (mm)	Applicable Insert	Cap Screw	Tor-que (N·m)	Spanner
	R	L	*h*	*b*	L_1	*f*	h_1	L_2	ØDm	*w*	a_r				
GNDF R/L 2020 K 312-035	●	●	20	20	125	20	20	35,6	35 ~ 45	**3,0**	**12**	GCM N30○○-□□	BX0520	5,0	LH040
GNDF R/L 2020 K 312-040	●	●	20	20	125	20	20	35,6	40 ~ 55	**3,0**	**12**				
GNDF R/L 2020 K 318-050	●	●	20	20	125	20	20	41,6	50 ~ 70	**3,0**	**18**				
GNDF R/L 2020 K 318-065	●	●	20	20	125	20	20	41,6	65 ~ 100	**3,0**	**18**				
GNDF R/L 2020 K 318-090	●	●	20	20	125	20	20	41,6	90 ~ 150	**3,0**	**18**				
GNDF R/L 2020 K 318-140	●	●	20	20	125	20	20	41,6	140 ~ 200	**3,0**	**18**				
GNDF R/L 2020 K 318-180	●	●	20	20	125	20	20	41,6	180 ~ 300	**3,0**	**18**				
GNDF R/L 2020 K 418-040	●	●	20	20	125	20	20	41,6	40 ~ 55	**4,0**	**18**	GCM N40○○-□□	BX0520	5,0	LH040
GNDF R/L 2020 K 423-050	●	●	20	20	125	20	20	46,6	50 ~ 70	**4,0**	**23**				
GNDF R/L 2020 K 423-065	●	●	20	20	125	20	20	46,6	65 ~ 90	**4,0**	**23**				
GNDF R/L 2020 K 423-085	●	●	20	20	125	20	20	46,6	85 ~ 130	**4,0**	**23**				
GNDF R/L 2020 K 423-125	●	●	20	20	125	20	20	46,6	125 ~ 200	**4,0**	**23**				
GNDF R/L 2020 K 423-180	●	●	20	20	125	20	20	46,6	180 ~ 300	**4,0**	**23**				
GNDF R/L 2020 K 423-280	●	●	20	20	125	20	20	46,6	280 ~ 1000	**4,0**	**23**				
GNDF R/L 2020 K 523-050	●	●	20	20	125	20	20	46,6	50 ~ 70	**5,0**	**23**	GCM N50○○-□□	BX0520	5,0	LH040
GNDF R/L 2020 K 523-065	●	●	20	20	125	20	20	46,6	65 ~ 90	**5,0**	**23**				
GNDF R/L 2020 K 523-085	●	●	20	20	125	20	20	46,6	85 ~ 130	**5,0**	**23**				
GNDF R/L 2020 K 523-125	●	●	20	20	125	20	20	46,6	125 ~ 200	**5,0**	**23**				
GNDF R/L 2020 K 523-180	●	●	20	20	125	20	20	46,6	180 ~ 300	**5,0**	**23**				
GNDF R/L 2020 K 523-280	●	●	20	20	125	20	20	46,6	280 ~ 1000	**5,0**	**23**				
GNDF R/L 2020 K 623-050	●	●	20	20	125	20	20	46,6	50 ~ 75	**6,0**	**23**	GCM N60○○-□□	BX0520	5,0	LH040
GNDF R/L 2020 K 623-070	●	●	20	20	125	20	20	46,6	70 ~ 110	**6,0**	**23**				
GNDF R/L 2020 K 623-100	●	●	20	20	125	20	20	46,6	100 ~ 200	**6,0**	**23**				
GNDF R/L 2020 K 623-180	●	●	20	20	125	20	20	46,6	180 ~ 300	**6,0**	**23**				
GNDF R/L 2020 K 623-280	●	●	20	20	125	20	20	46,6	280 ~ 1000	**6,0**	**23**				
GNDF R/L 2525 M 312-035	●	●	25	25	150	25	25	35,6	35 ~ 45	**3,0**	**12**	GCM N30○○-□□	BX0520	5,0	LH040
GNDF R/L 2525 M 312-040	●	●	25	25	150	25	25	35,6	40 ~ 55	**3,0**	**12**				
GNDF R/L 2525 M 318-050	●	●	25	25	150	25	25	41,6	50 ~ 70	**3,0**	**18**				
GNDF R/L 2525 M 318-065	●	●	25	25	150	25	25	41,6	65 ~ 100	**3,0**	**18**				
GNDF R/L 2525 M 318-090	●	●	25	25	150	25	25	41,6	90 ~ 150	**3,0**	**18**				
GNDF R/L 2525 M 318-140	●	●	25	25	150	25	25	41,6	140 ~ 200	**3,0**	**18**				
GNDF R/L 2525 M 318-180	●	●	25	25	150	25	25	41,6	180 ~ 300	**3,0**	**18**				
GNDF R/L 2525 M 418-040	●	●	25	25	150	25	25	41,6	40 ~ 55	**4,0**	**18**	GCM N40○○-□□	BX0520	5,0	LH040
GNDF R/L 2525 M 423-050	●	●	25	25	150	25	25	46,6	50 ~ 70	**4,0**	**23**				
GNDF R/L 2525 M 423-065	●	●	25	25	150	25	25	46,6	65 ~ 90	**4,0**	**23**				
GNDF R/L 2525 M 423-085	●	●	25	25	150	25	25	46,6	85 ~ 130	**4,0**	**23**				
GNDF R/L 2525 M 423-125	●	●	25	25	150	25	25	46,6	125 ~ 200	**4,0**	**23**				
GNDF R/L 2525 M 423-180	●	●	25	25	150	25	25	46,6	180 ~ 300	**4,0**	**23**				
GNDF R/L 2525 M 423-280	●	●	25	25	150	25	25	46,6	280 ~ 1000	**4,0**	**23**				
GNDF R/L 2525 M 523-050	●	●	25	25	150	25	25	46,6	50 ~ 70	**5,0**	**23**	GCM N50○○-□□	BX0520	5,0	LH040
GNDF R/L 2525 M 523-065	●	●	25	25	150	25	25	46,6	65 ~ 90	**5,0**	**23**				
GNDF R/L 2525 M 523-085	●	●	25	25	150	25	25	46,6	85 ~ 130	**5,0**	**23**				
GNDF R/L 2525 M 523-125	●	●	25	25	150	25	25	46,6	125 ~ 200	**5,0**	**23**				
GNDF R/L 2525 M 523-180	●	●	25	25	150	25	25	46,6	180 ~ 300	**5,0**	**23**				
GNDF R/L 2525 M 523-280	●	●	25	25	150	25	25	46,6	280 ~ 1000	**5,0**	**23**				
GNDF R/L 2525 M 623-050	●	●	25	25	150	25	25	46,6	50 ~ 75	**6,0**	**23**	GCM N60○○-□□	BX0520	5,0	LH040
GNDF R/L 2525 M 623-070	●	●	25	25	150	25	25	46,6	70 ~ 110	**6,0**	**23**				
GNDF R/L 2525 M 623-100	●	●	25	25	150	25	25	46,6	100 ~ 200	**6,0**	**23**				
GNDF R/L 2525 M 623-180	●	●	25	25	150	25	25	46,6	180 ~ 300	**6,0**	**23**				
GNDF R/L 2525 M 623-280	●	●	25	25	150	25	25	46,6	280 ~ 1000	**6,0**	**23**				

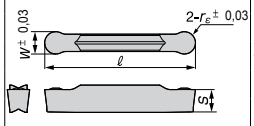
Select holders and inserts with the same grooving width (*w*).

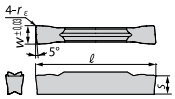
GND Type

■ Inserts – GCM Type

Grooving / Turning	Shape	Cat. No.	Coated Carbide				Dimensions (mm)					Pcs./ Pack.	Applicable Holder						
			AC830P	AC425K	AC520U	AC530U	W Grooving Width	W Tolerance	r_ε	ℓ	s		GND S	GND M	GND MS	GND L	GND LS	GND I	GND F
Fig.1 	**MG** Breaker General Type 	GCM N3004 MG	●	●	❍	●	**3,0**	±0,03	0,4	21,1	3,8	5	■	■	■	■	■	■	■
		GCM N4008 MG	●	●	❍	●	**4,0**	±0,03	0,8	26,4	4,0		■	■	■	■	■	■	■
		GCM N5008 MG	●	●	❍	●	**5,0**	±0,03	0,8	26,4	4,1		■	■	■	■	■	■	■
		GCM N6008 MG	●	●	❍	●	**6,0**	±0,03	0,8	26,4	4,5		■	■	■	■	■	■	■
		GCM N7008 MG	●	●	❍	●	**7,0**	±0,03	0,8	28,75	5,5			■		■			
		GCM N8008 MG	●	●	❍	●	**8,0**	±0,03	0,8	28,75	6,0			■		■			
	ML  w = 4,0mm w = 5,0mm Low Feed Type	GCM N3002 ML	●	●	❍	●	**3,0**	±0,03	0,2	21,1	3,8	5	■	■	■	■	■	■	■
		GCM N4004 ML	●	●	❍	●	**4,0**	±0,03	0,4	26,4	4,0		■	■	■	■	■	■	■
		GCM N5004 ML	●	●	❍	●	**5,0**	±0,03	0,4	26,4	4,1		■	■	■	■	■	■	■
		GCM N6004 ML	●	●	❍	●	**6,0**	±0,03	0,4	26,4	4,5		■	■	■	■	■	■	■
		GCM N7004 ML	●	●	❍	●	**7,0**	±0,04	0,4	28,75	5,5			■		■			
		GCM N8004 ML	●	●	❍	●	**8,0**	±0,04	0,4	28,75	6,0			■		■			

Grooving / Cut-Off	Shape	Cat. No.	Coated Carbide				Dimensions (mm)					Pcs./ Pack.	Applicable Holder						
			AC830P	AC425K	AC520U	AC530U	W Grooving Width	W Tolerance	r_ε	ℓ	s		GND S	GND M	GND MS	GND L	GND LS	GND I	GND F
	**GG** Breaker General Type 	GCM N2002 GG	●		❍	●	**2,0**	±0,03	0,2	21,1	3,6	5	■	■		■	■	■	
		GCM N3002 GG	●		❍	●	**3,0**	±0,03	0,2	21,1	3,8		■	■	■	■	■	■	■
		GCM N4002 GG	●		❍	●	**4,0**	±0,03	0,2	26,4	4,0		■	■	■	■	■	■	■
		GCM N5002 GG	●		❍	●	**5,0**	±0,03	0,2	26,4	4,1		■	■	■	■	■	■	■
		GCM N6002 GG	●		❍	●	**6,0**	±0,03	0,2	26,4	4,5		■	■	■	■	■	■	■
		GCM N3004 GG	●		❍	●	**3,0**	±0,03	0,4	21,1	3,8	5	■	■	■	■	■	■	■
		GCM N4004 GG	●		❍	●	**4,0**	±0,03	0,4	26,4	4,0		■	■	■	■	■	■	■
		GCM N5004 GG	●		❍	●	**5,0**	±0,03	0,4	26,4	4,1		■	■	■	■	■	■	■
		GCM N6004 GG	●		❍	●	**6,0**	±0,03	0,4	26,4	4,5		■	■	■	■	■	■	■
		GCM N7004 GG	●		❍	●	**7,0**	±0,04	0,4	28,75	5,5			■		■			
		GCM N8004 GG	●		❍	●	**8,0**	±0,04	0,4	28,75	6,0			■		■			
	GL Breaker Low Feed Type 	GCM N2002 GL	●		❍	●	**2,0**	±0,03	0,2	21,1	3,6	5	■	■		■	■	■	
		GCM N3002 GL	●		❍	●	**3,0**	±0,03	0,2	21,1	3,8		■	■	■	■	■	■	■
		GCM N4002 GL	●		❍	●	**4,0**	±0,03	0,2	26,4	4,0		■	■	■	■	■	■	■
		GCM N5002 GL	●		❍	●	**5,0**	±0,03	0,2	26,4	4,1		■	■	■	■	■	■	■
		GCM N6002 GL	●		❍	●	**6,0**	±0,03	0,2	26,4	4,5		■	■	■	■	■	■	■
		GCM N7004 GL	●		❍	●	**7,0**	±0,04	0,4	28,75	5,5			■		■			
		GCM N8004 GL	●		❍	●	**8,0**	±0,04	0,4	28,75	6,0			■		■			
New	**GF** Breaker Low Cutting Force Type 	GCM N125005 GF				●	**1,25**	±0,03	0,05	17,4	3,2	5				■			
		GCM N150005 GF				●	**1,50**	±0,03	0,05	17,4	3,7			■		■			
		GCM N2002 GF				●	**2,0**	±0,03	0,2	31,1	3,6		■	■		■	■	■	
		GCM N3002 GF	●		●	●	**3,0**	±0,03	0,2	31,1	3,8		■	■	■	■	■	■	■
		GCM N4002 GF	●		●	●	**4,0**	±0,03	0,2	26,4	4,0		■	■	■	■	■	■	■
		GCM N5002 GF	●		●	●	**5,0**	±0,04	0,2	26,4	4,1		■	■	■	■	■	■	■
		GCM N6002 GF	●		●	●	**6,0**	±0,04	0,2	26,4	4,5		■	■	■	■	■	■	■

Profiling	Shape	Cat. No.	Coated Carbide				Dimensions (mm)					Pcs./ Pack.	Applicable Holder						
			AC830P	AC425K	AC520U	AC530U	W Grooving Width	W Tolerance	r_ε	ℓ	s		GND S	GND M	GND MS	GND L	GND LS	GND I	GND F
	**RG** Breaker General Type 	GCM N3015 RG	●	●	❍	●	**3,0**	±0,03	1,5	21,1	3,8	5	■	■	■	■	■	■	■
		GCM N4020 RG	●	●	❍	●	**4,0**	±0,03	2,0	26,4	4,0		■	■	■	■	■	■	■
		GCM N5025 RG	●	●	❍	●	**5,0**	±0,03	2,5	27,2	4,1		■	■	■	■	■	■	■
		GCM N6030 RG	●	●	❍	●	**6,0**	±0,03	3,0	27,5	4,5		■	■	■	■	■	■	■
		GCM N7035 RG	●	●	❍	●	**7,0**	±0,04	3,5	29,05	5,5			■		■			
		GCM N8040 RG	●	●	❍	●	**8,0**	±0,04	4,0	29,05	6,0			■		■			

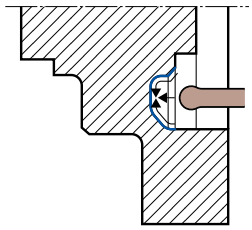
Cut-Off (Handed)	Shape	Cat. No.	Coated Carbide								Dimensions (mm)					Pcs./ Pack.	Applicable Holder						
			AC830P		AC425K		AC520U		AC530U		W Grooving Width	W Tolerance	r_ε	ℓ	s		GND S	GND M	GND MS	GND L	GND LS	GND I	GND F
	**CG** Breaker General Type 	GCM R/L2002 CG05	●	●			❍	❍	●	●	**2,0**	±0,03	0,2	21,1	3,6	5	■	■		■			
		GCM R/L3002 CG05	●	●			❍	❍	●	●	**3,0**	±0,03	0,2	21,1	3,8		■	■		■			
		GCM R/L4002 CG05	●	●			❍	❍	●	●	**4,0**	±0,03	0,2	26,4	4,0		■	■		■			
			R	L	R	L	R	L	R	L													

Drawing shows a right hand tool.
Select holders and inserts with the same grooving widths (*w*).

● = Euro stock
❍ = Japan stock

■ Application Examples

20CrMo5, Automotive Part, Face Profiling

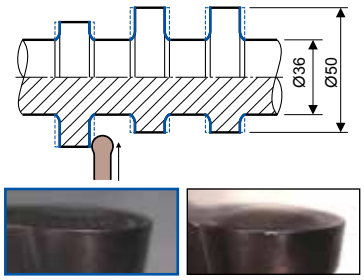


Target:
- Higher rigidity
- Vibration reduction
- Chip control
- Wear resistance performance

Holder:	GNDF R2525M 423-125
Insert:	GCM N4020 RG
Grooving width:	4mm
Cutting conditions:	v_c= 200m/min f = 0,14mm/rev wet

Stable machining free of vibration!
Excellent chip control using the GND type.

C53, Cam Shaft Grooving / Finishing (Contin. to Heavy Interrupted)

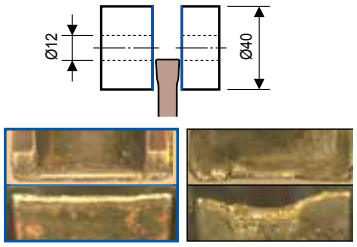


Target:
- Higher rigidity
- Vibration reduction
- Chip control
- Fracture resistance

Holder:	GNDM L2525M 618
Insert:	GCM N6030 RG
Grooving width:	6mm
Cutting conditions:	v_c= 130m/min f = 0,36mm/rev wet

Stable machining free of vibration!
Excellent fracture resistance
Stable chip control

C48, Machine Part, Cut-Off



Normal Wear
GND

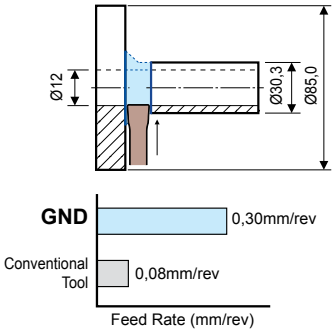
Chipping / Large Wear
Conventional Tool

Target:
- Higher rigidity
- Vibration reduction
- Fracture resistance

Holder:	GNDL R2525M 320
Insert:	GCM N3002 GG
Grooving width:	3mm
Cutting conditions:	n = 1600min^{-1} v_c= 200m/min f = 0,05mm/rev wet

Stable machining free of vibration!
Excellent fracture resistance
Stable fracture resistance

34CrMo4, Crank, Cut-Off

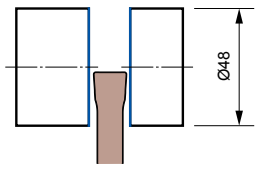


Target:
- Higher rigidity
- Vibration reduction
- Chip control

Holder:	GNDL R2525M 320
Insert:	GCM N3002 GG
Grooving width:	3mm
Cutting conditions:	v_c= 115m/min f = 0,30mm/rev wet

Improved efficiency
Stable machining free of vibration
Stable chip control

X40CrVMo5-1, (45-48HRC), Machine Part, Cut-Off

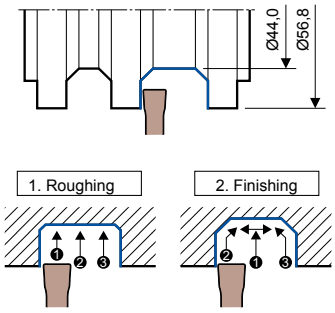


Target:
- Higher rigidity
- Vibration reduction
- Chip control

Holder:	GNDL R2525M 425
Insert:	GCM N4002 GG
Grooving width:	4mm
Cutting conditions:	v_c= 50m/min f = 0,03mm/rev wet

Stable machining free of vibration!
Excellent chip control using the GND type.
No more unexpected breakage!

20Cr4, Gear Shaft, Grooving / Pocketing



Target:
- Higher rigidity
- Vibration reduction
- Chip control

Holder:	GNDM R2020K 518
Insert:	GCM N5008 MG
Grooving width:	5mm
Cutting conditions:	v_c= 150m/min f = 0,1mm/rev wet

Stable machining free of vibration!
Excellent chip control using the GND type.

SumiTurn B-Groove Insert
TGA-BF Type

Indexable insert grooving system with triangular inserts and integral chipbreaker for external and internal grooving



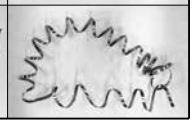
Characteristics

- Outstanding chip control when grooving
- Excellent chip control when finishing wide grooves using axial feed
- Grooving inserts from 1,5mm - 4,5mm wide
- New grade **AC530U** with Super ZX ultra hard coating for Steels, Stainless Steels, and Non Ferrous metals increases productivity and extends tool life

Performance

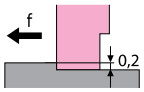
Comparison of chip control

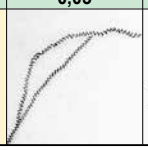
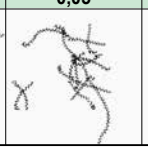
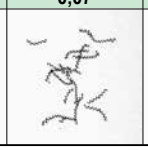
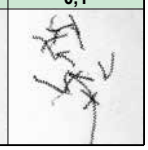
Insert: TGAR4200BF, Work Material: 34CrMo4
Cutting Data: v_c = 120 m/min, Wet

f (mm/rev)	0,05	0,07	0,1
B-Groove			
Conventional insert with ground chipbreaker			

Chip control whilst traversing

Insert: TGAR4200BF, Work Material: 34CrMo4
Cutting data: v_c = 120 m/min, Wet

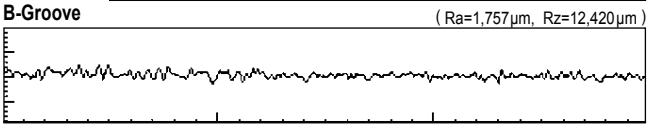


f (mm/rev)	0,03	0,05	0,07	0,1
B-Groove				

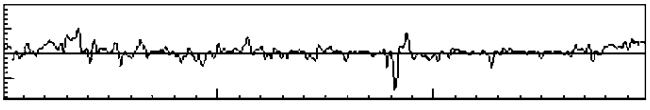
Comparison of surface roughness along sidewall

Insert: TGAR4200BF, Work Material: 34CrMo4
Cutting Data: v_c = 120 m/min, f = 0,07mm/rev, Wet

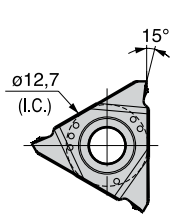
B-Groove (Ra=1,757µm, Rz=12,420µm)



Conventional carbide insert (Ra=3,488µm, Rz=20,598µm)



Inserts



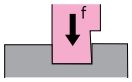
Notice:
Please note the cutting edge position e, for grooving widths below 1,85 mm..

(Note 2) Figures show right hand tools.

Cat. No.	Coated AC530U R	Coated AC530U L	Dimensions (mm) ( ) in ℓ presents max. depth t	ℓ	r	e	Applicable holder & insert group
TGA R/L **4145BF**			1,45	2,5 (2,0)	0,2	0,275	❶
TGA R/L **4150BF**	●	●	1,50	3,9 External (3,5) Internal (2,5)	0,2	0,250	❷
TGA R/L **4165BF**	❍	❍	1,65	3,9 External (3,5) Internal (2,5)	0,2	0,175	❷
TGA R/L **4175BF**	❍	❍	1,75	3,9 External (3,5) Internal (2,5)	0,2	0,125	❷
TGA R/L **4185BF**	❍		1,85	3,9 External (3,5) Internal (2,5)	0,2	0,075	❷
TGA R/L **4200BF**	●	●	2,00	3,9 External (3,5) Internal (2,5)	0,2	0	❷
TGA R/L **4220BF**	❍	❍	2,20	3,9 External (3,5) Internal (2,5)	0,2	0	❷
TGA R/L **4230BF**	❍	❍	2,30	3,9 External (3,5) Internal (2,5)	0,2	0	❷
TGA R/L **4250BF**	●	●	2,50	5,4 External (5,0) Internal (2,5)	0,3	0	❸
TGA R/L **4265BF**	❍	❍	2,65	5,4 External (5,0) Internal (2,5)	0,3	0	❸
TGA R/L **4270BF**	❍	❍	2,70	5,4 External (5,0) Internal (2,5)	0,3	0	❸
TGA R/L **4280BF**	❍	❍	2,80	5,4 External (5,0) Internal (2,5)	0,3	0	❸
TGA R/L **4300BF**	●	●	3,00	5,4 External (5,0) Internal (2,5)	0,3	0	❸
TGA R/L **4320BF**	❍	❍	3,20	5,4 External (5,0) Internal (2,5)	0,3	0	❸
TGA R/L **4330BF**	❍	❍	3,30	5,4 External (5,0) Internal (2,5)	0,3	0	❸
TGA R/L **4350BF**	●	●	3,50	5,4 External (5,0) Internal (2,5)	0,3	0	❸
TGA R/L **4370BF**	❍	❍	3,70	5,4 External (5,0) Internal (2,5)	0,3	0	❸
TGA R/L **4390BF**	❍	❍	3,90	5,4 External (5,0) Internal (2,5)	0,3	0	❸
TGA R/L **4400BF**	●	●	4,00	5,4 External (5,0) Internal (2,5)	0,4	0	❸
TGA R/L **4410BF**	❍	❍	4,10	5,4 External (5,0) Internal (2,5)	0,4	0	❸
TGA R/L **4420BF**		❍	4,20	5,4 External (5,0) Internal (2,5)	0,4	0	❸
TGA R/L **4430BF**	❍	❍	4,30	5,4 External (5,0) Internal (2,5)	0,4	0	❸
TGA R/L **4440BF**	❍	❍	4,40	5,4 External (5,0) Internal (2,5)	0,4	0	❸
TGA R/L **4450BF**	●	●	4,50	5,4 External (5,0) Internal (2,5)	0,4	0	❸

Recommended Cutting Conditions

Grooving

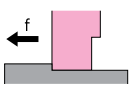


Wet condition is recommended.

Work material		General steel		Stainless steel	
Cutting speed (m/min)		50 ~ 180		50 ~ 160	
Groove width (mm)		1,5~2,3	2,5~3,3	3,5~4,5	
Feed rate (mm/rev)		0,03~0,12	0,04~0,12	0,05~0,12	
Depth of cut (mm)	Ext.	~3,5	~5,0	~5,0	
	Int.	~2,5			

Axial Feed

Feed direction for Axial Feed



Wet condition is recommended.

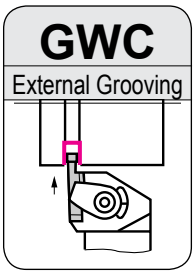
Work material	General steel		Stainless steel
Cutting speed (m/min)	50 ~ 180		50 ~ 160
Feed rate (mm/rev)	0,03~0,10	0,05~0,10	0,07~0,12
Depth of cut (mm)	~0,3	~0,5	~0,7

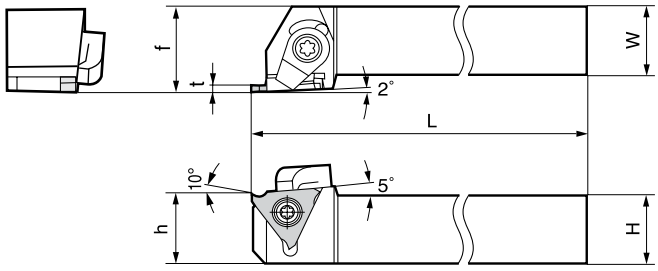
● = Euro stock
○ = Japan stock

❑ = Delivery on request

External Grooving

GWC
External Grooving





Figures show right hand tools.

■ Holders

Right handed tool holders are used with **right** handed inserts (TGA-R), **left** handed clamp (CCM 8U-L) and **right** handed screw (WB8-22-T).

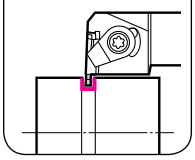
Cat. No.	Stock R	Stock L	H	W	L	f	h	Grooving width t (mm)	Maximum Grooving Depth (mm)	Applicable Insert Group No.
GWC R/L **2020-15**	●	●	20	20	125	25	20	1,25~1,45	2,0	❶
GWC R/L **2020-25**	●	●	20	20	125	25	20	1,50~2,30	3,5	❷
GWC R/L **2020-35**	●	●	20	20	125	25	20	2,50~4,80	5,0	❸
GWC R/L **2525-15**	●	●	25	25	150	30	25	1,25~1,45	2,0	❶
GWC R/L **2525-25**	●	●	25	25	150	30	25	1,50~2,30	3,5	❷
GWC R/L **2525-35**	●	●	25	25	150	30	25	2,50~4,80	5,0	❸

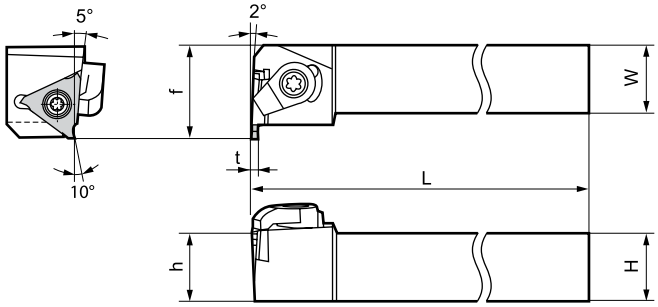
■ Spare Parts



Screw	Wrench	Clamp	Screw	Wrench
BFTX 0511N	TRX 20	CCM 8U -L/R	WB 8-22 -T/TL	LT 27

GWCS
External Grooving





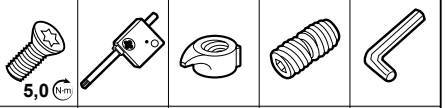
Figures show right hand tools.

■ Holders

Right handed tool holders are used with **left** handed inserts (TGA-L), **right** handed clamp (CCM 8U-R) and **left** handed screw (WB8-22-TL).

Cat. No.	Stock R	Stock L	H	W	L	f	h	Grooving width t (mm)	Maximum Grooving Depth (mm)	Applicable Insert Group No.
GWCS R/L **2020-15**	❑	❑	20	20	125	27	20	1,25~1,45	2,0	❶
GWCS R/L **2020-25**	❑	❑	20	20	125	27	20	1,50~2,30	3,5	❷
GWCS R/L **2020-35**	❑	❑	20	20	125	27	20	2,50~4,80	5,0	❸
GWCS R/L **2525-15**	❑	❑	25	25	150	32	25	1,25~1,45	2,0	❶
GWCS R/L **2525-25**	❑	❑	25	25	150	32	25	1,50~2,30	3,5	❷
GWCS R/L **2525-35**	❑	❑	25	25	150	32	25	2,50~4,80	5,0	❸

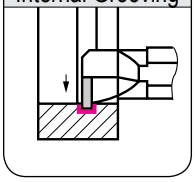
■ Spare Parts

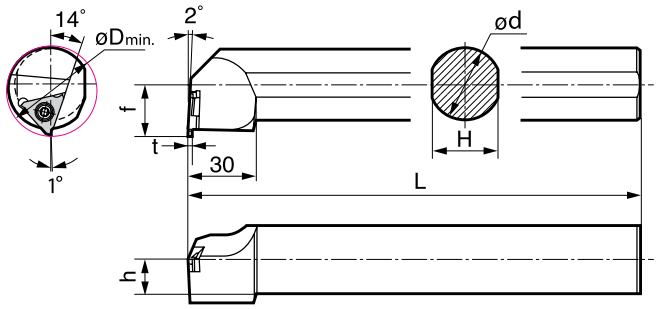


Screw	Wrench	Clamp	Screw	Wrench
BFTX 0511N	TRX 20	CCM 8U -R/L	WB 8-22 -TL/T	LT 27

Internal Grooving

GWCI
Internal Grooving





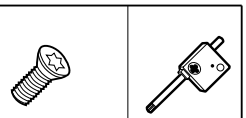
Figures show right hand tools.

■ Holders

Right handed tool holders are applicable with **left** handed inserts (TGA-L).

Cat. No.	Stock R	Stock L	øDmin	ød	L	H	h	f	Grooving width t (mm)	Maximum Grooving Depth (mm)	Applicable Insert Group No.
GWCI R/L **325**			35	25	200	23	11,5	17,5	0,33~2,80	0,8~2,0	
GWCI R/L **432**	❑	❑	40	32	250	30	15,0	17,5	1,25~4,80	2,0~2,5	❶❷❸

■ Spare Parts



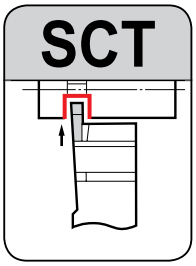
Screw	(N·m)	Wrench
BFTX 0409N	3,4	TRX 15
BFTX 0511N	5,0	TRX 20

*) Please select applicable inserts for the holders by using matching group numbers.

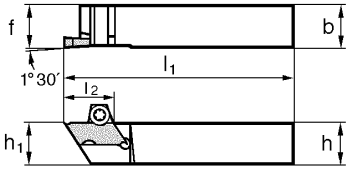
SCT Type



Parting-Off Tools



■ Holders



■ Spare Parts



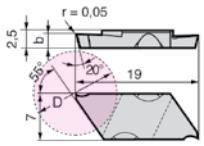
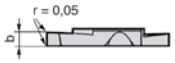
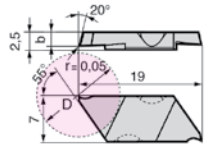
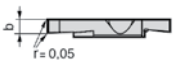


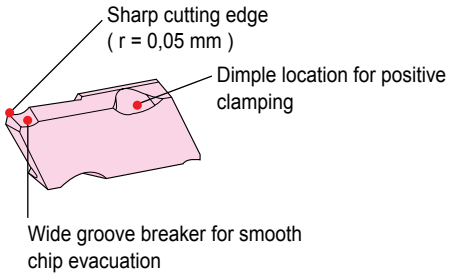
Ordering No.	Stock	Dimensions (mm)					Applicable inserts	Screw	Wrench
		$h=h_1$	b	l_1	l_2	f			
SCT R 1010	●	10	10	120	15	10	CTR ___	BFTX 0410 T8 **L**	TRX 08
SCT R 1212	●	12	12	120	15	12			
SCT R 1616	●	16	16	120	15	16			
SCT L 1010	●	10	10	120	15	10	CTL ___	BFTX 0410 T8 **R**	
SCT L 1212	●	12	12	120	15	12			
SCT L 1616	●	16	16	120	15	16			

Above figures show right hand tools.

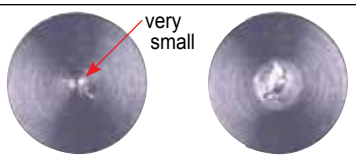
■ Inserts

(Coated carbide)

CTR CTL	Ordering No.	Stock ACZ310	Dimensions (mm) b	Dimensions (mm) Max. ø D	Insert Type
	**CTR 050505 R**		0,5	5	(R) right handed type  (N) neutral type 
	CTR 121005 R		1,0	12	
	CTR 121505 R	●	1,5		
	CTR 122005 R	●	2,0		
	CTR 121005 N		1,0		
	CTR 121505 N	●	1,5		
	CTR 122005 N	●	2,0		
	**CTL 050505 L**		0,5	5	(L) left handed type  (N) neutral type 
	CTL 121005 L	●	1,0	12	
	CTL 121505 L	●	1,5		
	CTL 122005 L	●	2,0		
	CTL 121005 N		1,0		
	CTL 121505 N		1,5		
	CTL 122005 N	●	2,0		



● Surface Finish Comparision



SCT Competitor´s tool

Work Material:	X6Cr17 (ø8 mm)
Insert:	CTR 121005 R, (b =1,0 mm)
Cutting Data:	v_c = 45 m/min
	f = 0,02 mm/rev, Wet

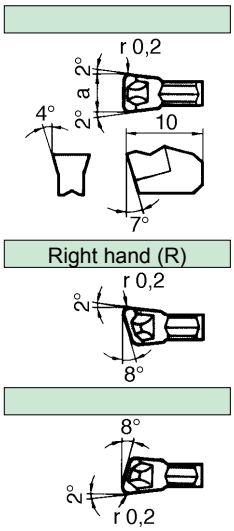
■ Recommended Cutting Data (SCT Type)

Work material	Approach angle	v_c (m/min)	f (mm/rev)
General steel	20° (R/L-Platte)	50 ~ 150	0,02 ~ 0,05
	0° (N-Platte)		0,02 ~ 0,10
Free-cutting steel	20° (R/L-Platte)	50 ~ 150	0,02 ~ 0,05
	0° (N-Platte)		0,02 ~ 0,10
Stainless steel	20° (R/L-Platte)	50 ~ 150	0,02 ~ 0,04
	0° (N-Platte)		0,02 ~ 0,05

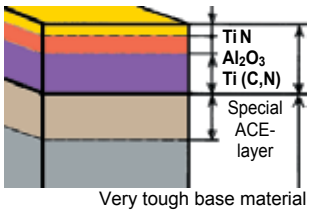
Cutting data for coated grade ACZ310

● = Euro stock
○ = Japan stock
▲ = To be replaced by new item

Parting-Off Holders
"Sumi-Grip" Insert



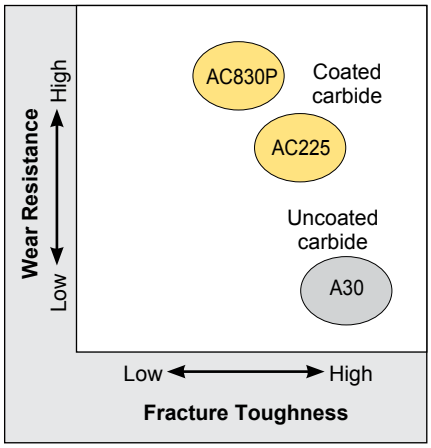
Ordering No.	Coated carbide AC830P	Coated carbide AC3000	[a] (mm)	Ordering No.	Coated carbide AC225	Uncoated carbide A30	[a] (mm)	Ordering No.	Uncoated carbide G10E	[a] (mm)
WCFN 2 T	○		2	**WCFN 2 A**	●		2			
WCFN 3	○	▲	3	**WCFN 3 A**	●		3	**WCFN 3 B**	●	3
WCFR 3	○	▲		**WCFR 3 A**	●			**WCFR 3 B**	●	
WCFL 3	○	▲		**WCFL 3 A**	●			**WCFL 3 B**	●	
WCFN 4	○	▲	4	**WCFN 4 A**	●	○	4	**WCFN 4 B**	●	4
WCFR 4	○			**WCFR 4 A**	●			**WCFR 4 B**		
WCFL 4	○			**WCFL 4 A**	●			**WCFL 4 B**		
WCFN 5	○	▲	5	**WCFN 5 A**	●		5	**WCFN 5 B**		5
WCFR 5	○			**WCFR 5 A**				**WCFR 5 B**		
WCFL 5	○			**WCFL 5 A**				**WCFL 5 B**		



Structure of AC225 coated layer

There is a multi layer coating which includes a 2 µm thick Al_2O_3 layer.
It is very tough and resistant to adhesion wear.

■ Insert Grade Map



■ Applications and Features of Inserts

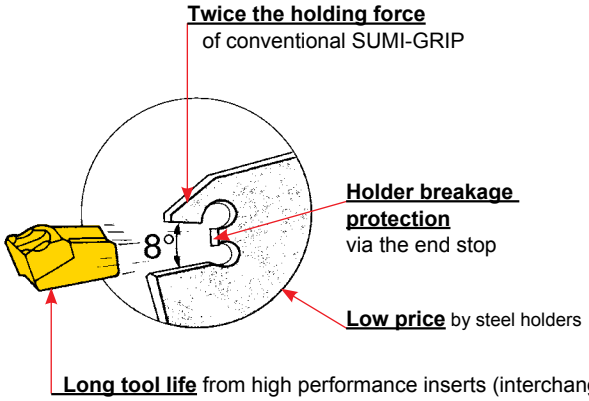
Grade	Ordering No. (Ex. a=3mm)	Applications	Features
AC830P (AC3000)	WCFN 3	General steel and high feed cutting (0,08~0,3/rev)	Coated insert having excellent wear resistance with low cutting resistance
AC225	WCFN 3A	General steel and slow feed cutting (0,04~0,25/rev) soft steel, stainlessw steel	Coated insert having excellent fracture toughness with good chip removal
A30	WCFN 3A	Hard to cut materials	Equivalent to P30
G10E	WCFN 3B	Cast iron, aluminum alloy	Equivalent to K10 with a small edge treatment

■ Recommended Cutting Conditions

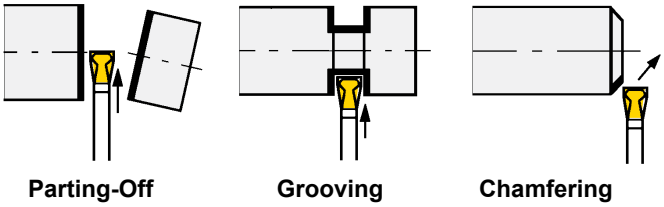
Grade	v_c (m/min) f (mm/rev)	General steel	Soft steel	Stainless steel	Die steel	Gray cast iron
AC830P (AC3000)	v_c	100 - 220	120 - 250	80 - 200	60 - 150	-
	f	0,08 - 0,3	0,08 - 0,15	0,08 - 0,15	0,08 - 0,15	-
AC225	v_c	80 - 200	100 - 230	60 - 180	60 - 150	-
	f	0,04 - 0,25	0,04 - 0,2	0,04 - 0,2	0,04 - 0,2	-
A30	v_c	50 - 120	70 - 150	70 - 150	50 - 120	-
	f	0,05 - 0,2	0,04 - 0,15	0,04 - 0,15	0,04 - 0,15	-
G10E	v_c	-	-	-	-	50 - 100
	f	-	-	-	-	0,06 - 0,2

The recommended cutting conditions are valid when using the part-off tool with tool block type and shank type in the clamping system.

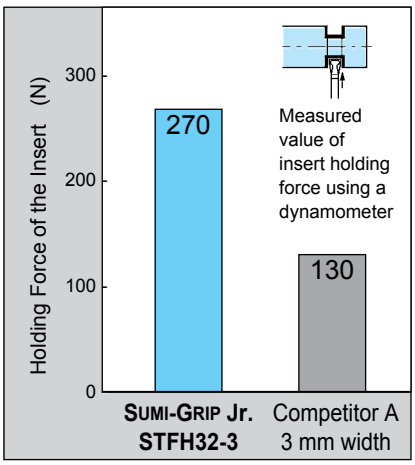
Features of Design



Effective Tooling with **Sumi-Grip Jr.**

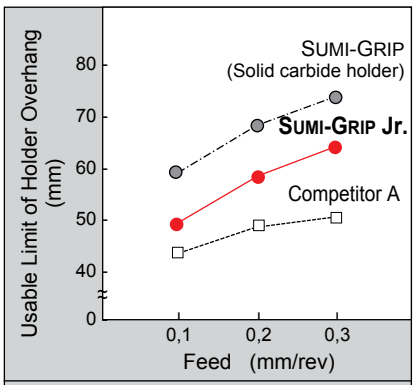


Twice the Insert Holding Force



Low Vibration

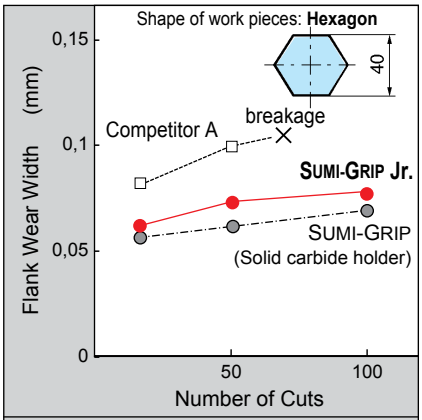
● Comparison of usable limit vibration



Work Material:	C45 (ø 50 mm, HB 250)
Insert :	3 mm width, coated (P25)
Cutting Data:	v_c = 80 m/min, Dry

WEAR RESISTANCE

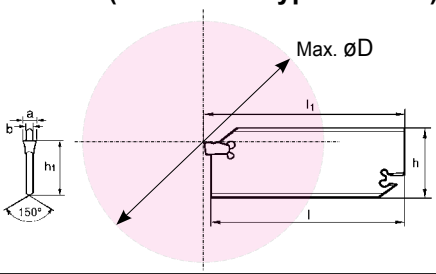
● (Interrupted cut part off)



Work Material:	C45
Insert :	3 mm width, coated (P25)
Cutting Data:	v_c = 150 m/min,
f = 0,15 mm/rev,	Water soluble coolant

Part-Off Holders

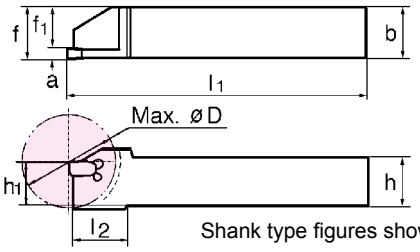
● Steel Blades (Tool Block Type Holders)



Ordering No.	Stock	Dimensions (mm)							Applicable inserts
		a	$øD_{Max}$	h	h_1	b	l	l_1	
STFH 26-2	●	2	40	26	21,4	1,7	108	109	WCF_ 2 _
STFH 26-3	●	3	70	26	21,4	2,4	108	109	WCF_ 3 _
STFH 26-4	●	4	70	26	21,4	3,4	108	109	WCF_ 4 _
STFH 26-5	●	5	70	26	21,4	4,3	108	109	WCF_ 5 _
STFH 32-2	●	2	40	32	25	1,7	148	149	WCF_ 2 _
STFH 32-3	●	3	100	32	25	2,4	148	149	WCF_ 3 _
STFH 32-4	●	4	100	32	25	3,4	148	149	WCF_ 4 _
STFH 32-5	●	5	100	32	25	4,3	148	149	WCF_ 5 _

Remarks: All tool holders include a wrench type **SL-4** .
Tool blocks for steel blades are ordered separately.

● Shank Type Holders

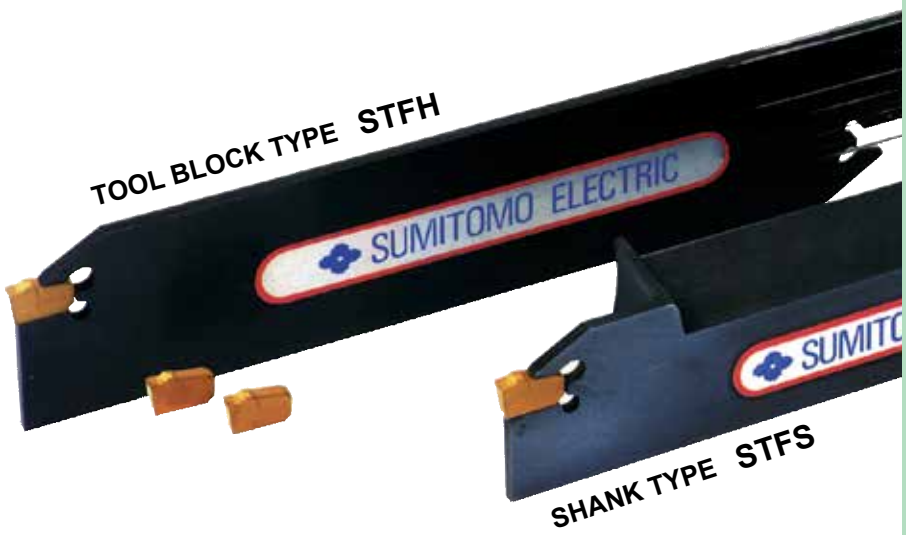


Shank type figures show right hand tools.

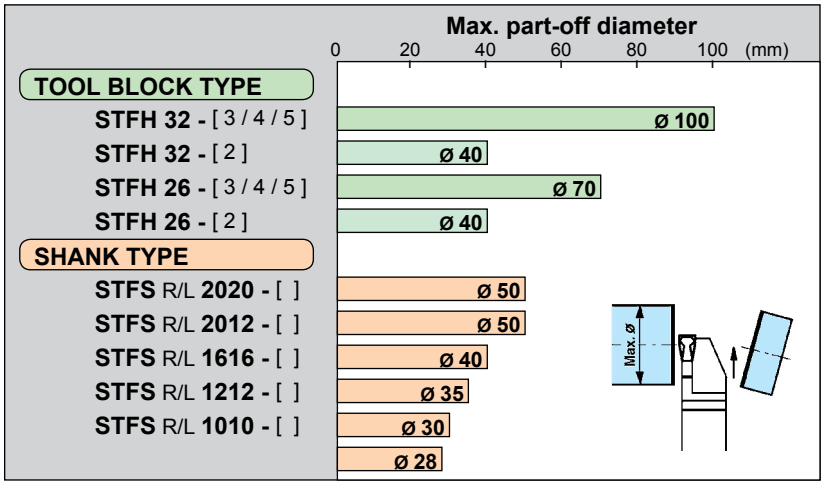
Ordering No.	Stock		Dimensions (mm)									Applicable inserts
	R	L	a	$øD_{Max}$	h	h_1	b	l_1	l_2	f	f_1	
STFS R/L 1010-2	●	❑	2	28	10	10	10	86	18	10	8	WCF_ 2 _
STFS R/L 1212-2	●	●		30	12	12	12	110	20	12	10	
STFS R/L 1616-2	●	●		35	16	16	16	110	20	16	14	
STFS R/L 2020-2	●	●		50	20	20	20	125	-	20	18	
STFS R/L 1616-3	●	●	3	35	16	16	16	110	20	16	13	WCF_ 3 _
STFS R/L 2012-3	●	❑		40	20	20	12	110	-	12	9	
STFS R/L 2020-3	●	●		50	20	20	20	125	-	20	17	
STFS R/L 2525-3	●	●		50	25	25	25	150	-	25	22	
STFS R/L 2020-4	●	●	4	50	20	20	20	125	-	20	16	WCF_ 4 _
STFS R/L 2525-4	●	●		50	25	25	25	150	-	25	21	
STFS R/L 2020-5	●	❑	5	50	20	20	20	125	-	20	15	WCF_ 5 _
STFS R/L 2525-5	●	❑		50	25	25	25	150	-	25	20	

● = Euro stock
❑ = Delivery on request

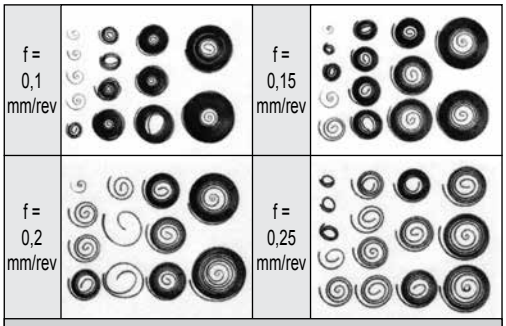
Sumi-Grip "Jr."



Recommended Application Range



Good Chip Removal

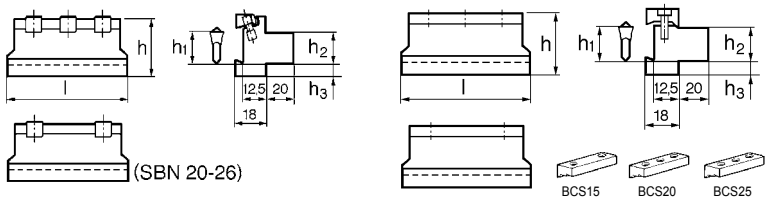


Work Material: C45 (ø 60 mm, HB 250)
Insert : **WCFN 3A** (AC225)
Cutting Data: v_c = 150 m/min,
Water soluble coolant

Tool Blocks

< Type SBN > Clamp System

< Type SBU > Wedge System



Ordering No.	Stock	Dimensions (mm)					Applicable steel blades	SPARE PARTS		
		h	h_1	h_2	h_3	l		Clamp	Screw	Wrench
SBN 20-26	●	45	20	20	10	80	STFH 26 _	BWS30	WB8-20	LH040
SBN 20-32	●	50	20	20	13,5	100	STFH 32 _			
SBN 25-32	●	50	25	25	8,5	110	STFH 32 _			

Ordering No.	Stock	Dimensions (mm)					Applicable steel blades	SPARE PARTS		
		h	h_1	h_2	h_3	l		Wedge	Screw	Wrench
SBU 20-26	●	45	20	20	10	80	STFH 26 _	BCS15	BX0622	LH050
SBU 20-32	●	50	20	20	13,5	100	STFH 32 _	BCS20		
SBU 25-32	●	50	25	25	8,5	110	STFH 32 _	BCS25		

Recommended Grades and Cutting Conditions

Work material	Grade	Cutting speed (m/min) / Feed (mm/rev)
General steel	AC225	80 – 200 / 0,05 – 0,2
Mild steel		
Stainless steel	AC225	60 – 180 / 0,05 – 0,2
Cast iron	G10E	50 – 120 / 0,06 – 0,2

■ Sumi-Grip- Series



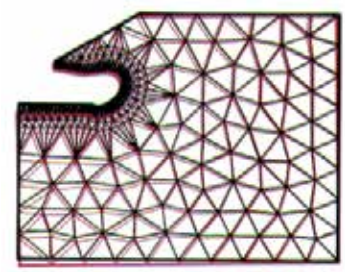
■ Features of Sumi-Grip

●High Rigidity

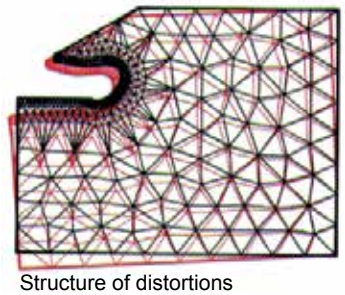
This figure shows a computer generated comparison of the distortion of steel and carbide holders caused by cutting forces.

The reduced distortion of the carbide holder makes cutting under harsher conditions and higher feeds possible.

Destortion of **Sumi-Grip** (Carbide holder)



Destortion of steel holder

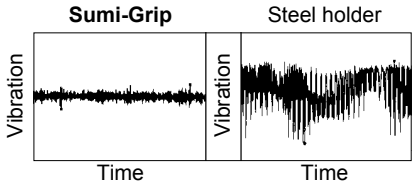


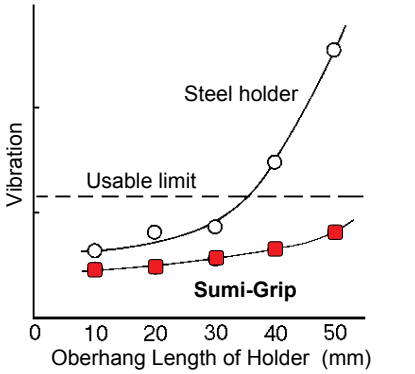
Structure of distortions
Changed sharp
Unchanged sharp

●Low Vibration

The figure shows the measurement of cutting vibration.
At high speeds the carbide holder experiences for less vibrations than does the steel holder. Thus, the overhang length can be extended and cutting speed can be increased with the **Sumi Grip**´s carbide holder.

Measurement of vibrations
(Overhang of holder: 50 mm)

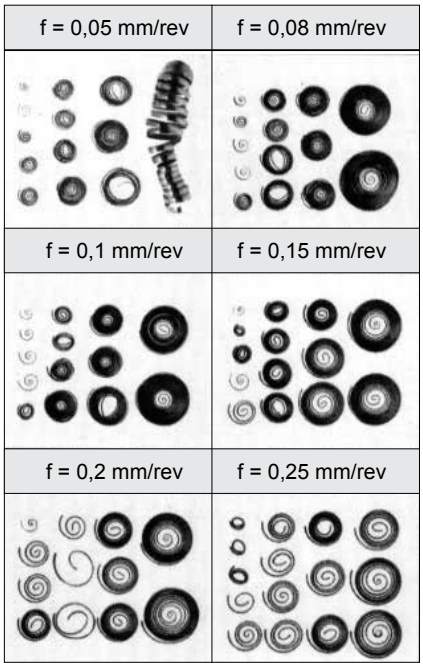




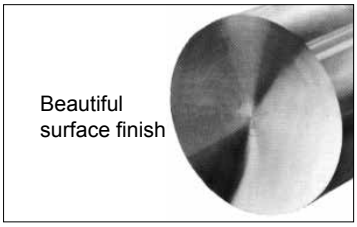
Work: Carbon steel (ø 60mm, HB250)
Width of Insert: 3 mm
Cutting Data: v_c = 150 m/min, f = 0,1 mm/rev

●Good Chip Removal

This picture show the shape of chips according to feed rate.
SUMI GRIP produces rolled chip which are easily removed.



Work material: Ck 45 (ø 60mm, HB250)
Insert width and type : 3 mm,
WCFN 3A (AC225)
Cutting conditions: v_c = 150 m/min, Wet

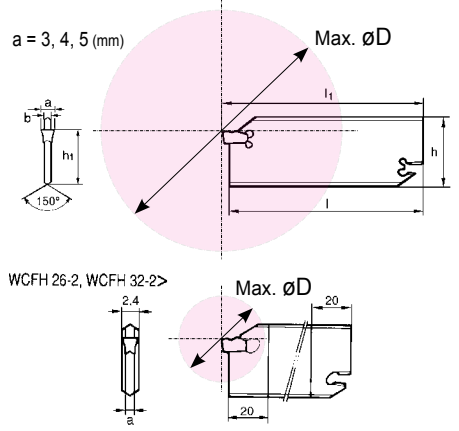


● = Euro stock
❑ = Delivery on request



- Width of cut off: 2 ~ 5 mm
- Max. cut-off diameter is 140 mm (In case of 2,0 mm width insert up to ø 40 mm).
- double sided carbide blade
- Tool block and carbide holder are interchangeable between right and left hand use.

■ Carbide blades



Ordering No.	Stock	Dimensions (mm)							Applicable inserts
		a	$øD_{Max}$	h	h_1	b	l	l_1	
WCFH 26-2	●	2	40	26	21,4	1,7	109	110	WCF_ 2 _
WCFH 26-3	●	3	80	26	21,4	2,4	108,5	110	WCF_ 3 _
WCFH 26-4	●	4	80	26	21,4	3,4	108,5	110	WCF_ 4 _
WCFH 26-5	●	5	80	26	21,4	4,3	108,5	110	WCF_ 5 _
WCFH 32-2	●	2	40	32	25	1,7	149	150	WCF_ 2 _
WCFH 32-3	●	3	140	32	25	2,4	148,5	150	WCF_ 3 _
WCFH 32-4	●	4	140	32	25	3,4	148,5	150	WCF_ 4 _
WCFH 32-5	●	5	140	32	25	4,3	148,5	150	WCF_ 5 _

■ Wrench

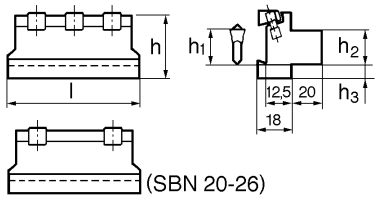


SL - 2
SL - 1
SL - 1
SL - 1
SL - 2
SL - 1
SL - 1
SL - 1

Remark: A carbide blade includes a wrench. Applicable Tool block and insert are ordered separately.

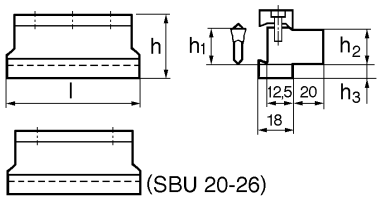
■ Tool blocks

<Type SBN> One piece type



Ordering No.	Stock	Dimensions (mm)					Applicable carbide blades
		h	h_1	h_2	h_3	l	
SBN 20-26	●	45	20	20	10	80	WCFH 26 _
SBN 20-32	●	50	20	20	13,5	100	WCFH 32 _
SBN 25-26	❑	48	25	25	10	80	WCFH 26 _
SBN 25-32	●	50	25	25	8,5	110	WCFH 32 _

<Type SBU> Separete type



Ordering No.	Stock	Dimensions (mm)					Applicable carbide blades
		h	h_1	h_2	h_3	l	
SBU 20-26	●	45	20	20	10	80	WCFH 26 _
SBU 20-32	●	50	20	20	13,5	100	WCFH 32 _
SBU 25-26	❑	48	25	25	10	80	WCFH 26 _
SBU 25-32	●	50	25	25	8,5	110	WCFH 32 _

■ Spare Parts

Clamp	Screw	Wrench
		
BWS 30	WB 8-20	LH 040

Wedge		
 20-26 SBU 25-26	 SBU20-32	 SBU25-32
BCS 15	BCS 20	BCS 25
Screw	Wrench	
		
BX 0622	LH 050	

■ Nomenclature

Holder

WCF H 26-3
- Sumi-Grip
- Holder type
- Insert width: a = 2, 3, 4, 5 mm
- Holder height: h = 26, 32 mm (Type H); h = 20, 25 mm (Type S)

Insert

WCF N 3 A
- Sumi-Grip
- Feed direction: Neutral (N), Right hand (R), Left hand (L)
- Insert width: a = 2, 3, 4, 5 mm
- Breaker type: - Standard (Nil), - Type A, - Type B

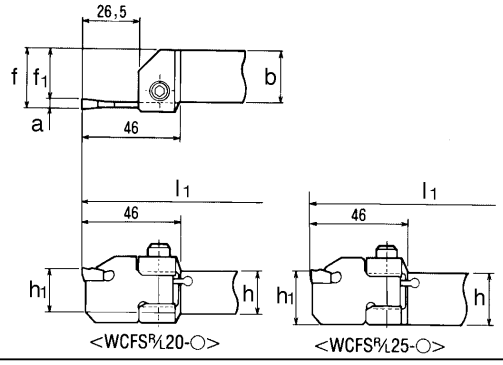


- Carbide blade on shank fixed type
- Width of cut off: 3,0 ~ 5,0 mm
- Max. cut off diameter is 50 mm
- Suitable for machining with small N/C machines and automated lathe machines



- Carbide blade on shank brazed type
- Width of cut off: 2,0 mm
- Economical brazed type
- Suitable for machining with small CNC machines

■ Holders (Fixed Type)

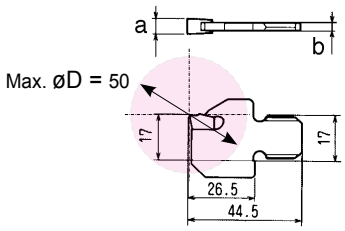


Ordering No.	Stock R	Stock L	a	b	h	h1	l1	f	f1	Included carbide blade	Applicable inserts
WCFS R/L 20-3	●	●	3	20	20	20	125	23	20	WCFH 17-3	WCF_ 3 _
WCFS R/L 20-4	●	●	4	20	20	20	125	24	20	WCFH 17-4	WCF_ 4 _
WCFS R/L 20-5	❑	❑	5	20	20	20	125	25	20	WCFH 17-5	WCF_ 5 _
WCFS R/L 25-3	●	●	3	25	25	25	150	28	25	WCFH 17-3	WCF_ 3 _
WCFS R/L 25-4	●	❑	4	25	25	25	150	29	25	WCFH 17-4	WCF_ 4 _
WCFS R/L 25-5	●	❑	5	25	25	25	150	30	25	WCFH 17-5	WCF_ 5 _

Remarks: A holder includes an applicable carbide blade and a wrench.
All figures show right hand tools.

■ Spare Parts

■ Wrench

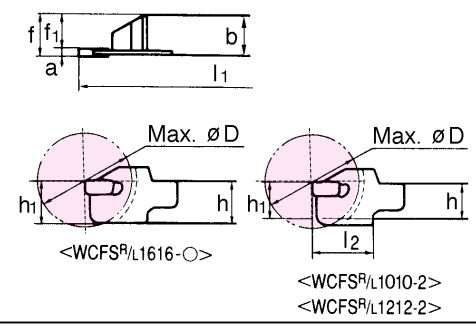




Carbide blade	Stock	Dimensions (mm) a	Dimensions (mm) b	Applicable inserts	Ordering No.
WCFH 17-3	●	3	2,4	WCF_ 3 _	SL - 1
WCFH 17-4	●	4	3,4	WCF_ 4 _	SL - 1
WCFH 17-5	●	5	4,3	WCF_ 5 _	SL - 1

■ Holders (Brazed Type)

Wrench



Ordering No.	Stock R	Stock L	a	øDMax	h	h1	b	l1	l2	f	f1	Applicable inserts
WCFS R/L 1010-2	●	❑	2	28	10	10	10	86	18	10	8	WCFN 2A
WCFS R/L 1212-2	●	●	2	30	12	12	12	110	20	12	10	WCFN 2A
WCFS R/L 1616-2	❑	●	2	35	16	16	16	100	–	16	14	WCFN 2A



Wrench
SL - 2
SL - 2
SL - 2

Remarks: A holder includes an applicable wrench.
All figures show right hand tools.

● = Euro stock
❑ = Delivery on request



General Features

Sumitomo Electric has developed „TME“ external threading inserts with pitch ranges of 1,0 ~ 3,0 mm or 10 ~ 24 threads/inch and „TMI“ internal threading inserts with a pitch range of 1,0 ~ 3,0 mm.

The superior features of the new sintered threading inserts include an M-class tolerance and dimple shaped chip breaker. The M-class tolerance reduces insert cost by eliminating the need for expensive grinding.

Furthermore, chip control is greatly improved as a result of the specially designed dimple chip breakers.

New Series of Indexable Inserts and Holders for Threading

For External Threading

For external thread

- ISO-Metric 60°
  - **TME** — with flat wiper edge — Pitch (mm): 1,0 1,25 1,5 1,75 2,0 2,5 3,0
  - **TME** — without flat wiper edge — Pitch (mm): 1,0 ~ 2,0 , 1,5 ~ 3,0
- Whitworth 55°
  - **TWE** — without flat wiper edge — Number of threads / inch: 14 ~ 10 , 24 ~ 16

→ **LTER** (□20, □25 mm) — (Lever lock system)

→ **STER** (□12, □16 mm) — (Screw on system)

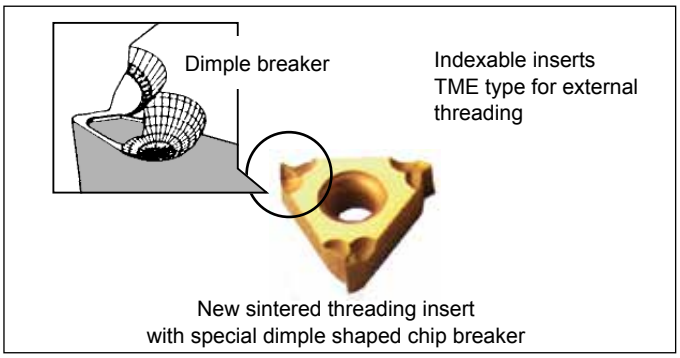
For Internal Threading

For internal thread — ISO-Metric 60°

- **TMI** — with flat wiper edge — Pitch (mm): 1,0 1,25 1,5 1,75 2,0 2,5 3,0
- **TMI** — without flat wiper edge — Pitch (mm): 1,0 ~ 2,0 , 1,5 ~ 3,0

→ **STIR** (Ø 16, Ø 20 mm) — (Screw on system)

Threading Insert



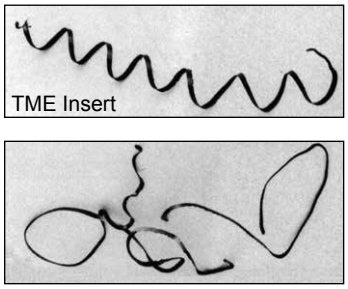
New sintered threading insert
with special dimple shaped chip breaker

■ General Features

- **A positive rake angle encourages good chip control and reduces cutting resistance.**
- **Two tier dimple-style chip breakers evacuate chip smoothly and easily.**
- **M-class tolerance reduces insert cost.**
- **Four available grades cover a wider range of applications.**
- **The LTER type holder is designed for easy clamping and replacement.**

● Comparison of Chip Control

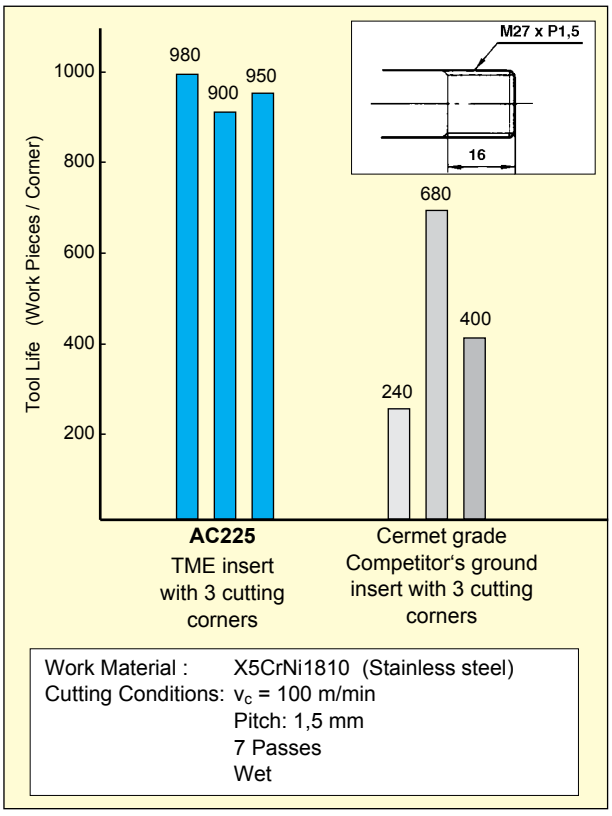




Competitor's ground insert

Work material: 25 CrMo 4
Cutting speed: 100 m/min
Pitch: 1,5 mm

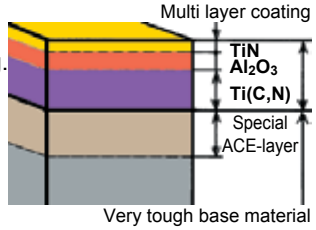
● Comparison of Tool Life

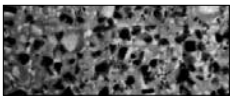


Work Material : X5CrNi1810 (Stainless steel)
Cutting Conditions: v_c = 100 m/min
Pitch: 1,5 mm
7 Passes
Wet

■ Cutting Grades for Threading

AC225
The AC225 is a carbide insert with a 2 µm multiple-layer coating. This design results in improved toughness and adhesion resistance making this grade **suitable for stainless steel and general steel**.





Neue
Cermet-Grade
T130A

T130A
The T130A is a cermet grade containing high TiN with a uniform fine-grain microstructure which results in improved wear resistance and toughness.
Thus, the T130A **produces a goods surface finish**.

■ Recommended cutting conditions

● **Cutting Speed (m/min.)**

Work material \ Grade	AC225	T130A
Soft steel	150 ~170	100 ~150
Carbon steel	100 ~170	80 ~130
Alloy steel	90 ~150	80 ~120
Stainless steel	70 ~140	-

● **Depth of Cut (Wiper Insert)**

		Cat. No.	Pitch	Depth of cut	Pass	1	2	3	4	5	6	7	8	9	10	11	12
ISO-Metric 60°	External	TME 100 R	1,00	0,68	5	0,20	0,16	0,14	0,11	0,07							
		TME 125 R	1,25	0,82	6	0,20	0,18	0,15	0,12	0,10	0,07						
		TME 150 R	1,50	0,96	7	0,22	0,18	0,14	0,13	0,12	0,10	0,07					
		TME 175 R	1,75	1,12	8	0,22	0,19	0,16	0,14	0,13	0,12	0,09	0,07				
		TME 200 R	2,00	1,25	8	0,25	0,21	0,18	0,16	0,15	0,13	0,10	0,07				
		TME 250 R	2,50	1,55	10	0,27	0,24	0,20	0,18	0,16	0,13	0,11	0,10	0,09	0,07		
		TME 300 R	3,00	1,86	12	0,28	0,25	0,20	0,19	0,17	0,15	0,13	0,12	0,10	0,10	0,09	0,07
	Internal	TMI 100 R	1,00	0,63	5	0,18	0,16	0,12	0,10	0,07							
		TMI 125 R	1,25	0,77	6	1,08	0,16	0,14	0,12	0,10	0,07						
		TMI 150 R	1,50	0,90	7	0,20	0,16	0,14	0,13	0,11	0,09	0,07					
		TMI 175 R	1,75	1,03	8	0,20	0,18	0,15	0,14	0,11	0,10	0,08	0,07				
		TMI 200 R	2,00	1,18	8	0,22	0,19	0,17	0,15	0,14	0,13	0,11	0,07				
		TMI 250 R	2,50	1,44	10	0,25	0,22	0,19	0,16	0,14	0,12	0,10	0,10	0,09	0,07		
		TMI 300 R	3,00	1,7	12	0,27	0,24	0,20	0,17	0,14	0,12	0,10	0,10	0,10	0,09	0,06	0,07

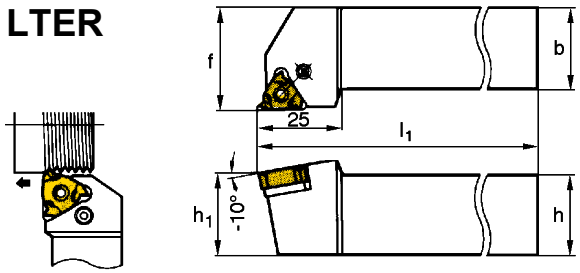
● **Depth of Cut (Non wiper insert)**

		Cat. No.	Radius	Pitch	Depth of cut	Pass	1	2	3	4	5	6	7	8	9	10	11	12	13	14
ISO-Metric 60°	External	TME 1020 R	0,13	1,00	0,68	5	0,20	0,16	0,12	0,10	0,07									
				1,25	0,84	6	0,20	0,18	0,16	0,13	0,10	0,07								
				1,50	1,03	7	0,22	0,20	0,17	0,15	0,12	0,10	0,07							
				1,75	1,22	8	0,22	0,21	0,18	0,16	0,15	0,13	0,10	0,07						
				2,00	1,41	10	0,22	0,20	0,18	0,16	0,14	0,13	0,12	0,10	0,09	0,07				
		TME 1530 R	0,20	1,50	0,95	7	0,22	0,17	0,14	0,13	0,12	0,10	0,07							
				1,75	1,14	8	0,22	0,18	0,15	0,14	0,13	0,12	0,09	0,07						
				2,00	1,33	9	0,25	0,20	0,18	0,16	0,15	0,13	0,10	0,09	0,07					
				2,50	1,71	12	0,25	0,22	0,19	0,17	0,15	0,14	0,13	0,12	0,10	0,09	0,08	0,07		
				3,00	2,09	14	0,25	0,22	0,20	0,20	0,18	0,17	0,15	0,14	0,14	0,10	0,10	0,09	0,08	0,07
	Internal	TMI 1020 R	0,06	1,00	0,59	6	0,16	0,12	0,10	0,08	0,08	0,05								
				1,25	0,75	7	0,16	0,14	0,12	0,10	0,10	0,08	0,05							
				1,50	0,92	8	0,18	0,15	0,14	0,12	0,10	0,10	0,08	0,05						
				1,75	1,08	9	0,18	0,16	0,14	0,13	0,12	0,12	0,10	0,08	0,05					
				2,00	1,24	10	0,20	0,18	0,15	0,14	0,12	0,12	0,10	0,10	0,08	0,05				
		TMI 1530 R	0,09	1,50	0,91	8	0,18	0,14	0,14	0,12	0,10	0,10	0,08	0,05						
				1,75	1,07	9	0,18	0,16	0,13	0,13	0,12	0,12	0,10	0,08	0,05					
				2,00	1,23	10	0,20	0,18	0,14	0,14	0,12	0,12	0,10	0,10	0,08	0,05				
				2,50	1,56	12	0,20	0,18	0,16	0,16	0,15	0,13	0,13	0,11	0,11	0,10	0,08	0,05		
				3,00	1,88	14	0,22	0,20	0,18	0,18	0,16	0,16	0,14	0,14	0,10	0,10	0,10	0,08	0,07	0,05

The shorter pitch, the slower speed. In case of non wiper insert or internal threading, passing time should be requested to increase.

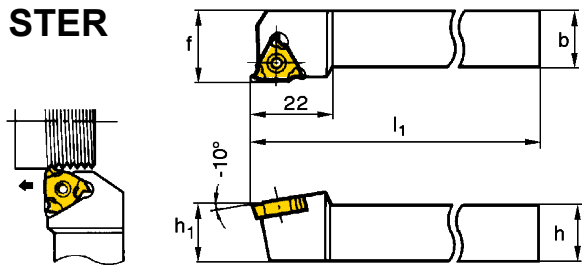
LTER / STER Type

LTER



These figures show right hand tools.

STER



These figures show right hand tools.

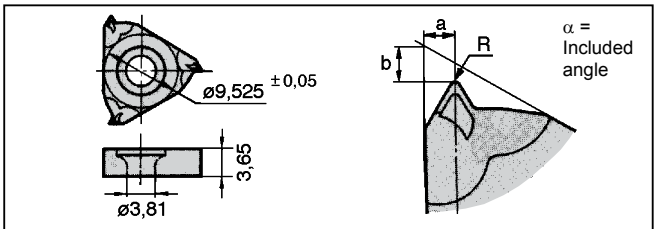
Holders with Lever Lock System

Ordering No.	Stock	Dimensions (mm)					
		h	h_1	b	l_1	f	
LTER 2020	●	20	20	20	125	25	
LTER 2525	●	25	25	25	150	32	

Holders with Screw on System

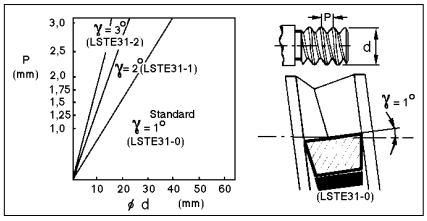
Ordering No.	Stock	Dimensions (mm)					
		h	h_1	b	l_1	f	
STER 1212	●	12	12	12	100	16	
STER 1616	●	16	16	16	100	20	

Inserts

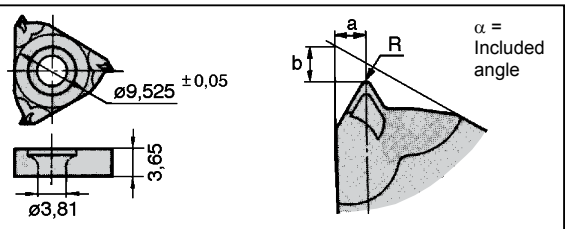


Ordering No.	Pitch (mm)	Pitch Threads No./inch	Coated carbide AC225	Cermet T130A	Dimensions (mm) R	α	a	b	
TME 100 R	1,00	-	●	○	0,13	60	0,8	1,2	
TME 125 R	1,25	-	●		0,17	60	0,8	1,2	
TME 150 R	1,50	-	●		0,20	60	1,0	1,2	
TME 175 R	1,75	-	●		0,24	60	1,2	1,2	(1)
TME 200 R	2,00	-	●		0,27	60	1,4	1,2	
TME 250 R	2,50	-	●		0,35	60	1,4	1,2	
TME 300 R	3,00	-	●		0,42	60	1,8	1,2	
TME 1020 R	1,00 ~ 2,00	24 ~12	●		0,13	60	1,4	1,2	(2)
TME 1530 R	1,50 ~ 3,00	16 ~ 8	●		0,20	60	1,4	1,0	
TWE 1410 R	-	24 ~10	●		0,13	55	1,4	1,2	(3)
TWE 2416 R	-	24 ~16			0,23	55	1,4	1,2	

Remarks: (1) TME100R - 300R (ISO Thread)
(2) TME1020R,1530R (ISO Thread) without chamfer
(3) TWE1410R, 2416R (Whitworth Thread) without chamfer



Inserts



Ordering No.	Pitch (mm)	Pitch Threads No./inch	Coated carbide AC225	Cermet T130A	Dimensions (mm) R	α	a	b	
TME 100 R	1,00	-	●	○	0,13	60	0,8	1,2	
TME 125 R	1,25	-	●		0,17	60	0,8	1,2	
TME 150 R	1,50	-	●		0,20	60	1,0	1,2	
TME 175 R	1,75	-	●		0,24	60	1,2	1,2	(1)
TME 200 R	2,00	-	●		0,27	60	1,4	1,2	
TME 250 R	2,50	-	●		0,35	60	1,4	1,2	
TME 300 R	3,00	-	●		0,42	60	1,8	1,2	
TME 1020 R	1,00 ~ 2,00	24 ~12	●		0,13	60	1,4	1,2	(2)
TME 1530 R	1,50 ~ 3,00	16 ~ 8	●		0,20	60	1,4	1,0	
TWE 1410 R	-	24 ~10	●		0,13	55	1,4	1,2	(3)
TWE 2416 R	-	24 ~16			0,23	55	1,4	1,2	

Remarks: (1) TME100R- 300R (ISO Thread)
(2) TME1020R,1530R (ISO Thread) without chamfer
(3) TWE1410R, 2416R (Whitworth Thread) without chamfer

Spare Parts

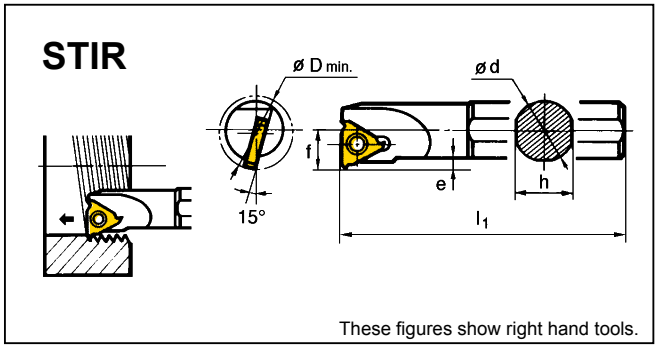
Holder	Lever Pin	Screw	Shim	Shim pin	Wrench
					
LTER	LCL3SD	LCS3TE	LSTE31-0 *)	LSP3SD	LH025

*) Remarks: LTER type has supplement of γ =1° shim LSTE 31-0.
Shims LSTE 31-1 for γ = 2° and LSTE 31-2 for γ = 3° are option.

Spare Parts

Holder	Screw	Wrench
	 2,0 N·m	
STER	BFTX03508	TRX 10

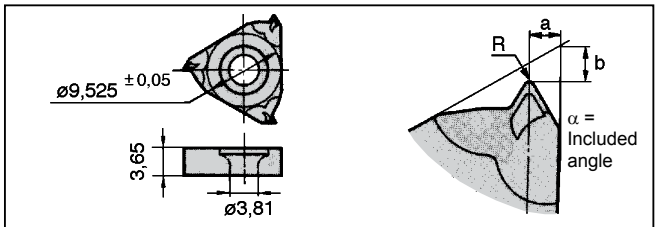
● = Euro stock



■ Holders with Screw on System

Ordering No.	Stock	Dimensions (mm)					
		ød	h	l_1	e	f	ø$D_{min.}$
STIR 316	●	16	15	150	3,5	11	20
STIR 320	●	20	18	180	5,0	14	25

■ Inserts



Ordering No.	Pitch		Coated carbide	Cermet	Dimensions (mm)				
	(mm)	Threads No./inch	AC225	T130A	R	α	a	b	
TMI 100 R	1,00	-	●		0,06	60	0,8	1,2	(1)
TMI 125 R	1,25	-			0,07	60	0,8	1,2	
TMI 150 R	1,50	-	●		0,09	60	1,0	1,2	
TMI 175 R	1,75	-			0,11	60	1,2	1,2	
TMI 200 R	2,00	-	●		0,12	60	1,4	1,2	
TMI 250 R	2,50	-	●		0,16	60	1,4	1,2	
TMI 300 R	3,00	-	●		0,20	60	1,8	1,2	
TMI 1020 R	1,00 ~ 2,00	24 ~ 12			0,06	60	1,0	1,2	(2)
TMI 1530 R	1,50 ~ 3,00	16 ~ 8	●		0,09	60	1,5	1,2	

Remarks: (1) TME100R- 300R (ISO Thread)
(2) TME1020R,1530R (ISO Thread) without chamfer

■ Spare Parts

Holder	Screw	Wrench
	2,0 (N·m)	
STIR	BFTX03508	TRX 10

Milling Cutters

G

G1 ~ G46





Selection Guide — **Face Mill Series** ..... G 2 - 3
ISO — **Milling Insert Identification Table** ..... G 4 - 5

Face Mills

General Purpose Face Mills
DGC (M/F) **13000** ..... G 6 - 9
WGX (M/F) **13000** G10-11
WGC (M/F) **3000/4000** G12-13
UFO (F) **4000/5000** G14-15
DNX (F) **12000** G16-17

Multi Purpose "Wave Radius Mills" with Polygon Inserts
WRCX (F) **1200/1600/2000** G18-19
RSX New G20-21
RSX (F) **10000/12000/16000** G22-23

Shoulder Mills

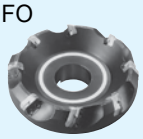
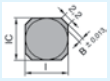
"Sumi Dual" Mill
DFC 09000 New G24-27
"Wave Mills" for Shoulder Milling
WFX 08000/12000 New G28-29
WFX (M/F) **08000** G30
WFX (F) **12000** G31
Tangential Milling System
PWS (F) **4000** G32-33
WEX (F) **2000/3000** G34
WRX (F) G35
PWC (F) **4000** G36-37
CNP (F) **13000** G38

Others

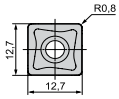
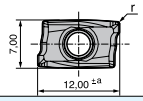
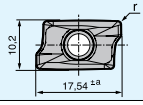
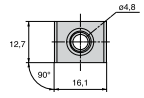
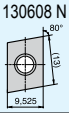
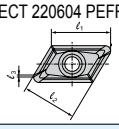
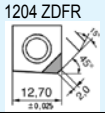
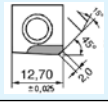
High Feed Milling
MSX 08000/12000/14000 ..... G39
"Wave Mill" Series
WAX 3000 ..... G40
WAX 4000 New G41

Aluminium Milling
SUMIDIA **"RF"** G42
SUMIDIA **"SRF"** G43
Grey Cast Iron Milling
SUMIBORON **"BN Finish Mill" FMU** G44-45

Selection Guide

Application	Endmill Type	Series	Insert Type	Approach Angle / Max. Depth of Cut (mm)	External Diameter (mm)	Application: Face Milling – General Purpose	Face Milling – Finishing	Face Milling – High Feed	Shoulder Milling	Slot Milling	Ramping	Copying	Chamfering	Boring	Finishing	Work Material: P – Carbon Steel / Alloy Steel	P – Tempered Steel / Die Steel	M – Stainless Steel	K – Cast Iron / Ductile Cast Iron	N – Non-Ferrous Metal	N – Aluminium Alloy	S – Ti Alloy / Heat Resistant Alloy	H – Hardened Steel HRC 45 ~ 55	Ref. Page
Face Milling	DGC 	DGC (-M/F) 13000RS	SNMU 13T6ANER-L/G/H  ONMU 13T6ANER-L/G 	SNMU 6 mm 45° / ONMU 3 mm 45°	ø40 ~ ø250 / ø42,9 ~ ø252,9	◎				○			○			◎	◎	○	○					G8
	WGX 	WGX (-M/F) 13000RS	SEMT 13T3 AGSR - L / G / H / FG 	6 mm 45°	ø40 ~ ø250	◎				○			○			◎	◎	○	○					G10
	WGC 	WGC 3000 RS 4000 RS	SEE(M)T 0903 (IC/ l = 9,525) SEE(M)T 13T3 (IC/ l = 13,4) 	4 mm 45°	ø32 ~ ø100	◎				○			○			◎	◎	◎	◎	◎	◎	◎		G12
		WGC (-M/F) 4000 RS		6 mm 45°	ø40 ~ ø200																			
	UFO 	UFO (-F) 4000 RS	SFK-N/R 12T3 (IC/ l = 12,7) SFK-N 1504 (IC/ l = 15,875) 	5 mm 45°	ø50 ~ ø315	○				○			○			○	○	○	○	○	○	○		G14 G15
		UFO 5000 RS		7 mm 45°	ø80 ~ ø315																			
	DNX 	DNX (-F) 12000RS	SNMT1205 ZNEN 	8 mm 65°	ø80 ~ ø250	○										○			◎					G16
Radius Milling	RSX New 	RSX (-F) 10000RS	RDET10T3MOT 	5 mm	ø40 ~ ø52	◎				○	◎	◎						◎				◎		G22
		RSX (-F) 12000RS		6 mm	ø40 ~ ø100																			
		RSX (-F) 16000RS		8 mm	ø63 ~ ø160																			
Multi-Purpose	WRCX 	WRCX (-F/X) 12000RS 16000RS 20000RS	QPMT 120440PPEN/-H 160660PPEN/-H 200670PPEN/-H QPET 120460PPFR-S 160680PPFR-S	6 ~ 10 mm	ø40 ~ ø160	◎				○	◎	◎				◎	◎	◎	◎		◎	○	○	G19
High Feed Milling	MSX 	MSX 08000RS 12000RS 14000RS	WDMT0603ZDTR (d=6,35) WDMT0804ZDTR (d=8,5) WDMT1205ZDTR (d=12) WDMT1406ZDTR (d=14)	1,5 ~ 2,5 mm 20°	ø40 ~ ø100			◎		○	○					◎	◎	◎	◎				○	G39
Shoulder Milling	DFC New 	DFC (-M/F) 09000RS	XNMU 0606_PNER L/G/H 	6 mm 90°	ø50 ~ ø160	○		◎	◎	○						◎	◎	○	◎					G26

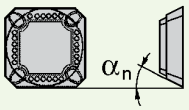
◎ : Best
○ : Suitable

Application	Endmill Type	Series	Insert Type	Approach Angle / Max. Depth of Cut (mm)	External Diameter (mm)	Application: Face Milling: General Purpose	Face Milling: Finishing	Face Milling: High Feed	Shoulder Milling	Slot Milling	Ramping	Copying	Chamfering	Boring	Finishing	Work Material: P: Carbon Steel / Alloy Steel	P: Tempered Steel / Die Steel	M: Stainless Steel	K: Cast Iron / Ductile Cast Iron	N: Non-Ferrous Metal	N: Aluminium Alloy	S: Ti Alloy / Heat Resistant Alloy	H: Hardened Steel HRC 45 ~ 55	Ref. Page
Shoulder Milling	WFX New 	WFX (-F/-M) 08000RS WFX (-F) 12000 RS	SOMT 080304 PZER-L/G/H SOMT 120408 PDER-L/G/H 	6 mm 90° 10 mm 90°	ø50 ~ ø160	○			◎	○						◎	◎	◎	◎	◎	◎			G30 G31
	PWS 	PWS (-F) 4000 RS	LNMX 170808 PNSR-L/G/R 	16 mm 90°	ø80 ~ ø250	○		◎	◎	○						◎	○	○	○					G33
	WEX 	WEX 2000F WEX 3000F	AXMT123504PEER-G AXMT170508PEER-G 	10 mm 90° 14 mm 90°	ø40 ~ ø100	○			◎	◎	◎					◎	◎	◎	◎	◎	◎	◎		G34
	WRX 	WRX 2000F WRX 3000F	AXMT123504PEER-G AXMT170508PEER-G 	18 ~ 36 mm 90° 27 ~ 53 mm 90°	ø40 ~ ø50 ø50 ~ ø100	○			◎	◎	◎					◎	◎	◎	◎	◎	◎	◎		G35
	PWC 	PWC (-F) 4000 RS	LNMX 160608 PNS-N/H 	12 mm 88°	ø80 ~ ø200	○		◎	○	○			◎						◎					G36
	CNP 	CNP (-F) 13000 RS	CNMU 130608 N-G/H CNMQ 130608 N 	12 mm 90°	ø40 ~ ø200				◎							◎	◎	◎	◎					G38
Aluminium Alloy and Non-Ferrous Metals	WAX New 	WAX 3000 RS WAX 4000 RS	AECT 160404 PEFRA AECT 220604 PEFRA 	16 ~ 18 mm 90° 22 ~ 24 mm 90°	ø50 ~ ø125	○			◎	◎	◎	◎								○	◎			G40 G41
	RF 	RF 4000 RS	SNEW 1204 ADFR-NF SDET 1204 ZDFR 	3 mm 90°	ø80 ~ ø315	◎	◎													○	◎			G42
	SRF 	SRF 50/63 RS	SNEW 09T3 ADTR-NF 	5 mm 90°	ø30 ~ ø63	◎	◎													○	◎			G43
High Speed Finishing of Cast Iron	FMU 	FMU 4000 RS	SNEW 1204 ADT-R/L 	0,5 mm 45°	ø80 ~ ø315		◎												◎					G45

ISO Identification Table

Insert shape			
C	80°	A	85°
D	55°	B	82°
E	75°	K	55°
F	50°	H	120°
V	35°	O	135°
R	-	P	108°
S	90°	L	90°
T	60°	M	86°
W	80°		

Clearance angle	
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°

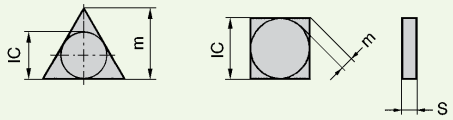


O Other clearance angle with specific description

Insert type			
A		W	
G		T	
M			
N			
R		X	Non standard

S E M T

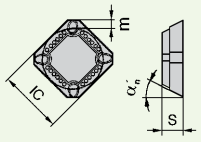
Tolerances



IC: theoretical diameter of inscribed circle
m: nose height
s: thickness

Class	Tolerances (mm)		
	m	IC	s
A	±0,005	±0,025	±0,025
F	±0,005	±0,013	±0,025
C	±0,013	±0,025	±0,025
H	±0,013	±0,013	±0,025
E	±0,025	±0,025	±0,025
G	±0,025	±0,025	±0,13

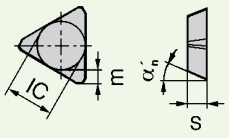
Class	Tolerances (mm)		
	m	IC	s
J	±0,005	±0,05~ ±0,13*)	±0,025
K	±0,013	±0,05~ ±0,13*)	±0,025
L	±0,025	±0,05~ ±0,13*)	±0,025
M	±0,08~ ±0,18*)	±0,05~ ±0,13*)	±0,13
N	±0,08~ ±0,18*)	±0,05~ ±0,13*)	±0,025
U	±0,13~ ±0,38*)	±0,08~ ±0,25*)	±0,13



*) The tolerance is dependent upon the insert size of IC. See tables below.

Tolerance class for dimension m

m	S	T	C	W	V	D
6,35	±0,08				-	±0,11
9,525	±0,08				±0,13	±0,11
12,7	±0,13					±0,15
15,875	±0,15					±0,18
19,05	±0,15					±0,18
25,4	±0,18					

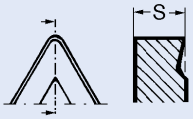


Tolerance class for dimension IC

IC	S	T	C	D	V	W	R
6,35	±0,05						
9,525	±0,05						±0,05
12,7	±0,08						±0,08
15,875	±0,10						±0,10
19,05	±0,10						±0,10
25,4	±0,13						±0,10

ISO Identification Table

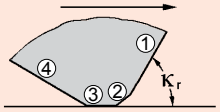
Thickness



02	s = 2,38 mm
03	s = 3,18
T3	**s = 3,97**
04	s = 4,76
05	s = 5,56
06	s = 6,35
07	s = 7,94
09	s = 9,52

Corner geometry with wiper flat

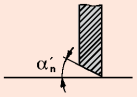
Entering angle



A	**45°**
D	60°
E	75°
F	85°
P	90°
Z	- Others

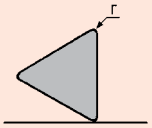
1. Major cutting edge
2. Chamfered corner
3. Wiper flat
4. Side cutting edge

Clearance angle on wiper flat



A	3°
B	5°
C	7°
D	15°
E	20°
F	**25°**
G	30°
N	0°
P	11°
Z	- **Others**

Radius



02	r = 0,2 mm
04	r = 0,4
08	r = 0,8
12	r = 1,2
16	r = 1,6
20	r = 2,0
24	r = 2,4

M0 - Round insert (metric)
00 - Round insert (inch)

1 3 T 3 A G S R

Insert size

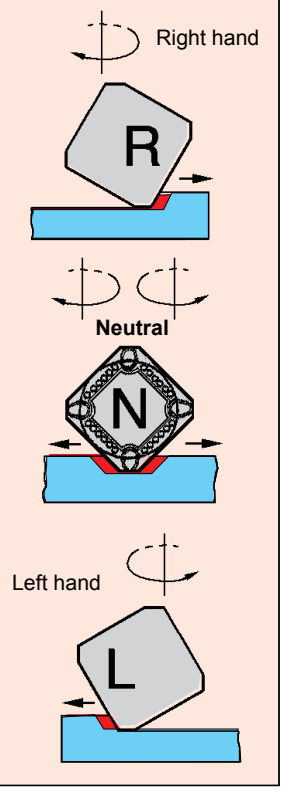
Symbol and cutting edge length (mm)

IC d (mm) \ Insert type	C	D	R	S	T	V	W
3,97					**06** (6,9)		
4,76					**08** (8,2)		
5,0			**05** (5,0)				
5,56					**09** (9,6)	**09** (9,7)	**03** (3,8)
6,0			**06** (6,0)				
6,35	**06** (6,4)	**07** (7,7)		**06** (6,35)	**11** (11,0)	**11** (11,1)	**04** (4,3)
7,94	**08** (8,0)			**07** (7,94)			**05** (5,4)
8,0			**08** (8,0)				
9,525	**09** (9,7)	**11** (11,6)	**09** (9,525)	**09** (9,525)	**16** (16,5)	**16** (16,6)	**06** (6,5)
10			**10** (10,0)				
12			**12** (12,0)				
12,7	**12** (12,9)	**15** (15,5)	**12** (12,7)	**12** (12,7)	**22** (22,0)		**08** (8,7)
15,875	**16** (16,1)	**19** (19,4)	**15** (15,875)	**15** (15,875)	**27** (27,5)		**10** (10,9)
16			**16** (16,0)				
19,05	**19** (19,3)		**19** (19,05)	**19** (19,05)	**33** (33,0)		
20			**20** (20,0)				
25			**25** (25,0)				
25,4			**25** (25,4)	**25** (25,4)			
31,75			**31** (31,75)	**31** (31,75)			
32			**32** (32,0)				

Cutting edge condition

F	Sharp
E	Rounded
T	Chamfered
S	Rounded and chamfered

Feed direction



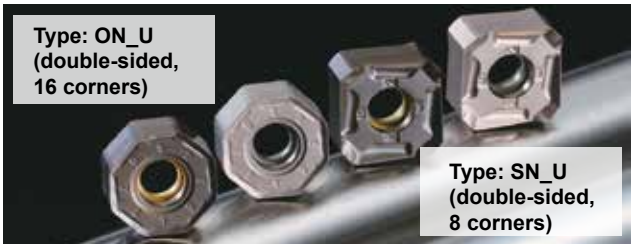
DGC(M/F) Type



General Features

Sumi Dual Mill DGC type utilizes double-sided inserts for excellent economy. This is a general-purpose cutter featuring high cutting edge strength for high efficiency milling and low-burr chipbreaker design that provides high qualitiy machined surface.

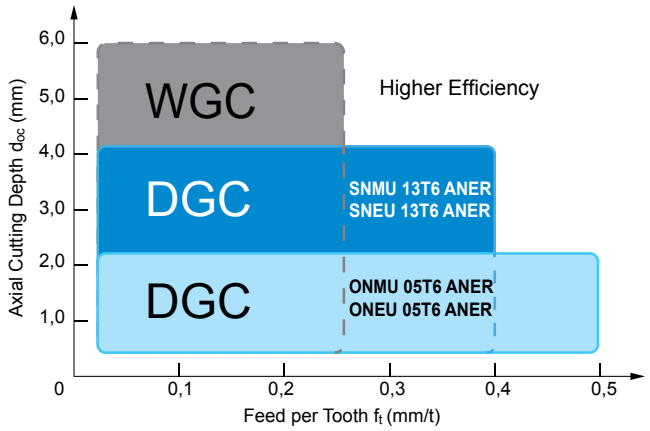
The DGC type insert lineup includes double-sided SNMU / SNEU and ONMU / ONEU types.
Up to 16 corners can be used for improved economy.



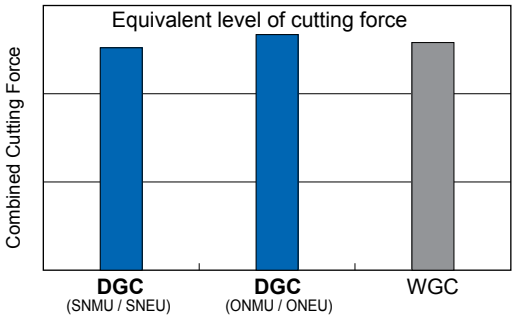
Characteristics

- Same cutting performance as single-sided inserts plus superior economy.
- Achieves level of cutting edge sharpness and machined surface quality equivalent to single-sided cutter at a maximum cutting depth of $d_{oc} \leq 3$mm.

Recommended Cutting Conditions for General Steel Milling



Cutting Force Comparison



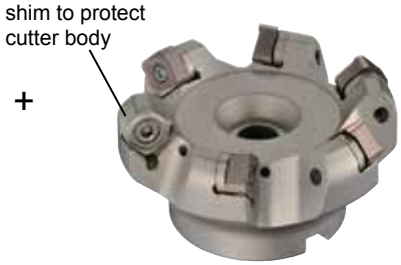
Work Material:	34CrMo4
Tool:	Ø100
Cutting Data:	v_c=200m/min, f_t=0,3mm/t, d_{oc}=3mm, w_{oc}=85mm

Dual-Purpose Body

Two types of inserts can be used with a single body depending on milling application to help reduce costs. Stronger than single-sided cutters.



– first recommendation
– economical double-sided design offers 8 cutting edges with SN_U inserts
– maximum depth of cut: d_{oc} = 6mm





– double-sided design with 16 corners for improved economy
– maximum depth of cut: d_{oc} = 3mm



max. d_{oc} = 6mm
8 corners use

Use two types of inserts for different applications.



max. d_{oc} = 3mm
16 corners use

Line-up

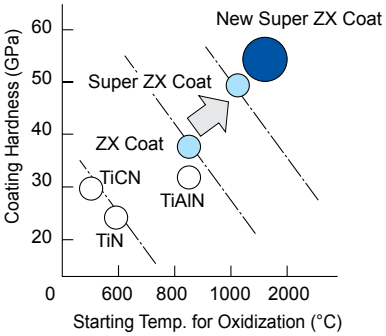
Choose a tool that fits your application from a comprehensive line-up

Cat. No	DGC 13000 RS	DGCM 13000 RS	DGCF 13000 RS	DGC 13000 EW
Type	Standard pitch	Medium pitch	Fine pitch	Endmill type
Cutter Diameter	Ø40mm ~ Ø250mm	Ø50mm ~ Ø250mm	Ø50mm ~ Ø250mm	Ø40mm ~ Ø63mm
Cutting Edges	3 ~ 10	4 ~ 14	5 ~ 18	3 ~ 4
Shape				

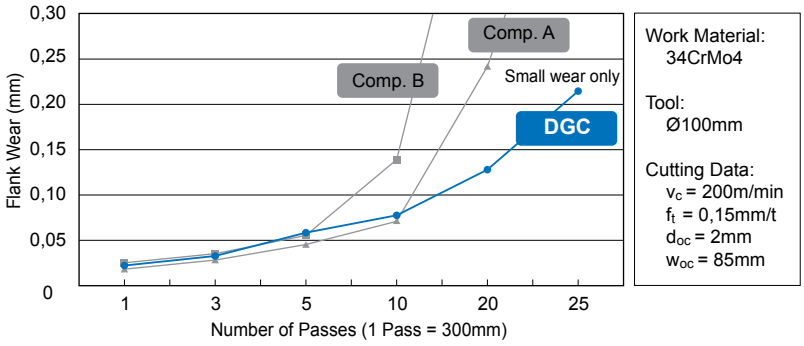
High Reliability

Employs New Super ZX Coating, a multi-layer PVD coating grade and CVD coating grade with enhanced coating strength provided by newly developed stress control technology.
Improved run-out precision reduces tool life deviation to achieve highly reliable tool life.

Multi-layer PVD Coating



Wear Resistance

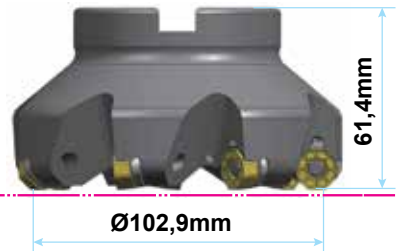


Cutter Diameter and Cutter Body Height

Insert: SN_U 13T6 ANER (square)



Insert: ON_U 05T6 ANER (octagonal)

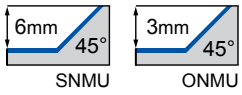


Example: D_c = 100mm	Number of Cutting Edges	Tool Diameter (mm)	Cutter Height (mm)	Max. Depth of Cut (mm)
SNMU / SNEU 	8	100,0	63,0	6,0
ONMU / ONEU 	16	102,9	61,4	3,0

Square inserts (SNMU/SNEU) and octagonal inserts (ONMU/ONEU) can be used interchangeably on the same body.
Using these inserts the cutter will have different cutter diameter and cutter body height.

General Milling of Steel and Cast Iron

Rake Angle	Radial	-10°
	Axial	-5°



SNMU ONMU

Body – Shell type



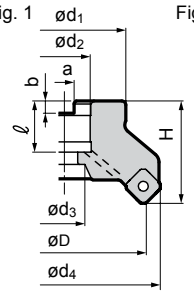
Fig. 1


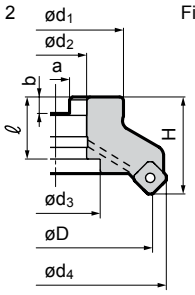
Fig. 2


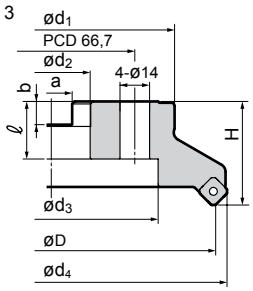
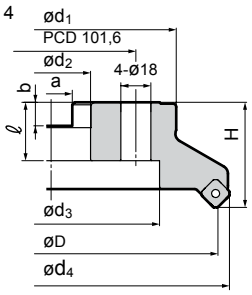
Fig. 3


Fig. 4


Cutter body ØD ≥ 160mm: no inner coolant

Body

● Type: DGC, Standard Pitch

Cat. No.	Stock	Dimension (mm)				Mounting					No. of Teeth	Weight (kg)	Fig.
		øD	ød4	ød1	H	ød2	ød3	a	b	ℓ			
DGC 13040 RS	●	40 (42,90)	54	36	40 (38,44)	16	13,5	8,4	5,6	18	3	0,3	1
DGC 13050 RS	●	50 (52,90)	64	40	40 (38,44)	22	18,0	10,4	6,3	20	3	0,4	1
DGC 13063 RS	●	63 (65,90)	77	50	40 (38,44)	22	18,0	10,4	6,3	20	4	0,5	1
DGC 13080 RS	●	80 (82,90)	94	60	50 (48,44)	27	20,0	12,4	7,0	25	4	1,2	1
DGC 13100 RS	●	100 (102,90)	114	70	50 (48,44)	32	46,0	14,4	8,5	32	5	1,6	2
DGC 13125 RS	●	125 (127,90)	139	80	63 (61,44)	40	52,0	16,4	9,5	29	6	2,8	1
DGC 13160 RS	●	160 (162,90)	174	130	63 (61,44)	40	88,0	16,4	9,5	29	7	4,5	3
DGC 13200 RS	❑	200 (202,90)	214	150	63 (61,44)	60	130,0	25,7	14,0	35	8	7,1	4
DGC 13250 RS	❑	250 (252,90)	264	190	63 (61,44)	60	160,0	25,7	14,0	35	10	11,2	4

● Type: DGCM, Medium Pitch

Cat. No.	Stock	Dimension (mm)				Mounting					No. of Teeth	Weight (kg)	Fig.
		øD	ød4	ød1	H	ød2	ød3	a	b	ℓ			
DGCM 13050 RS	●	50 (52,90)	64	40	40 (38,44)	22	18	10,4	6,3	20	4	0,3	1
DGCM 13063 RS	●	63 (65,90)	77	50	40 (38,44)	22	18	10,4	6,3	20	5	0,5	1
DGCM 13080 RS	●	80 (82,90)	94	60	50 (48,44)	27	20	12,4	7,0	25	6	1,1	1
DGCM 13100 RS	●	100 (102,90)	114	70	50 (48,44)	32	46	14,4	8,5	32	7	1,5	2
DGCM 13125 RS	●	125 (127,90)	139	80	63 (61,44)	40	52	16,4	9,5	29	8	2,8	1
DGCM 13160 RS	●	160 (162,90)	174	130	63 (61,44)	40	88	16,4	9,5	29	10	4,6	3
DGCM 13200 RS	❑	200 (202,90)	214	150	63 (61,44)	60	130	25,7	14,0	35	12	7,0	4
DGCM 13250 RS	❑	250 (252,90)	264	190	63 (61,44)	60	160	25,7	14,0	35	14	11,1	4

● Type: DGCF, Fine Pitch

Cat. No.	Stock	Dimension (mm)				Mounting					No. of Teeth	Weight (kg)	Fig.
		øD	ød4	ød1	H	ød2	ød3	a	b	ℓ			
DGCF 13050 RS	●	50 (52,90)	64	40	40 (38,44)	22	18	10,4	6,3	20	5	0,3	1
DGCF 13063 RS	●	63 (65,90)	77	50	40 (38,44)	22	18	10,4	6,3	20	6	0,5	1
DGCF 13080 RS	●	80 (82,90)	94	60	50 (48,44)	27	20	12,4	7,0	25	8	1,1	1
DGCF 13100 RS	●	100 (102,90)	114	70	50 (48,44)	32	46	14,4	8,5	32	10	1,4	2
DGCF 13125 RS	●	125 (127,90)	139	80	63 (61,44)	40	52	16,4	9,5	29	12	2,7	1
DGCF 13160 RS	●	160 (162,90)	174	130	63 (61,44)	40	88	16,4	9,5	29	14	4,4	3
DGCF 13200 RS	❑	200 (202,90)	214	150	63 (61,44)	60	130	25,7	14,0	35	16	6,9	4
DGCF 13250 RS	❑	250 (252,90)	264	190	63 (61,44)	60	160	25,7	14,0	35	18	11,0	4

( ) Figures in brackets indicate values for ONMU inserts.
Inserts are not included.

Identification Details

DGC	M	13	050	R	S
Cutter Series	M: Medium F: Fine	Insert Size	Cutter Diameter	Direction	Metric

● = Euro stock
❑ = Delivery on request

Inserts

Application	Coated Carbide						
High Speed/Light cut	P			K		MS	
General Purpose		PM	M	K		MS	
Roughing		PM	PM		K		MS
Cat. No.	ACP100	ACP200	ACP300	ACK200	ACK300	ACM200	ACM300	Fig.
SNMU 13T6ANER L	●	●	●	●	●			1
SNMU 13T6ANER G	●	●	●	●	●			1
SNMU 13T6ANER H	●	●	●	●	●			1
SNMU 13T6ANER FL	●	●	●	●	●			2
SNMU 13T6ANER FG	●	●	●	●	●			2
SNEU 13T6ANER L						●	●	1
SNEU 13T6ANER G						●	●	1
SNEU 13T6ANER FL						●	●	2
SNEU 13T6ANER FG						●	●	2
XNEU 13T6ANER W		●			●			3
ONMU 05T6ANER L	●	●	●	●	●			4
ONMU 05T6ANER G	●	●	●	●	●			4
ONEU 05T6ANER L						●	●	4
ONEU 05T6ANER G						●	●	4

Fig. 1

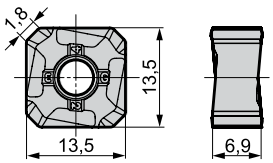


Fig. 2

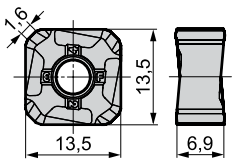


Fig. 3

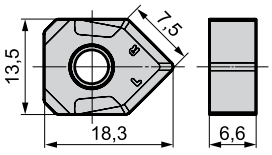
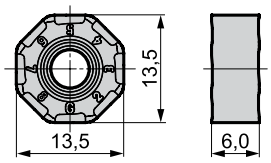
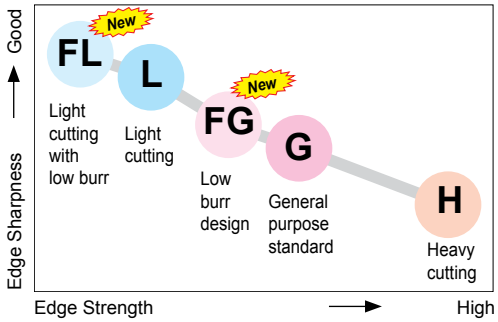


Fig. 4

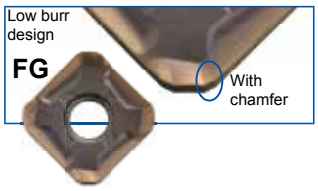


Chipbreaker



Improved Milling Quality

FG type chipbreakers feature chamfer to minimize burrs and provide excellent milling qualitiy.





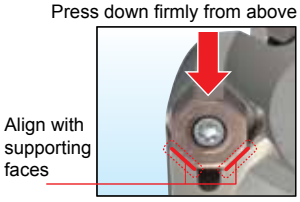
FG type inserts with low-burr design enable high-qualitiy milling with few burrs and little edge chipping.

Attaching Inserts

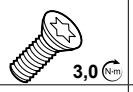


Octagonal Inserts

Firmly align insert with supporting face, press down in the direction of the arrow and tighten the screw to fix the insert.



Spare Parts

Shim	Shim Screw	L Type Wrench	Insert Srew	Spanner
				
DGCS13R	BW0609F	LH040	BFTX0412IP	TRDR15IP

Optional

Insert Srew (*)

BFTX0418IP

*Corners can be changed simply by loosening the screw. (Only suitable for DGC / DGCM types with body size ≥ Ø80).

Recommended Cutting Conditions (SN_U)

ISO	Work Material	Fit-ness	Cutting Speed v_c (m/min)	Feed Rate f_t (min/t)	Depth of Cut (mm)	Grade
P	General Steel	◎	150-**200**-250	0,10-**0,25**-0,40	<4	ACP200 ACP300
	Alloyed Steel	◎	180-**250**-350	0,10-**0,30**-0,45	<4	ACP200 ACP300
	Die Steel	◎	100-**150**-200	0,15-**0,25**-0,35	<4	ACP200 ACP300
M	Stainless Steel	○	160-**200**-250	0,15-**0,23**-0,30	<3	ACM200 ACM300 ACP300
K	GG+GGG	◎	100-**200**-250	0,10-**0,25**-0,40	<5	ACK200 ACK300

Min. – **Optimum** – Max.

Recommended Cutting Conditions (ON_U)

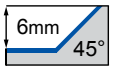
ISO	Work Material	Fit-ness	Cutting Speed v_c (m/min)	Feed Rate f_t (min/t)	Depth of Cut (mm)	Grade
P	General Steel	◎	150-**200**-250	0,10-**0,30**-0,50	<2	ACP200 ACP300
	Alloyed Steel	◎	180-**250**-350	0,10-**0,50**-0,50	<2	ACP200 ACP300
	Die Steel	◎	100-**150**-200	0,15-**0,25**-0,30	<2	ACP200 ACP300
M	Stainless Steel	○	160-**200**-250	0,15-**0,23**-0,30	<2	ACM200 ACM300 ACP300
K	GG+GGG	◎	100-**200**-250	0,10-**0,30**-0,50	<2	ACK200 ACK300

◎ Preferred choice ○ Suitable

WGX (M/F) Type

General Milling of Steel and Cast Iron

Rake Angle		
	Radial	-20° ~ -24°
	Axial	20° ~ 22°



■ Body – Shell type



Fig. 1

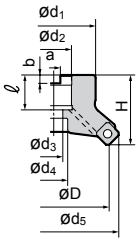


Fig. 2

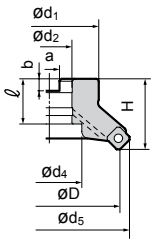


Fig. 3

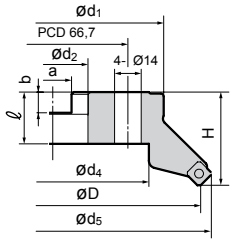
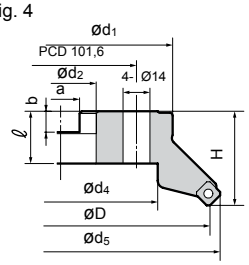


Fig. 4



Cutter body ØD ≥ 160mm: no inner coolant

■ Body

Inner coolant available for D_c ≤ Ø125mm

● Type: WGX, Standard Pitch

Cat. No.	Stock	Dimension (mm)				Mounting						No. of Teeth	Weight (kg)	Fig.
		øD	ød5	ød1	H	ød2	ød4	ød3	a	b	ℓ			
WGX 13040 RS	●	40	52	32	40	16	14,0	9,0	8,4	5,6	18	3	0,3	1
WGX 13050 RS	●	50	62	40	40	22	18,0	11,0	10,4	6,3	20	3	0,4	1
WGX 13063 RS	●	63	76	50	40	22	18,0	11,0	10,4	6,3	20	4	0,6	1
WGX 13080 RS	●	80	93	55	50	27	20,0	13,5	12,4	7,0	25	4	1,2	1
WGX 13100 RS	●	100	113	70	50	32	46,0	-	14,4	8,5	32	5	1,6	2
WGX 13125 RS	●	125	138	80	63	40	52,0	29,0	16,4	9,5	29	6	2,8	1
WGX 13160 RS	●	160	173	130	63	40	88,0	-	16,4	9,5	29	7	4,5	3
WGX 13200 RS	●	200	213	150	63	60	130,0	-	25,7	14,0	35	8	7,1	4
WGX 13250 RS	❑	250	263	190	63	60	160,0	-	25,7	14,0	35	10	11,2	4

● Type: WGXM, Medium Pitch

Cat. No.	Stock	Dimension (mm)				Mounting						No. of Teeth	Weight (kg)	Fig.
		øD	ød5	ød1	H	ød2	ød4	ød3	a	b	ℓ			
WGXM 13050 RS	●	50	62	40	40	22	18,0	11,0	10,4	6,3	20	4	0,4	1
WGXM 13063 RS	●	63	77	50	40	22	18,0	11,0	10,4	6,3	20	5	0,6	1
WGXM 13080 RS	●	80	94	55	50	27	20,0	13,5	12,4	7,0	25	6	1,1	1
WGXM 13100 RS	●	100	114	70	50	32	46,0	-	14,4	8,5	32	7	1,6	2
WGXM 13125 RS	●	125	139	80	63	40	52,0	29,0	16,4	9,5	29	8	2,8	1
WGXM 13160 RS	●	160	174	130	63	40	88,0	-	16,4	9,5	29	10	4,5	3
WGXM 13200 RS	●	200	214	150	63	60	130,0	-	25,7	14,0	35	12	7,0	4
WGXM 13250 RS	❑	250	264	190	63	60	160,0	-	25,7	14,0	35	14	11,1	4

● Type: WGXF, Fine Pitch

Cat. No.	Stock	Dimension (mm)				Mounting						No. of Teeth	Weight (kg)	Fig.
		øD	ød5	ød1	H	ød2	ød4	ød3	a	b	ℓ			
WGXF 13050 RS	●	50	62	40	40	22	18,0	11,0	10,4	6,3	20	5	0,4	1
WGXF 13063 RS	●	63	77	50	40	22	18,0	11,0	10,4	6,3	20	6	0,6	1
WGXF 13080 RS	●	80	94	55	50	27	20,0	13,5	12,4	7,0	25	8	1,1	1
WGXF 13100 RS	●	100	114	70	50	32	46,0	-	14,4	8,5	32	10	1,5	2
WGXF 13125 RS	●	125	139	80	63	40	52,0	29,0	16,4	9,5	29	12	2,7	1
WGXF 13160 RS	●	160	174	130	63	40	88,0	-	16,4	9,5	29	16	4,5	3
WGXF 13200 RS	●	200	214	150	63	60	130,0	-	25,7	14,0	35	20	6,9	4
WGXF 13250 RS	❑	250	264	190	63	60	160,0	-	25,7	14,0	35	24	11,0	4

( ) Figures in brackets indicate values for ONMU inserts.
Inserts are not included.

■ Identification Details

WGX	M	13	050	R	S
Cutter Series	M: Medium F: Fine	Insert Size	Cutter Diameter	Direction	Metric

● = Euro stock
❑ = Delivery on request

WGX (M/F) Type



General Features

The Wavemill WGX Type employs unique chipbreaker design to provide lower cutting resistance and higher quality surface finishes than conventional tools.

Series

Type	Cat. No.	Cutter	No. of Teeth
Standard Pitch	WGX 13000RS	Ø40 ~ Ø250	3 ~ 10
Medium Pitch	WGXM 13000RS	Ø50 ~ Ø250	4 ~ 14
Fine Pitch	WGXF 13000RS	Ø50 ~ Ø250	5 ~ 24
Endmill Type	WGX 13000EW	Ø32 ~ Ø63	3 ~ 5

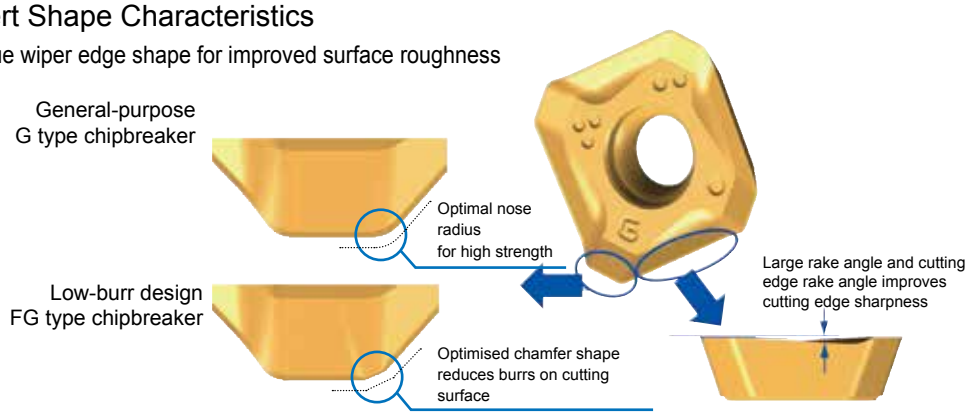
Inner coolant available for $D_c \leq$ Ø125mm

Characteristics

- Stable Cutting
  Special chipbreaker designed for WGX enables lower cutting forces.
- High Quality
  Improved run-out precision and unique wiper edge shape ensure excellent surface finish quality.
  Optimised chamfer edge reduces burr and edge chipping.
- Long Tool Life
  Features high precision technology that reduces insert run-out variation and a new coating to provide stable and long tool life.

Insert Shape Characteristics

Unique wiper edge shape for improved surface roughness



Inserts

Application	Coated Carbide							Carb.	DLC	
High Speed/Light Cut	P			K		MS		KN	N	
General Purpose		PM	M	K		MS	MS		N	
Roughing		PM	PM		K		MS			
Cat. No.	ACP100	ACP200	ACP300	ACK200	ACK300	ACM200	ACM300	H1	DL1000	Fig.
SEET 13T3AGFR-L								○	○	1
New SEET 13T3AGSR-L	●	●	●	●	●	●	●			1
SEET 13T3AGSR-G	●	●	●	●	●	●	●			1
SEMT 13T3AGSR-L	●	●	●	●	●	●	●			1
SEMT 13T3AGSR-G	●	●	●	●	●	●	●			1
SEMT 13T3AGSR-H	●	●	●	●	●	●	●			1
SEMT 13T3AGSR-FG	●	●	●	●	●	●	●			2
New XEEW 13T3AGER-WR		●			●					3

Fig. 1

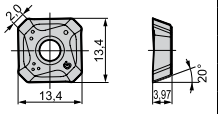


Fig. 2

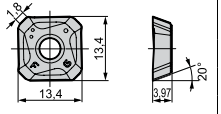
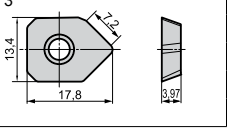
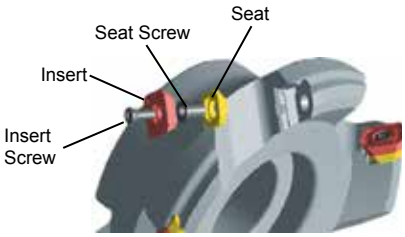


Fig. 3





Spare Parts

Applicable Cutters	Seat	Seat Screw	Insert Screw	Insert Wrench	Torque (N·m)	Seat Wrench
						
WGX (-M/F)	WGCS 13 R	BW 0507 F	BFTX 03512 IP	TRDR 15 IP	3,0	LH 035

Recommended Cutting Conditions

ISO	Work Material	Hardness	Cutting Speed v_c (m/min)	Feed Rate f_t (mm/tooth)	Grade
P	General Steel	180~280HB	150-**200**-250	0,15-**0,20**-0,25	ACP200
P	Soft Steel	≤180HB	180-**265**-350	0,10-**0,25**-0,40	ACP200
P	Die Steel	200~220HB	100-**150**-200	0,15-**0,20**-0,25	ACP200
M	Stainless Steel	-	160-**205**-250	0,15-**0,23**-0,30	ACM300
K	Cast Iron	250HB	100-**175** -250	0,15-**0,23**-0,30	ACK200
N	Non Ferrous Alloy	-	500-**750**-1000	0,15-**0,23**-0,30	DL1000
S	Exotic Alloy	-	30 - **50**- 80	0,10-**0,20**-0,30	ACM300

Minimum-**Optimum**-Maximum

WGC (M/F) Type

General Milling for Steel, Cast Iron & Exotic Material

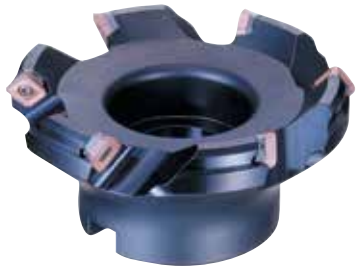


Fig. 1

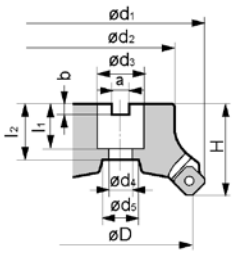


Fig. 2

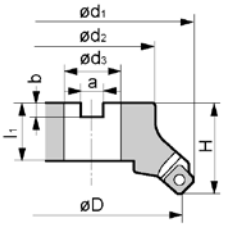
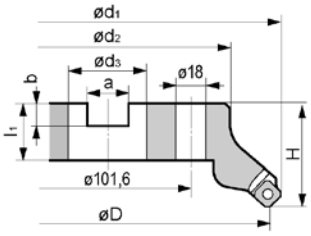


Fig. 3



■ Body

● Standard WGC - Type

Type	Cat. No.	Stock	Dimensions (mm)				Mounting							No. of teeth	Weight (Kg)	Fig.
			ø D	ød1	ød2	H	a	b	ød3	ød4	ød5	l1	l2			
WGC 3000	WGC 3032 RS	❑	32	41	32	40	8,4	5,6	16	9	14	18	28	4	0,2	1.
	WGC 3040 RS	●	40	49	32	40	8,4	5,6	16	9	14	18	28	4	0,3	
	WGC 3050 RS	●	50	59	40	40	10,4	6,3	22	11	18	20	26	5	0,4	
	WGC 3063 RS	❑	63	72	50	40	10,4	6,3	22	11	18	20	26	6	0,6	
	WGC 3080 RS		80	89	60	50	12,4	7,0	27	13,5	20	25	31	6	1,1	
	WGC 3100 RS		100	109	70	50	14,4	8,5	32	-	-	32	-	7	1,5	2.
WGC 4000	WGC 4040 RS	❑	40	52	32	40	8,4	5,6	16	9	14	18	28	3	0,4	1.
	WGC 4050 RS	●	50	63	40	40	10,4	6,3	22	11	18	20	26	3	0,5	
	WGC 4063 RS	●	63	76	50	40	10,4	6,3	22	11	18	20	26	4	0,6	
	WGC 4080 RS	●	80	93	60	50	12,4	7,0	27	13,5	20	25	31	4	1,0	
	WGC 4100 RS	●	100	113	70	50	14,4	8,5	32	-	-	32	-	5	1,5	2.
	WGC 4125 RS	●	125	138	80	63	16,4	9,5	40	-	-	38	-	6	2,6	
	WGC 4160 RS	●	160	173	100	63	16,4	9,5	40	-	-	38	-	7	4,0	
	WGC 4200 RS	●	200	213	130	63	25,7	14,0	60	-	-	35	-	8	6,6	3.

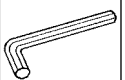
● Medium Pitch WGCM - Type

Type	Cat. No.	Stock	Dimensions (mm)				Mounting							No. of teeth	Weight (Kg)	Fig.
			ø D	ød1	ød2	H	a	b	ød3	ød4	ød5	l1	l2			
WGCM 4000	WGCM 4050 RS	●	50	63	40	40	10,4	6,3	22	11	18	20	26	4	0,5	1.
	WGCM 4063 RS	●	63	76	50	40	10,4	6,3	22	11	18	20	26	5	0,6	
	WGCM 4080 RS	●	80	93	60	50	12,4	7,0	27	13,5	20	25	31	6	1,0	
	WGCM 4100 RS	●	100	113	70	50	14,4	8,5	32	-	-	32	-	7	1,5	2.
	WGCM 4125 RS	●	125	138	80	63	16,4	9,5	40	-	-	38	-	8	2,6	
	WGCM 4160 RS	●	160	173	100	63	16,4	9,5	40	-	-	38	-	10	4,0	
	WGCM 4200 RS	❑	200	213	130	63	25,7	14,0	60	-	-	35	-	12	6,6	3.

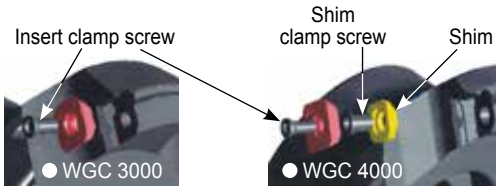
● Close Pitch WGCF - Type

Type	Cat. No.	Stock	Dimensions (mm)				Mounting							No. of teeth	Weight (Kg)	Fig.
			ø D	ød1	ød2	H	a	b	ød3	ød4	ød5	l1	l2			
WGCF 4000	WGCF 4050 RS	●	50	63	40	40	10,4	6,3	22	11	18	20	26	5	0,5	1.
	WGCF 4063 RS	●	63	76	50	40	10,4	6,3	22	11	18	20	26	6	0,6	
	WGCF 4080 RS	●	80	93	60	50	12,4	7,0	27	13,5	20	25	31	8	1,0	
	WGCF 4100 RS	●	100	113	70	50	14,4	8,5	32	-	-	32	-	10	1,5	2.
	WGCF 4125 RS	●	125	138	80	63	16,4	9,5	40	-	-	38	-	12	2,6	
	WGCF 4160 RS	●	160	173	100	63	16,4	9,5	40	-	-	38	-	16	4,0	
	WGCF 4200 RS	❑	200	213	130	63	25,7	14,0	60	-	-	35	-	20	6,6	3.

■ Spare Parts

Cutter	Shim	Shim screw	Insert screw		Wrench	Wrench
						
WGC 3000 RS	-	-	BFTX 0307 IP	**2,0**	TRDR 10 IP	-
WGC/-F 4000 RS	WGCS 13 R	BW 0507 F	BFTX 03512 IP	**3,0**	TRDR 15 IP	LH035

■ Structure



● = Euro stock
○ = Japan stock

❑ = Delivery on request

Face Mill
WGC (M/F) Type

Features

- Suitable for high speed machining v_c < 400m/min.
- Tough lightweight cutter body with wide chip pockets for fast metal removal.
- Low cost precision moulded inserts give G class performance at greatly reduced cost.
- Wide range of grades for most workpiece materials - including steels, irons, high temperature alloys, aluminium's etc.
- Improves metal removal rates, flatness, dimensional accuracy, and surface finish.



Insert

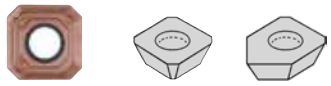


Fig. 1

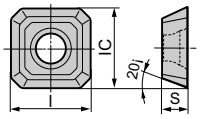


Fig. 2

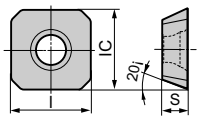
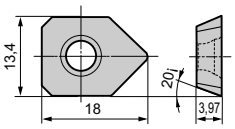


Fig. 3



For WGC 3000 series	Cat. No.	Coated Carbide					DLC	Cermet	Uncoated Carbide		PCD	Dimensions (mm)			Fig.
		ACP100	ACP200	ACP300	ACK200	ACK300	DL1000	T250A	EH520	H1	DA2200	l	IC	s ±t	
	SEET 0903 AGFN-L	●	●	●	●	●						9,525 ±0,025		3,18 ±0,025	1.
	SEET 0903 AGSN-G	●	●	●	●	●									
	SEET 0903 AGSN-N	●	●	●	●	●									
	SEMT 0903 AGSN-L	❍	●	●	❍	❍						9,525 ±0,05		3,18 ±0,13	
	SEMT 0903 AGSN-G	●	●	●	●	●									
For WGC, WGC M/-F 4000 series	SEET 13T3 AGFN-L	●	●	●	●	●	●		●	●		13,4 ±0,025		3,97 ±0,025	1.
	SEET 13T3 AGSN-G	●	●	●	●	●		●							
	SEET 13T3 AGSN-N	●	●	●	●	●		●							
	SEMT 13T3 AGSN-L	●	●	●	●	●						13,4 ±0,08		3,97 ±0,13	
	SEMT 13T3 AGSN-G	●	●	●	●	●									
	SEMT 13T3 AGSN-H	●	●	●	●	●									
	SECW 13T3 AGTN-N-NF											13,4 ±0,025		3,97 ±0,025	2.
	XEEW 13T3 AGFR-W-NF											18	13,4	3,97 ±0,025	3.
	XEEW 13T3 AGER-W					❍									

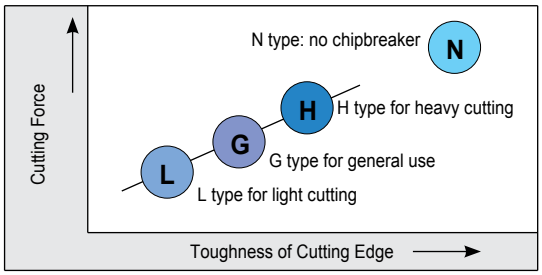
Specifications



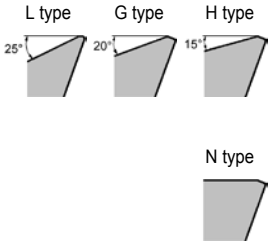
Approach angle: 45°
Axial rake angle: + 20° ~ +22° (+ 20°)
Radial rake angle: - 20° ~ - 24° (- 10° ~ - 19°)
0,03mm
Max. depth of cut: 6 mm (4 mm)
0,02mm
Run-out with M class insert SEMT13T3

( ) shows WGC 3000 type

Chip Breaker System



● Cutting Edge Geometry



Recommended Cutting Conditions

[v_c =m/min, f_t =mm/tooth] [min.– **optimum** – max.]

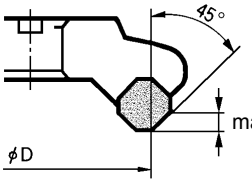
Insert Type		SEMT 13T3 AGSN-G												
Grade		ACP100			ACP200			ACP300		ACK200		ACK300		
Work Material / Type		Low carbon steel	Alloy steel	Die steel	Low carbon steel	Alloy steel	Die steel	Stainless steel austenitic	Stainless steel martensitic	Cast iron	Ductile cast iron	Cast iron	Ductile cast iron
WGC (-M/-F) 4040 ~ 4200	v_c	100-**250**-400	80-**220**-280	80-**150**-250	80-**200**-370	70-**150**-250	60-**130**-220	120-**180**-240	100-**140**-200	220-**270**-450	150-**180**-250	180-**220**-270	130-**160**-220
	f_t	0,1-**0,25**-0,4	0,1-**0,25**-0,4	0,1-**0,2**-0,3	0,1-**0,25**-0,4	0,1-**0,25**-0,4	0,1-**0,2**-0,3	0,1-**0,2**-0,3	0,1-**0,2**-0,3	0,1-**0,25**-0,4	0,1-**0,25**-0,4	0,1-**0,25**-0,4	0,1-**0,25**-0,4
	d_{oc}	1,0-**3,0**-5,0			1,0-**3,0**-5,0			1,0-**2,0**-3,0		1,0-**3,0**-5,0		1,0-**3,0**-5,0	

UFO / UFOF Type

General Milling for Steel, Cast Iron & Exotic Material



Specifications



Approach angle: 45°
Axial rake angle: + 27°
Radial rake angle: - 7°
(-10° for ø 50 and ø 63)
max depth of cut: 5,0 mm (UFO 4000 type)
7,0 mm (UFO 5000 type)

Body

Type	Cat. No.	Stock R	Stock L	Dimensions (mm) ø D	ø d_1	ø d_2	H	Mounting ø d_3	a	b	l_1	No. of teeth	max. depth of cut	Weight (Kg)	Fig.
UFO 4000	**UFO 4050 R/L-S**	●		50	74	45	50	22	10,4	6,3	20	4	5,0	1,3	1.
	UFO 4063 R/L-S	●		63	86	50	50	22	10,4	6,3	20	5		1,6	
	UFO 4080 R/L-S	●		80	103	60	50	27	12,4	7,0	25	5		2,1	2.
	UFO 4100 R/L-S	●		100	122	75	50	32	14,4	8,5	29	6		2,9	
	UFO 4125 R/L-S	●		125	146	75	63	40	16,4	9,5	29	7		4,2	3.
	UFO 4160 R/L-S	●		160	180	100	63	40	16,4	9,5	29	9		6,6	
	UFO 4200 R/L-S	●		200	220	130	63	60	25,7	14,0	32	11		9,5	4.
	UFO 4250 R/L-S	❑		250	270	300	63	60	25,7	14,0	40	13		14,8	
	UFO 4315 R/L-S	❑		315	335	240	80	60	25,7	14,0	40	15		26,6	5.
UFO 5000	**UFO 5080 R/L-S**	●		80	102	60	50	27	12,4	7,0	25	5	7,0	2,1	1.
	UFO 5100 R/L-S	●		100	119	75	50	32	14,4	8,5	29	6		2,9	2.
	UFO 5125 R/L-S	●		125	143	75	63	40	16,4	9,5	29	7		4,2	
	UFO 5160 R/L-S	●		160	177	100	63	40	16,4	9,5	29	9		6,6	3.
	UFO 5200 R/L-S	●		200	217	130	63	60	25,7	14,0	32	11		9,5	4.
	UFO 5250 R/L-S	❑		250	267	200	63	60	25,7	14,0	40	13		14,8	
	UFO 5315 R/L-S	❑		315	332	240	80	60	25,7	14,0	40	15		26,6	5.

Fig. 1

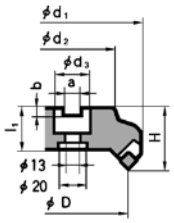


Fig. 2

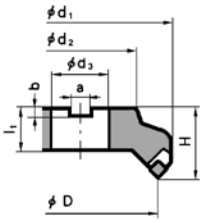


Fig. 3

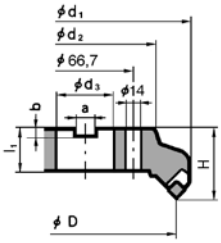


Fig. 4

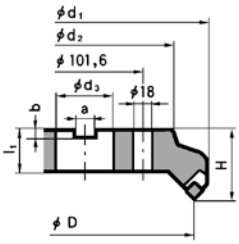
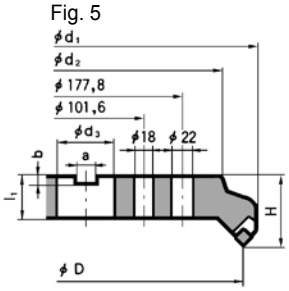
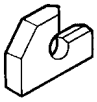
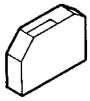


Fig. 5

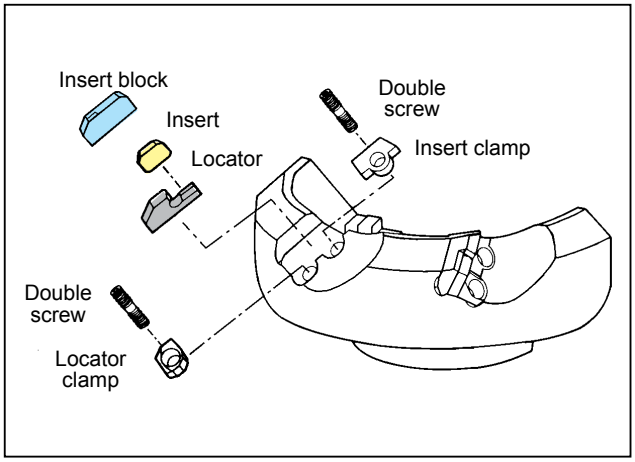


Spare Parts

Cutter	Locator	Insert block	Insert clamp
			
4050 - 4063	UF 4 K R/L	S-UF 4 S R/L	UFTW R/L
4080 - 4315	UF 4 K R/L	UF 4 S R/L	
5080 - 5315	UF 5 K R/L	UF 5 S R/L	

Cutter	Locator clamp	Double screw	Wrench
			
4050 - 4063	UFKW R/L	WB 7-15 T	TT 25
4080 - 4315			
5080 - 5315			

Structure



● = Euro stock
○ = Japan stock

❑ = Delivery on request

Face Mill
UFO / UFOF Type

Features

- 45° approach face mills
- 27° super high rake multi purpose cutter for outstanding productivity milling steels, irons and alloys
- Substantially improves metal removal rates on low powered machines
- Differential pitched inserts guarantee smooth cutting action
- Rigid body incorporates carbide locators and HSS shims resulting in extremely low run out



Body (Close Pitch Type)

Type	Cat. No.	Stock R	Stock L	Dimensions (mm) ø D	ø d_1	ø d_2	H	Mounting ø d_3	a	b	l_1	No. of teeth	Max. depth of cut	Weight (Kg)	Fig.
UFOF 4000	**UFOF 4080 R/L-S**	●		80	103	60	50	27	12,4	7,0	25	6	5,0	2,1	1.
	UFOF 4100 R/L-S	●		100	122	75	50	32	14,4	8,5	29	8		2,9	2.
	UFOF 4125 R/L-S	●		125	146	75	63	40	16,4	9,5	29	10		4,2	
	UFOF 4160 R/L-S	●		160	180	100	63	40	16,4	9,5	29	12		6,6	3.
	UFOF 4200 R/L-S	❑		200	220	130	63	60	25,7	14,0	32	16		9,5	4.
	UFOF 4250 R/L-S	❑		250	270	300	63	60	25,7	14,0	40	20		14,8	
	UFOF 4315 R/L-S	❑		315	335	240	80	60	25,7	14,0	40	24		26,6	5.

Insert

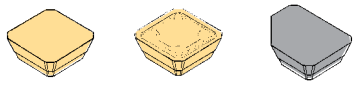


Fig. 1

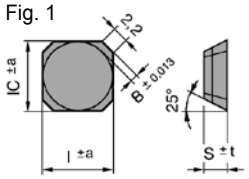


Fig. 2

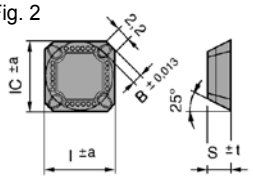
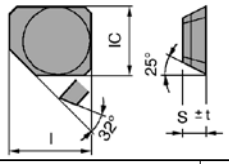


Fig. 3



UFO 4000 UFOF 4000			Cat. No.	Coated Carbide ACP100	ACP200	ACP300	ACK200	ACK300	Cermet T250A	Uncoated Carbide A30N	G10E	H1	H10E	Dimensions (mm) l	IC	s ±t	Fig.
	12	T3	**SFKN 12T3 AZFN**				●	●			❍	❍		12,7 ±0,075		3,97 ±0,025	1.
			SFKN 12T3 AZTN	●	●	●			❍	❍							
			SFKR 12T3 AZTN	❍	❍									12,7 ±0,05			2.
			UW 12500 R										❍	16	12,2		3.
UFO 5000	15	04	**SFKN 1504 AZFN**				●	❍			❍			15,875 ±0,075		4,76 ±0,025	1.
			SFKN 1504 AZTN	●	●	●				❍							
			UW 15500 R										❍	16	12,2		3.

Recommended Cutting Conditions

[v_c =m/min, f_t =mm/tooth] [min.– **optimum** – max.]

Grade / Work Material / Insert Type		ACP100 Low carbon steel	ACP100 Alloy steel	ACP100 Die steel	ACP200 Low carbon steel	ACP200 Alloy steel	ACP200 Die steel	ACP300 Stainless steel austenitic	ACP300 Stainless steel martensitic	ACK200 Cast iron	ACK200 Ductile cast iron	ACK300 Cast iron	ACK300 Ductile cast iron
UFO (-F) 4000	v_c	100-**250**-400	80-**220**-280	80-**150**-250	80-**200**-370	70-**150**-250	60-**130**-220	120-**180**-240	100-**140**-200	220-**270**-450	150-**180**-250	180-**220**-270	130-**160**-220
	f_t	0,1-**0,25**-0,4	0,1-**0,25**-0,4	0,1-**0,2**-0,3	0,1-**0,25**-0,4	0,1-**0,25**-0,4	0,1-**0,2**-0,3	0,1-**0,2**-0,3	0,1-**0,2**-0,3	0,1-**0,25**-0,4	0,1-**0,25**-0,4	0,1-**0,25**-0,4	0,1-**0,25**-0,4
	d_{oc}	1,0-**3,0**-5,0			1,0-**3,0**-5,0			1,0-**2,0**-3,0		1,0-**3,0**-5,0		1,0-**3,0**-5,0	
UFO (-F) 5000	v_c	100-**250**-400	80-**220**-280	80-**150**-250	80-**200**-370	70-**150**-250	60-**130**-220	120-**180**-240	100-**140**-200	220-**270**-450	150-**180**-250	180-**220**-270	130-**160**-220
	f_t	0,1-**0,25**-0,4	0,1-**0,25**-0,4	0,1-**0,2**-0,3	0,1-**0,25**-0,4	0,1-**0,25**-0,4	0,1-**0,2**-0,3	0,1-**0,2**-0,3	0,1-**0,2**-0,3	0,1-**0,25**-0,4	0,1-**0,25**-0,4	0,1-**0,25**-0,4	0,1-**0,25**-0,4
	d_{oc}	1,0-**4,0**-7,0			1,0-**4,0**-7,0			1,0-**3,0**-5,0		1,0-**4,0**-7,0		1,0-**4,0**-7,0	

DNX / DNXF Type

General Milling for Cast Iron and Steel

Approach angle	:	65°
Axial rake angle	:	+ 5°
Radial rake angle	:	- 6°

8 mm / 65°



Fig. 1

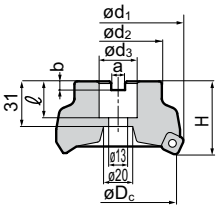


Fig. 2

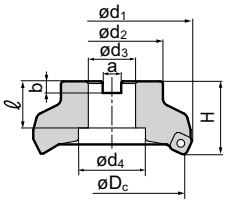


Fig. 3

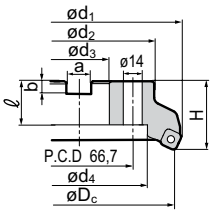
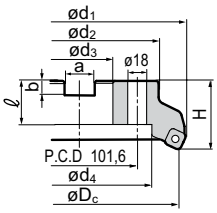


Fig. 4



■ Body

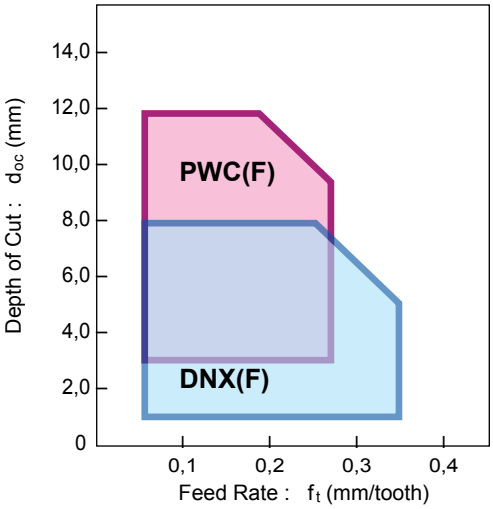
● Standard DNX - Type

Type	Cat. No.	Stock	Dimensions (mm)				Mounting					Number of teeth	Max. depth of cut	Weight (Kg)	Fig.
			ø D	ød1	H	ød2	ød3	ød4	a	b	ℓ				
DNX 12000	DNX 12080 RS	●	80	88	50	60	27	–	12,4	7,0	25	6	8,0	1,2	1.
	DNX 12100 RS	●	100	108	50	80	32	46	14,4	8,5	29	7		1,6	2.
	DNX 12125 RS	●	125	133	63	80	40	56	16,4	9,5	29	8		2,8	
	DNX 12160 RS	●	160	168	63	100	40	88	16,4	9,5	29	10		4,4	3.
	DNX 12200 RS	❑	200	210	63	150	60	130	25,7	14,0	35	16		8,0	4.
	DNX 12250 RS	❑	250	260	63	180	60	160	25,7	14,0	35	20		12,2	

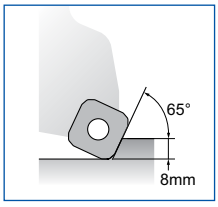
● Close Pitch DNXF - Type

Type	Cat. No.	Stock	Dimensions (mm)				Mounting					Number of teeth	Max. depth of cut	Weight (Kg)	Fig.
			ø D	ød1	H	ød2	ød3	ød4	a	b	ℓ				
DNXF 12000	DNXF 12080 RS	●	80	88	50	60	27	–	12,4	7,0	25	8	8,0	1,2	1.
	DNXF 12100 RS	●	100	108	50	80	32	46	14,4	8,5	29	10		1,6	2.
	DNXF 12125 RS	●	125	133	63	80	40	56	16,4	9,5	29	11		2,7	
	DNXF 12160 RS	●	160	168	63	100	40	88	16,4	9,5	29	12		4,4	3.

■ First Recommendation: DNX



DNX / DNXF



Wiper width = 1,2mm



Max. depth of cut : 8mm, Approach angle : 65°		
Cutter Type	Diameter Range	Characteristics
DNX 12000 RS	Ø80~Ø250mm	- General purpose - Medium pitch type
DNXF 12000 RS	Ø80~Ø160mm	- General purpose - Fine pitch type

■ Spare Parts

Cutter	Insert screw	Wrench	Locator	Clamp screw	Wrench
					
Ø 80 ~ Ø160	BFTX0412 IP	TRDR15 IP	–	–	–
Ø200 , Ø250			DNXK 12 R	BX 0515	LH 040

■ Identification of Cutter Body

DNX F 12 080 R S

DNX	F	12	080	R	S
Cutter type	Fine pitch	Insert size	Diam.	Cutting direction	Shell type

● = Euro stock
❑ = Delivery on request

DNX / DNXF Type



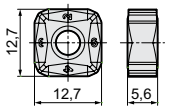
Features

- Small inserts with 8 cutting edges
- Economic by double-side usage
- Excellent grade for cast iron machining
- Optimised geometry for best results in cast iron
- Special inserts for steel machining

Insert

Cat. No.	Coated Carbide					Fig.
	ACP200	ACP300	ACK100	ACK200	ACK300	
SNMT 1205 ZNEN-G	●		●	●	●	1
SNMT 1205 ZNEN-H	●		●	●	●	2
SNMT 1205 ZNEN-SH	●	❑	●	●	●	3

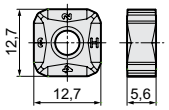
Fig. 1 **G** Type



Cutting edge



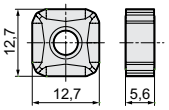
Fig. 2 **H** Type



Flat land



Fig. 3 **SH** Type

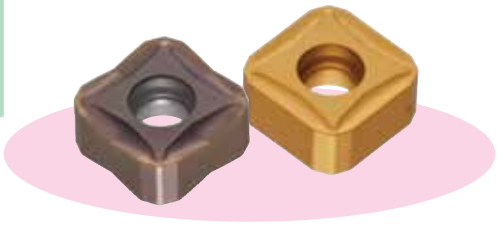


Flat land



G Type : For general purpose
H Type : For heavy machining
SH Type : For steel machining

- Negative inserts
- Inserts with 8 cutting edges
- Applicable for steel machining



Advantage of SH-Type when Steel machining

G Type



Chip packing causes higher cutting forces !

SH Type



Smooth chip evacuation reduces cutting forces !

Recommended Cutting Conditions

[v_c = m/min, f_t = mm/tooth] [min.– **optimum** – max.]

ISO	Work Material	Hardness (HB)	Cutting Speed v_c (m/min)	Feed Rate f_t (mm/tooth)	Insert Grade
P	Carbon steel	180 - 280	150 - **175** - 200	0,10 - **0,15** - 0,20	ACP200
	Alloy steel	180 - 280	150 - **175** - 200	0,10 - **0,15** - 0,20	ACP200
K	Grey cast iron (GG)	250	150 - **225** - 300	0,10 - **0,20** - 0,30	ACK200 / ACK300
	Ductile cast iron (GGG)	250	150 - **225** - 250	0,10 - **0,18** - 0,25	ACK200 / ACK300

Wave Radius Mill
WRCX Type

High Durable Mill with Polygon Inserts

Grades for Steels, Cast Iron and Aluminium



Features

The "Wave Mill" WRCX type is a new multi purpose milling cutter for face milling, slotting, helical boring, plunging and profiling. Its unique design features 16 corner polygon inserts and a durable cutter body manufactured from high tensile alloyed steel protected by a hard surface treatment. Insert rigidity is maximised via close tolerance seat pockets and centre clamped using a torxscrew . Choose from a variety of insert grades such as our award winning Diamond like Carbon DL 1000 capable of high feed machining aluminium, our uncoated H1 grade suitable for non-ferrous metals or our new ACP/ACK grades for steels and irons.

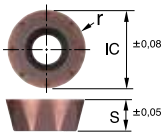
Advantages

- Durable cutter body – Special alloyed steel with hard surface.
- High feed cutting – Optimised pitch and high number of cutting edges
- Excellent chip removal – Wide pocket and integral coolant hole
- Maximum rigidity – Rigid clamping of inserts with TORXPLUS screw
- Wide application range – Carbon steels, alloy steels, stainless steels, high temperature alloys, diemould steels, aluminiums, non-ferrous metals etc

Insert

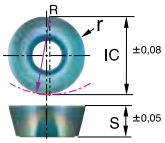
● QPMT... : Standard 16 cornered polygon type
QPMT...-H : Stronger cutting edge type

Fig. 1



● QPET...-S : Polished round insert for non-ferrous material

Fig. 2



Rake angle: 25°

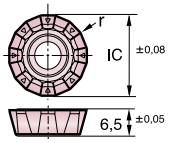
4 corners use

R : wiper radius

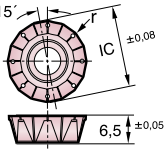
Cat. No.	Coated Carbide					Diamond Coated	Uncoated Carbide	IC (mm)	r (mm)	s (mm)	Max. d_{oc} 4 corners application	Max. d_{oc} 8 corners application	Fig.	Applicable Cutter
	ACP100	ACP200	ACP300	ACK200	ACK300	DL1000	H1							
QPMT 120440 PPEN	●	●	●	●	●			12	4,0	4,76	5,6	1,5	❶	WRCX/-F 12000 RS
QPMT 120440 PPEN-H	●	●	●	●	●									
QPET 120460 PPFR-S						●	●		6,0			–	❷	
QPMT 160660 PPEN	●	●	●	●	●			16	6,0	6,5	7,6	2,1	❶	WRCX/-F/-X 16000 RS
QPMT 160660 PPEN-H	●	●	●	●	●									
QPET 160680 PPFR-S						●	●		8,0			–	❷	
QPMT 200670 PPEN	●	●	●	●	●			20	7,0	6,5	9,4	2,5	❶	WRCXF 20000 RS
QPMT 200670 PPEN-H	●	●	●	●	●									

● Anti-Vibration Type (Paired Sets for Vibration Free Machining)

Type 08



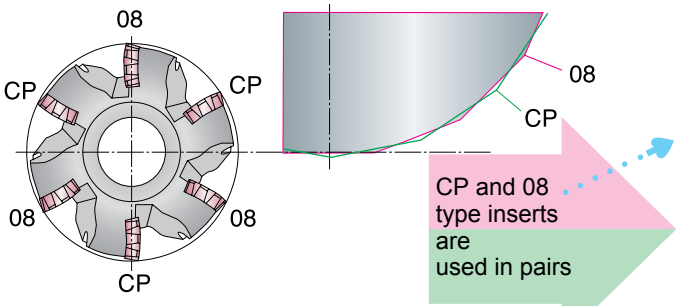
Type CP



Cat. No.	Coated carbide					Diamond coated	Uncoated carbide	IC (mm)	r (mm)	s (mm)	Max. d_{oc} 4 corners application	Max. d_{oc} 8 corners application	Insert type	Applicable cutter
	ACP100	ACP200	ACP300	ACK200	ACK300	DL1000	H1							
QPMT 160608 PPEN	●	●	●	●	●			16	0,8	6,5	7,6	1,2	08	WRCX/-F/-X 16000 RS
QPMT 160608 PPEN-CP	●	●	●	●	●							2,3	CP	
QPMT 200608 PPEN	●	●	●	●	●			20	0,8	6,5	9,4	1,6	08	WRCXF 20000 RS
QPMT 200608 PPEN-CP	●	●	●	●	●							2,9	CP	

The combination of different inserts in a staggered formation varies the cut depth and eliminates vibration when feed rate is

$f_t < 0,15$ (IC=16 mm)
or
$f_t < 0,2$ (IC=20 mm).



● Chip Formation

Anti-vibration Type	Standard Type
	

Work Material: 50C
Cutting Data: f_t = 0,1mm/tooth, d_{oc} = 7 mm
Insert Size: IC = 20 mm

● = Euro stock
❑ = Delivery on request



Axial rake angle: - 3°
Radial rake angle: 0°

Fig. 1

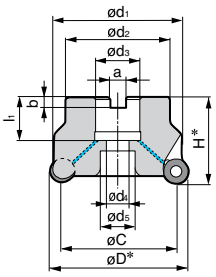


Fig. 2

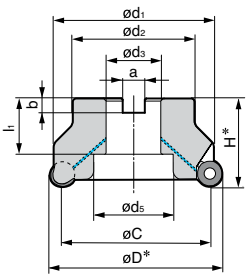
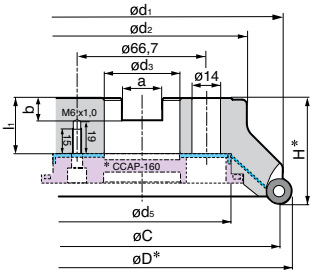


Fig. 3



■ Body

* Note Fig.3 for øD=160 : Coolant cap (CCAP-160) with 4 screws (BX0620) and wrench (TH050) is available seperately.

● Standard WRCX Type

Insert IC (mm)	Cat. No.	Stock	Dimensions (mm)					Mounting						No. of teeth	Helical boring øB Standard	Ramping αmax.	Weight (Kg)	Fig.
			ø D*	ø C	ød1	ød2	H*	a	b	ød3	ød4	ød5	l1					
12	WRCX 12040 RS	●	40	28	36	36	40	8,4	5,6	16	9	14	18	4	68 ± 11	10°	0,2	1
	WRCX 12050 RS	●	50	38	46	40	40	10,4	6,3	22	11	18	20	4	88 ± 11	7°	0,3	
	WRCX 12052 RS	●	52	40	48	40	40	10,4	6,3	22	11	18	20	5	92 ± 11	6°30´	0,3	
	WRCX 12063 RS	●	63	51	59	40	40	10,4	6,3	22	11	18	20	5	114 ± 11	5°	0,4	
	WRCX 12080 RS	●	80	68	76	55	50	12,4	7,0	27	13,5	20	25	6	148 ± 11	3°30´	0,9	
16	WRCX 16063 RS	●	63	47	50	50	40	10,4	6,3	22	11	18	20	3	110 ± 15	8°	0,4	1
	WRCX 16080 RS	●	80	64	70	55	50	12,4	7,0	27	13,5	20	25	4	144 ± 15	5°30´	0,8	
	WRCX 16100 RS	●	100	84	90	70	50	14,4	8,5	32	-	46	32	5	184 ± 15	4°	1,3	2
	WRCX 16125 RS	❑	125	109	115	80	63	16,4	9,5	40	-	52	38	5	234 ± 15	3°	2,4	

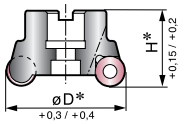
● Close Pitch WRCXF Type

Insert IC (mm)	Cat. No.	Stock	Dimensions (mm)					Mounting						No. of teeth	Helical boring øB Standard	Ramping αmax.	Weight (Kg)	Fig.
			ø D*	ø C	ød1	ød2	H*	a	b	ød3	ød4	ød5	l1					
12	WRCXF 12050 RS	❑	50	38	46	40	40	10,4	6,3	22	11	18	20	5	88 ± 11	7°	0,3	1
	WRCXF 12063 RS	❑	63	51	59	40	40	10,4	6,3	22	11	18	20	6	114 ± 11	5°	0,4	
16	WRCXF 16052 RS	●	52	36	45	45	40	10,4	6,3	22	11	17,7	20	4	88 ± 15	10°	0,3	
	WRCXF 16063 RS	●	63	47	50	50	40	10,4	6,3	22	11	18	20	4	110 ± 15	8°	0,4	
	WRCXF 16080 RS	●	80	64	70	55	50	12,4	7,0	27	13,5	20	25	5	144 ± 15	5°30´	0,8	
	WRCXF 16100 RS	●	100	84	90	70	50	14,4	8,5	32	-	46	32	6	184 ± 15	4°	1,3	2
	WRCXF 16125 RS	●	125	109	115	80	63	16,4	9,5	40	29	52	29	6	234 ± 15	3°	2,4	1
	WRCXF 16160 RS	●	160	144	150	100	63	16,4	9,5	40	-	93	29	8	304 ± 18	2°	4,0	3*
20	WRCXF 20080 RS	●	80	60	68	55	50	12,4	7,0	27	13,5	20	25	5	140 ± 18	7°	0,7	1
	WRCXF 20100 RS	●	100	80	88	70	50	14,4	8,5	32	-	46	32	6	180 ± 18	5°	1,1	2
	WRCXF 20125 RS	●	125	105	113	80	63	16,4	9,5	40	29	52	29	6	230 ± 18	3°30´	2,3	1
	WRCXF 20160 RS	●	160	140	148	100	63	16,4	9,5	40	-	93	29	8	300 ± 18	2°30´	3,9	3*

● Extra Close Pitch WRCXX Type

Insert IC (mm)	Cat. No.	Stock	Dimensions (mm)					Mounting						No. of teeth	Helical boring øB Standard	Ramping αmax.	Weight (Kg)	Fig.
			ø D*	ø C	ød1	ød2	H*	a	b	ød3	ød4	ød5	l1					
16	WRCXX 16080 RS	●	80	64	70	55	50	12,4	7,0	27	13,5	20	25	6	144 ± 15	5°30´	0,8	1
	WRCXX 16100 RS	●	100	84	90	70	50	14,4	8,5	32	-	46	32	7	184 ± 15	4°	1,3	2

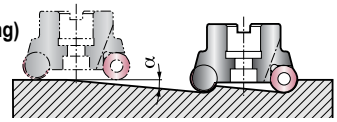
* Note : When using CP type anti-vibration inserts / IC = 16, please change above dimensions: øD* +0,3 & H* +0,15 mm
In case of anti-vibration inserts / IC = 20, please change above dimensions: øD* +0,4 & H* +0,2 mm



■ Maximum Rotation (min-1) for Non-ferrous cutting when using QPET Insert

Cutter ø D \ n	10	12	16
25	28.000		
32	25.000		
40		22.000	
50		20.000	14.000
63		18.000	13.000
80		16.000	12.000
100			10.000
125			9.000
160			8.000

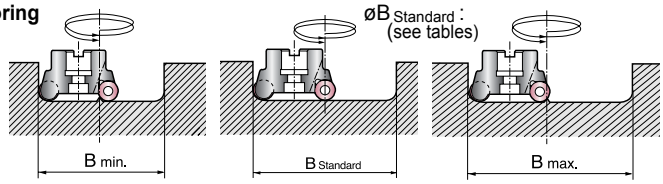
Ramping (Slant Milling)



α max : (see tables)

Helical Boring

øB Standard : (see tables)



■ Spare Parts

Cutter		Screw	Screw
			
WRCX	12○○○	BFTX 0409 IP	TRDR 15 IP
WRCX/-F/-X	16052 ~ 16100	BFTX 0511 IP	TRDR 20 IP
	16125 ~ 16160	BFTX 0513 IP	
WRCX/-F	20○○○	BFTX 0615 IP	TRDR 25 IP

■ Recommended Cutting Conditions

Material / Grade / øD (mm)		Carbon steel (ex. C40 ~ C50)	Alloy steel (Below HRC40)	Stainless steel (ex. X10CrNiS18-9)	Cast iron (ex. GG20)	Non-ferrous material
		ACP100, ACP200	ACP100, ACP200	ACP200, ACP300	ACK200, ACK300	DL1000, H1
40 ~ 80	v_c	100-**160**-200	100-**140**-180	80-**120**-160	80-**120**-160	200-**500**-1000
	f_t	0,2-**0,4**-0,6	0,2-**0,3**-0,4	0,1-**0,2**-0,3	0,1-**0,2**-0,4	0,1-**0,3**-0,4
100 ~ 160	v_c	150-**200**-250	100-**160**-200	160-**180**-200	100-**150**-200	200-**500**-1000
	f_t	0,3-**0,4**-0,6	0,1-**0,3**-0,5	0,15-**0,2**-0,3	0,1-**0,15**-0,2	0,2-**0,3**-0,6

[v_c = m/min, f_t = mm/tooth] [min.– optimum – max.]

RSX Series



Features

The Wave Radius Mill RSX Series is developed for exotic alloys as well as for stainless steel machining.
In combination with the new ACM-grades a high tool life can be achieved.
E-class tolerance inserts guarantee good run-out.

Characteristics

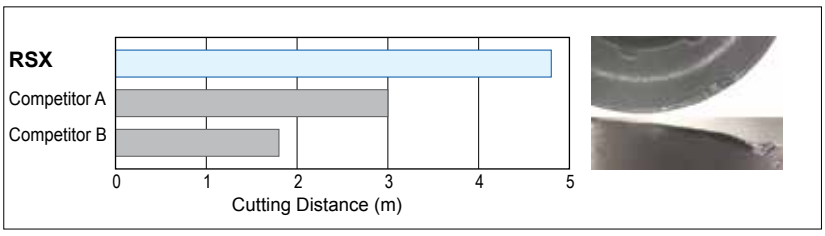
Smooth cutting action and low vibration machining provided based on the high rake angle design and high rigidity body.
High reliability achieved with ACM100 / ACM200 / ACM300 adopted for exotic alloy machining.
Insert positioning mechanism ensures accurate and secure location.

Series

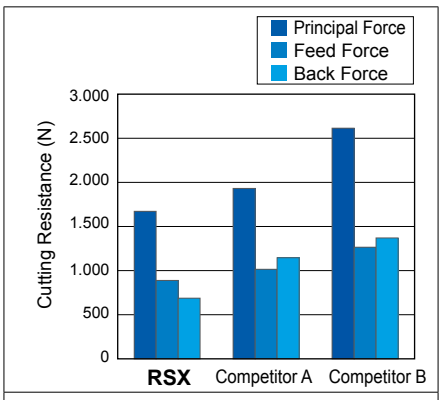
Image	Series	Insert Size	Cat. No.	External Diameter (mm)										
				ø25	ø32	ø40	ø50	ø52	ø63	ø66	ø80	ø100	ø125	ø160
Shank Type 	Standard	10	RSX 10000 ES	●	●									
		12	RSX 12000 ES		●									
	Fine Pitch	10	RSXF 10000 ES	●	●									
		12	RSXF 12000 ES		●									
Shell Type 	Standard	10	RSX 10000 RS			●	●	●						
		12	RSX 12000 RS			●	●	●	●	●	●	●		
		16	RSX 16000 RS						●		●	●	●	
	Fine Pitch	10	RSXF 10000 RS			●	●	●						
		12	RSXF 12000 RS			●	●	●	●	●	●	●		
		16	RSXF 16000 RS						●		●	●	●	❑
Modular Type 	Standard	10	RSX 10000 M	●	●									
		12	RSX 12000 M		●	●								
	Fine Pitch	10	RSXF 10000 M	●	●									
		12	RSXF 12000 M		●	●								

Cutting Performance

Tool Life Comparison (Fracture Resistance)

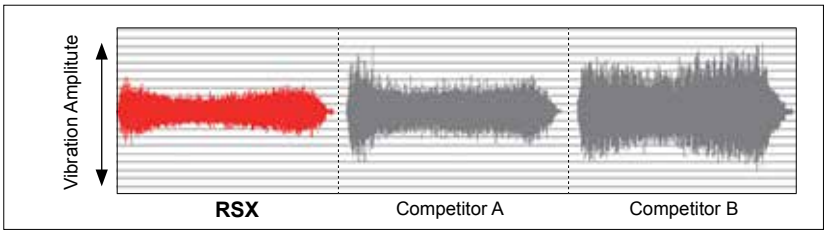


Cutting Resistance Comparison



Work Material: X5CrNiS1810
Tool: Ø50
Cutting Data: v_c = 200m/min, f_t = 0,5mm/t, a_p = 2,0mm, a_e= 10,0mm, Wet

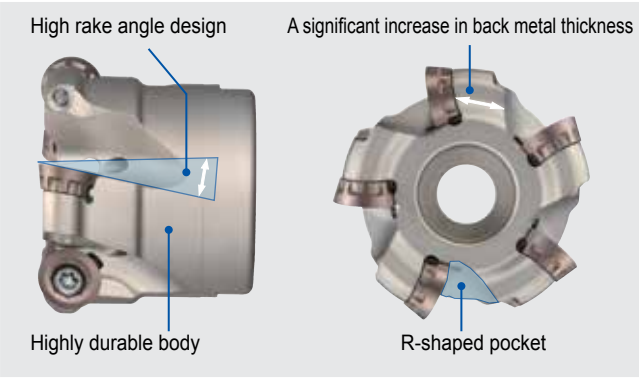
Cutting Vibration Comparison



● = Euro stock
❑ = Delivery on request

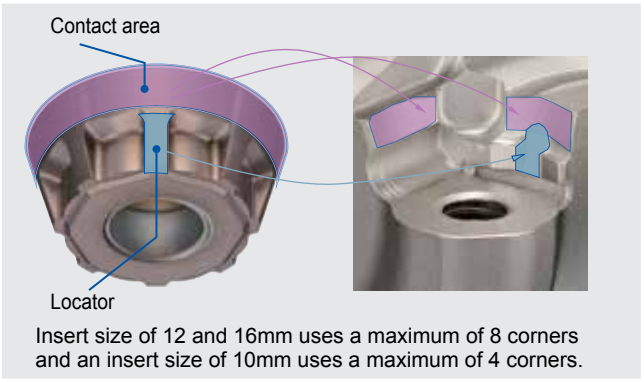
Low Cutting Resistance, Less Vibration

Low cutting resistance and low vibration machining have been achieved with super high rake angle design + high rigidity body.



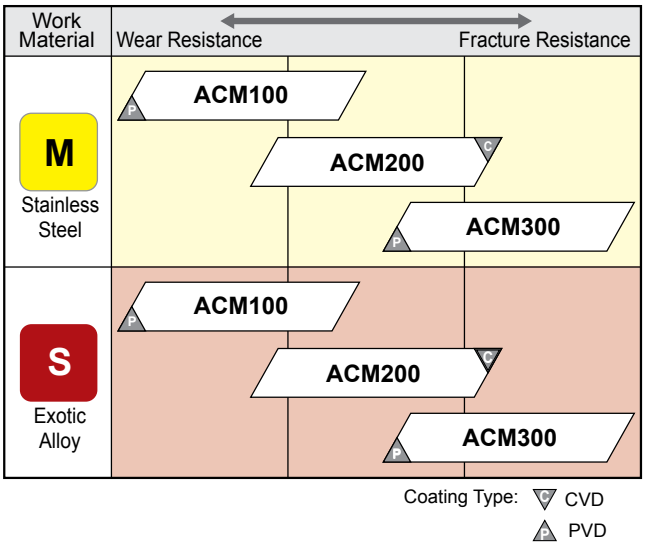
High Operability

Ease of corner control has been achieved with the adoption of a unique positioning mechanism that is highly precise and highly operable.



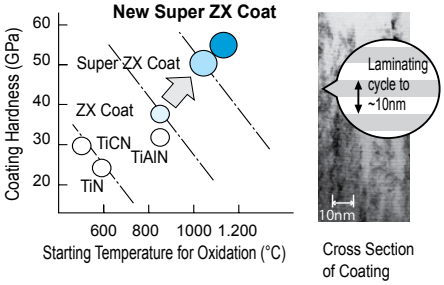
Insert size of 12 and 16mm uses a maximum of 8 corners and an insert size of 10mm uses a maximum of 4 corners.

Stable and Long Tool Life

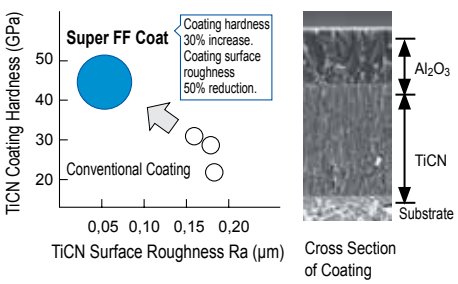


A long life ensured with the adoption of the ACM series and significant improvements have been made in processing exotic alloy and stainless steel machining.

ACM100/ACM300



ACM200



New Super ZX Coat

The product series with a coating film hardness approximately 40% higher and an oxidation onset temperature 200°C higher than conventional products.
Enables machining at least 1,5 times faster and more efficiently than conventional products.
A product life at least twice as long as that of conventional products achieved under the same machining conditions.

Super FF Coat

Smooth coating surface provides excellent adhesion and chipping resistance.
Improved coating adhesion strength.
Harder than conventional coatings with hugh improvements in wear resistance.
High speed, high effiency machining of more than 1,5 times than of conventional grades possible.
Achieving more than double the tool life of conventional grades under the same cutting conditions.

Milling of exotic alloys and stainless steel

Rake Angle		
	Radial	-5°
	Axial	10°

5mm (10000RS) 6mm (12000RS) 8mm (16000RS)

Body – Dimensions



Fig. 1

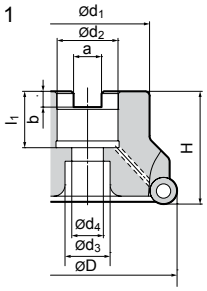


Fig. 2

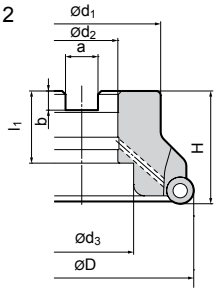
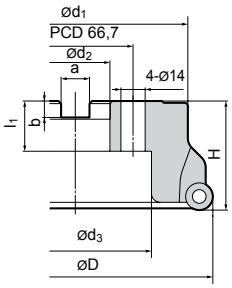


Fig. 3



Body (RSX10000RS, Standard)

Cat. No.	Stock	Dimensions (mm)									No. of teeth	Weight (kg)	Fig.
		øD	ød1	H	ød2	a	b	l1	ød3	ød4			
RSX 10040RS	●	40	34	40	16	8,4	5,6	18	14	9	4	0,2	1
10050RS	●	50	40	40	22	10,4	6,3	20	18	11	5	0,3	1
10052RS	●	52	40	40	22	10,4	6,3	20	18	11	5	0,4	1

Body (RSXF10000RS, Fine Pitch

RSXF 10040RS	●	40	34	40	16	8,4	5,6	18	14	9	5	0,2	1
10050RS	●	50	40	40	22	10,4	6,3	20	18	11	6	0,3	1
10052RS	●	52	40	40	22	10,4	6,3	20	18	11	6	0,3	1

Body (RSX12000RS, Standard)

RSX 12040RS	●	40	32	40	16	8,4	5,6	18	13,5	9	3	0,2	1
12050RS	●	50	40	40	22	10,4	6,3	20	18	11	4	0,3	1
12052RS	●	52	40	40	22	10,4	6,3	20	18	11	4	0,3	1
12063RS	●	63	40	40	22	10,4	6,3	20	18	11	5	0,4	1
12066RS	●	66	55	50	27	12,4	7,0	25	20	14	6	0,7	1
12080RS	●	80	55	50	27	12,4	7,0	25	20	14	6	1,0	1
12100RS	●	100	70	50	32	14,4	8,5	32	46	-	6	1,4	2

Body (RSXF12000RS, Fine Pitch)

RSXF 12040RS	●	40	32	40	16	8,4	5,6	18	13,5	9	4	0,2	1
12050RS	●	50	40	40	22	10,4	6,3	20	18	11	5	0,3	1
12052RS	●	52	40	40	22	10,4	6,3	20	18	11	5	0,3	1
12063RS	●	63	40	40	22	10,4	6,3	20	18	11	6	0,4	1
12066RS	●	66	55	50	27	12,4	7,0	25	20	14	7	0,7	1
12080RS	●	80	55	50	27	12,4	7,0	25	20	14	7	0,9	1
12100RS	●	100	70	50	32	14,4	8,5	32	46	-	10	1,3	2

Body (RSX16000RS, Standard)

RSX 16063RS	●	63	50	40	22	10,4	6,3	20	18	11	4	0,5	1
16080RS	●	80	55	50	27	12,4	7,0	25	20	14	5	0,9	1
16100RS	●	100	70	50	32	14,4	8,5	32	46	-	6	1,3	2
16125RS	●	125	80	63	40	16,4	9,5	29	52	29	6	2,6	1

Body (RSXF16000RS, Fine Pitch)

RSXF 16063RS	●	63	50	40	22	10,4	6,3	20	18	11	5	0,4	1
16080RS	●	80	55	50	27	12,4	7,0	25	20	14	6	0,8	1
16100RS	●	100	70	50	32	14,4	8,5	32	46	-	7	1,3	2
16125RS	●	125	80	63	40	16,4	9,5	29	52	29	8	2,5	1
16160RS	❑	160	130	63	40	16,4	9,5	29	88	-	10	4,8	3

Cutter Identification

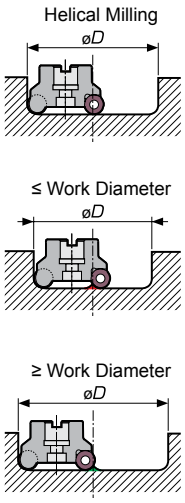
RSX	F	12	040	R	S
Cutter Series	Fine Pitch Type	Insert Size	Cutter Diameter	Cutting Direction	Metric

● = Euro stock
❑ = Delivery on request

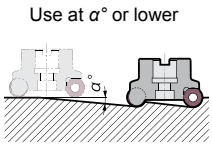
Various Machining Use

Various types of processing, such as mould engraving, slant milling and helical processing.

Helical Milling



Ramping



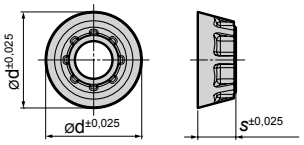
Recommended Values for Helical and Ramping

Insert Cat. No.	Helical				Taper
	Cutter ØDc	Work Diameter			Ramping Angle α°(max)
		Min.	Optimal Ø	Max.	
RDET10...	25	33,0	40	49	10°30‘
	32	46,0	54	63	6°45‘
	40	62,0	70	79	4°30‘
	50	82,0	90	99	3°15‘
	52	86,0	94	103	3°10‘
RDET12...	32	41,5	52	63	12°30‘
	40	57,5	68	79	8°00‘
	50	77,5	88	99	5°30‘
	52	81,5	92	103	5°15‘
	63	103,5	114	125	4°00‘
	66	109,5	120	131	3°45‘
	80	137,5	148	159	2°50‘
	100	177,5	188	199	2°10‘
RDET16...	63	96,0	110	125	6°00‘
	80	130,0	144	159	4°10‘
	100	170,0	184	199	3°00‘
	125	220,0	234	249	2°20‘

Inserts

Application	Grade		
High Speed/Light Cut	MS	MS	
General Purpose	MS	MS	MS
Roughing			MS

Cat. No.	ACM100	ACM200	ACM300	Dimens. ød (IC)	Dimens. S	Applicable Cutters
RDET 10T3M0EN G	●	●	●	10	3,97	RSX(F) 10000RS
10T3M0EN H	●	●	●	10	3,97	
RDET 1204M0EN G	●	●	●	12	4,76	RSX(F) 12000RS
1204M0EN H	●	●	●	12	4,76	
RDET 1606M0EN G	●	●	●	16	6,5	RSX(F) 16000RS
1606M0EN H	●	●	●	16	6,5	



Cutting Edge Cross Section



G - Type **H** - Type

M0: IC is metric

Spare Parts

Applicable Cutters	Wrench	Screw	Recommended Tightening Torque (N·m)
RSX(F) 10000RS	TRDR15IP	BFTX03584IP	**3,0**
RSX(F) 12000RS		BFTX0409IP	**3,0**
RSX(F) 16000RS	TRDR20IP	BFTX0511IP	**5,0**

Recommended Cutting Conditions

Min.-**Optimum**-Max.

ISO	Work Material			Hardness	Cutting Speed v_c (m/min)	Feed Rate f_t (mm/t)	Grade
M	Stainless Steel	Cr Based	Ferritic	200HB	150-**180**-200	0,15-**0,25**-0,35	ACM300
			Martensitic	200-330HB	80-**120**-180	0,15-**0,25**-0,35	ACM300
		Cr-Ni Based	Austenitic	200HB	150-**180**-200	0,15-**0,25**-0,35	ACM300
			Austenitic, ferritic	230-270HB	80-**120**-180	0,15-**0,25**-0,35	ACM200
			Precipitation hardening	330HB	60-**100**-160	0,15-**0,25**-0,35	ACM200
S	Heat resistant alloy		Ni based material	250-350HB	20- **30**- 40	0,10-**0,20**-0,30	ACM100 ACM200
	Titanium		Pure Titanium	(Rm400)	60- **80**-100	0,10-**0,20**-0,30	
			α + β alloy system	(Rm1050)	40- **50**- 60	0,10-**0,20**-0,30	

General Features

The Sumi Dual Mill DFC type employs cost effective double-sided inserts for high toughness and enhanced accuracy.
The double-side inserts are flexible and reduces costs.



Large Line-up

- Diameter from Ø25mm to Ø160mm
- Available as standard, fine and extra-fine pitch
- Bore diameter: metric
- Insert geometry: L, G, H

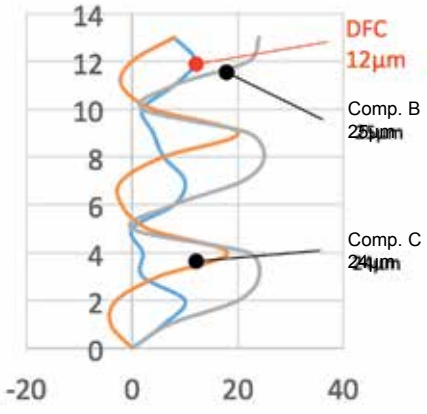
Cutter Body

Type		Cat. No.	Diameter (mm)	No. of Teeth	Image
Shank	Standard Pitch	DFC 09000 E	Ø25~Ø80	2~5	
	Fine Pitch	DFCM 09000 E	Ø32~Ø80	3~7	
Shell	Standard Pitch	DCF 09000 RS	Ø50~Ø160	4~8	
	Fine Pitch	DFCM 09000 RS	Ø50~Ø160	5~12	
	Extra-Fine Pitch	DFCF 09000 RS	Ø50~Ø160	6~16	

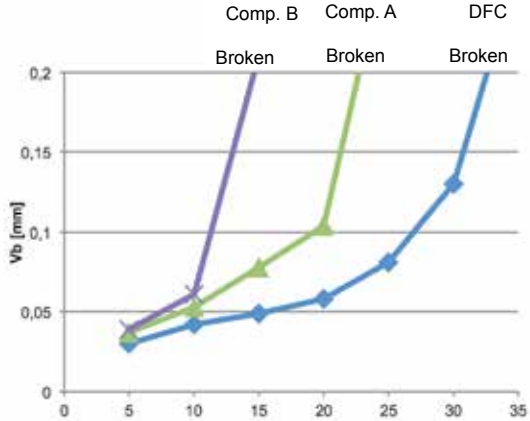
90 Degree Accuracy

Work material: Carbon steel

Cutting conditions:
v_c=200m/min, f_t=0.1mm/t
a_e=5.0mm, a_p=5.0mm x 3 passes

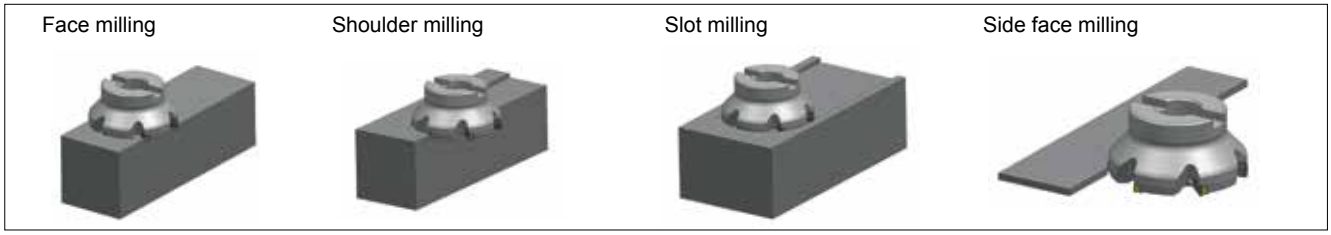


Shell type: ø63 mm



Number of passes (1 pass = 0.30mm)

Suitable Applications

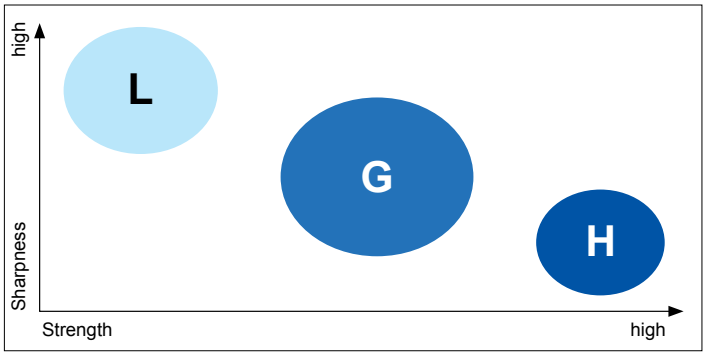


● = Euro stock

■ New Insert Design Provides Excellent Machining Accuracy

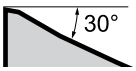
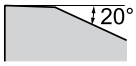
- The new insert design separates the location area and cutting edge producing an optimized solution.
- Machining accuracy is comparable to single sided inserts provided the DOC is less than 3mm.
- The SEC-Sumi Dual Mill design, equips the user with a highly stable cutter for high feed machining applications.

● Chipbreaker Selection Map



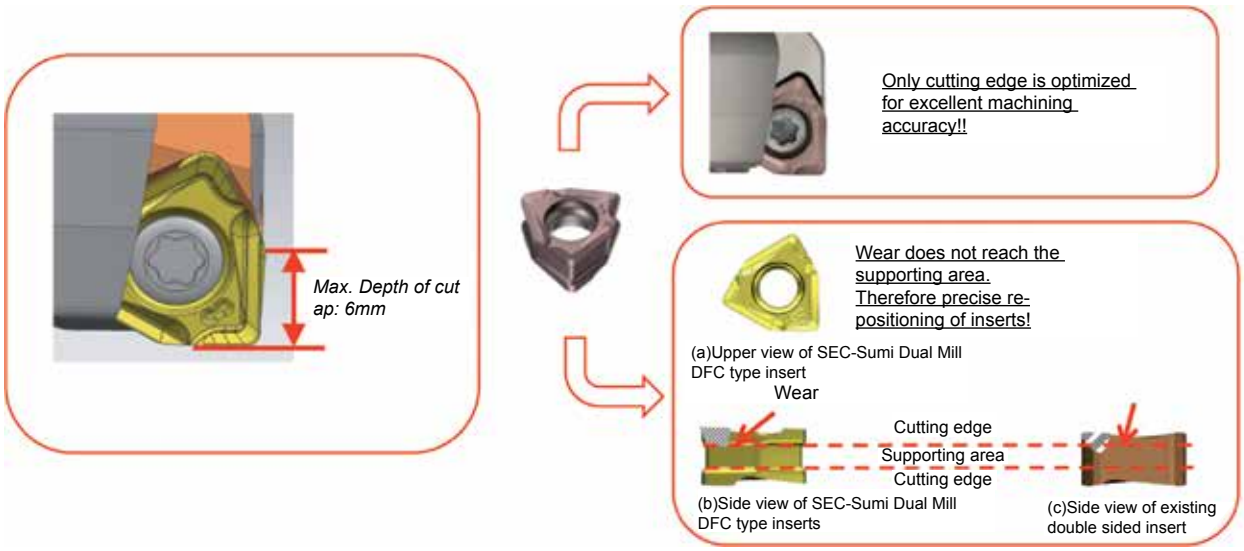
● Inserts

Cat. No.	R0,8
XNMU0606__PNER-L	●
XNMU0606__PNER-G	●
XNMU0606__PNER-H	●

Work Material	Steel, Cast Iron		
Chipbreaker	L type	G type	H type
			
Feature	Low cutting force	General purpose	Strong edge
Cutting edge geometry			
Application	Light cut, low rigidity milling and reduced burrs	Main breaker for general purpose applications	Roughing, heavy interrupted and hardness steel milling

■ Stable and High Cutting Performance Combined with High Toughness

- The excellent cutter performance offers efficient machining, enables high feed rate capability.
- The new insert construction provides extremely accurate edge to edge indexing whilst the location area offers high security and stability.



DFC(M/F) 09000RS Type

New

Body – Shell type

Rake Angle	Radial	-9°
	Axial	-5°

Max. a_p: 6mm



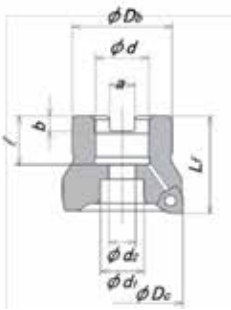


Fig.1

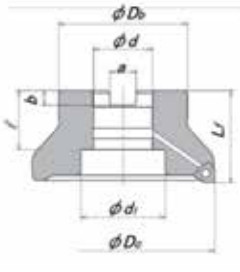


Fig.2

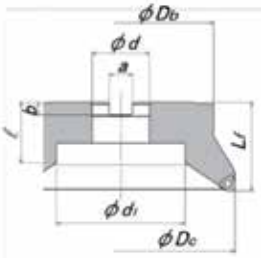


Fig.3

■ Body – Dimensions

● Sumi Dual Mill DFC type, Standard Pitch

Cat. No.	Stock	Dimensions (mm)									No. of Teeth	Weight (kg)	Fig.
		Dc	Db	Lf	d	a	b	ℓ	d1	d2			
DFC09050RS	●	50	41	40	22	10,4	6,3	20	18	11	4	0,3	1
DFC09063RS	●	63	50	40	22	10,4	6,3	20	18	11	4	0,5	1
DFC09080RS	●	80	55	50	27	12,4	7	22	20	14	5	1,0	1
DFC09100RS	●	100	70	50	32	14,4	8	26	46	32	6	1,4	2
DFC09125RS	●	125	80	63	40	16,4	9	29	52	29	7	2,8	1
DFC09160RS	●	160	100	63	40	16,4	9	29	90	-	8	4,6	3

● Sumi Dual Mill DFC type, Medium Pitch

Cat. No.	Stock	Dimensions (mm)									No. of Teeth	Weight (kg)	Fig.
		Dc	Db	Lf	d	a	b	ℓ	d1	d2			
DFCM09050RS	●	50	41	40	22	10,4	6,3	20	18	11	5	0,3	1
DFCM09063RS	●	63	50	40	22	10,4	6,3	20	18	11	6	0,5	1
DFCM09080RS	●	80	55	50	27	12,4	7	22	20	14	7	0,9	1
DFCM09100RS	●	100	70	50	32	14,4	8	26	46	32	8	1,4	2
DFCM09125RS	●	125	80	63	40	16,4	9	29	52	29	11	2,7	1
DFCM09160RS	●	160	100	63	40	16,4	9	29	90	-	12	4,5	3

● Sumi Dual Mill DFC type, Fine Pitch

Cat. No.	Stock	Dimensions (mm)									No. of Teeth	Weight (kg)	Fig.
		Dc	Db	Lf	d	a	b	ℓ	d1	d2			
DFCF09050RS	●	50	41	40	22	10,4	6,3	20	18	11	6	0,3	1
DFCF09063RS	●	63	50	40	22	10,4	6,3	20	18	11	7	0,5	1
DFCF09080RS	●	80	55	50	27	12,4	7	22	20	14	9	0,9	1
DFCF09100RS	●	100	70	50	32	14,4	8	26	46	32	11	1,3	2
DFCF09125RS	●	125	80	63	40	16,4	9	29	52	29	14	2,6	1
DFCF09160RS	●	160	100	63	40	16,4	9	29	90	-	16	4,6	3

■ Identification Details

DFC	M	09	050	R	S
Cutter Series	M: Medium F: Fine	Insert Size	Cutter Diameter	Direction	Metric

■ Spare Parts

Screw	Wrench
BFTX03512IP	TRDR15IP Torque: 3,0 (N·m)

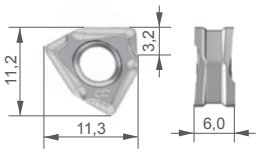
● = Euro stock

Inserts

Grade		Coated Carbide						
Application	High Speed / Light Cutting	P			K		MS	
	General Purpose Cutting		P		K		MS	MS
	Rough Cutting		P	P		K		MS

P	Steel
M	Stainless Steel
K	Cast Iron
S	Exotic Alloy

Cat. No.	ACP100	ACP200	ACP300	ACK200	ACK300	ACM200	ACM300	Radius rε
XNMU060608PNER-L	-	●	●	-	●	-	●	0,8
XNMU060608PNER-G	●	●	●	●	●	●	●	0,8
XNMU060608PNER-H	●	●	●	●	●	●	●	0,8



Recommemded Cutting Conditions

ISO	Work-material	Hardness	Cutting Speed (m/min) Min. - Optimum - Max.	Feed Rate Min. - Optimum - Max.	Depth of Cut (mm)	Grade
P	General Steel	180~280HB	150 - **200** - 250	0,10 - **0,20** - 0,30	< 6	ACP200 ACP300
	Soft Steel	≤ 180HB	180 - **250** - 350	0,15 - **0,25** - 0,35	< 6	ACP200 ACP300
	Die Steel	200~220HB	100 - **150** - 200	0,10 - **0,18** - 0,25	< 4	ACP200 ACP300
M	Stainless Steel	-	160 - **205** - 250	0,12 - **0,18** - 0,25	< 6	ACM200 ACM300
K	Cast Iron	250HB	100 - **175** - 250	0,10 - **0,20** - 0,30	< 6	ACK200 ACK300

Application Examples

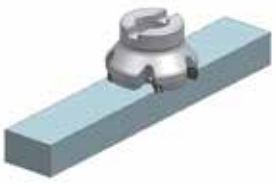
Work piece		Sumitomo	Comp.
Workpiece material: Steel (HRB 269-330)	**Breaker**	G	
	Grade	ACP200	
	v_c (m/min)	226	200
	v_f (mm/min)	1260	
	f_t (mm/t)	0,28	0,2
	a_p (mm)	2	2
	a_e (mm)	5	5
	Dry or Wet	Wet	Wet
	Tool diam. Ø	80	
	No. of Teeth	5	
	Result	Efficiency: 158% achieved	
	Evaluation	Wear resistance, efficiency	



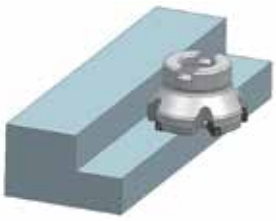
Work piece		Sumitomo	Comp.
Workpiece material: S235 (Carbon steel) Face milling	**Breaker**	G	
	Grade	ACP200	
	v_c (m/min)	180	180
	v_f (mm/min)	1092	910
	f_t (mm/t)	0,3	0,2
	a_p (mm)	2 x 2mm	2 x 2mm
	a_e (mm)	50	50
	Dry or Wet	Dry	Dry
	Tool diam. Ø	63mm	63mm
	No. of Teeth	4	5
	Result	Efficiency: 120% achieved	
	Evaluation	Wear resistance, efficiency	



Work piece		Sumitomo	Comp.
Workpiece material: Cast Iron	**Breaker**	G	
	Grade	ACP200	
	v_c (m/min)	156	156
	v_f (mm/min)	536	404
	f_t (mm/t)	0,17	0,09
	a_p (mm)	2,2	2,2
	a_e (mm)	63,5	63,5
	Dry or Wet	Dry	Dry
	Tool diam. Ø	80mm	80mm
	No. of Teeth	5	7
	Result	Efficiency: 133% achieved Tool life: 138% achieved	
	Evaluation	Efficiency, tool life	



Work piece		Sumitomo	Comp.
Workpiece material: Cr-Mo alloy	**Breaker**	G	
	Grade	ACP200	
	v_c (m/min)	200	200
	v_f (mm/min)	838	838
	f_t (mm/t)	0,2	0,13
	a_p (mm)	6	6
	a_e (mm)	43	43
	Dry or Wet	Dry	Dry
	Tool diam. Ø	80mm	80mm
	No. of Teeth	5	8
	Result	Efficiency: 120% achieved	
	Evaluation	Efficiency	



WFX Type



General Features

Wave Mill WFX type for shoulder milling is a screw-locking type cutter capable of using four corners.
Ideal cutting edge design delivers good squareness.
The **WFX08000** type has been added (max. depth of cut: 6,0mm) for smaller depth cutting.
This new lineup covers a wide variety of applications.

Wave Mill
WFX_ 08000 Type

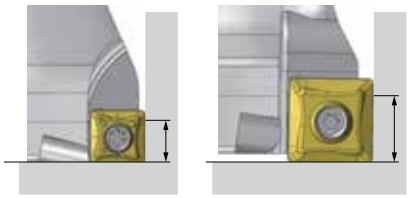


Characteristics

The insert shape, optimized for shoulder milling and combined with a high-precision body, leaves a superior machined surface finish.



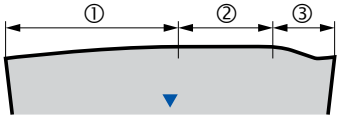
● Max. Depth of Cut



WFX08000 type (max. 6mm)

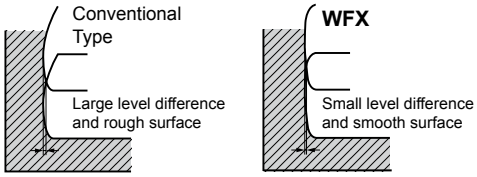
WFX12000 type (max. 10mm)

● Optimized Edge Shape



① The convex shape ensures the cutting edge strength.

② The flat shape minimises differences in step levels.



③ The wiper edge function improves the surface roughness.

Product Range

● Shell Type

WFX (Standard Pitch)	WFXM (Fine Pitch)	WFXF (Extra-Fine Pitch)
WFX08000RS	**WFXM**08000RS	**WFXF**08000RS
Ø40-100mm, 3-8 teeth	Ø40-100mm, 4-10 teeth	Ø40-100mm, 6-12 teeth
WFX12000RS		**WFXF**12000RS
Ø50-160mm, 38 teeth		Ø50-160mm, 4-12 teeth

● Endmill Type

WFX-E (Standard Pitch)	WFXM-E (Fine Pitch)	WFXF-E (Extra-Fine Pitch)
WFX08000**E**	**WFXM**08000**E**	
Ø20-63mm, 2-5 teeth	Ø25-63mm, 3-6 teeth	
WFX12000**E**		**WFXF**12000**E**
Ø40-80mm, 3-4 teeth		Ø50-80mm, 4-6 teeth

● Modular Type

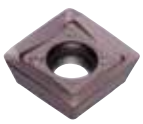
WFX-M (Standard Pitch)
WFX08000**M**
Ø20-40mm, 2-3 teeth

Inserts

Cat. No.	R0,2	R0,4	R0,8	R1,2	R1,6
SOMT 0803_ _PZER-**L**		●	●		
0803_ _PZER-**G**		●	●	●	
0803_ _PZER-**H**			●	●	
SOET 0803_ _PZER-**G**		●	●	●	
0803_ _PZFR-**S**	●	●	●		
SOMT 1204_ _PDER-**L**			●		
1204_ _PDER-**G**		●	●	●	●
1204_ _PDER-**H**			●		
SOET 1204_ _PDFR-**S**			●		



WFX08000 type insert (General Purpose G type chipbreaker)

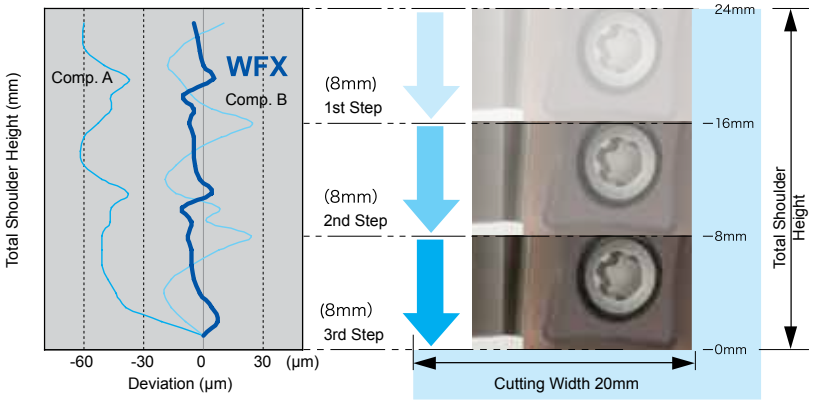


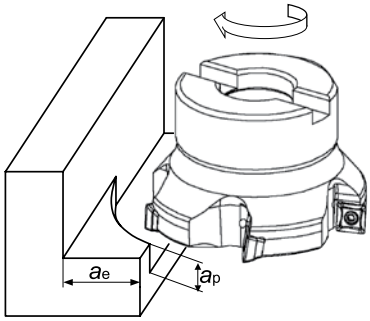
WFX12000 type insert (General Purpose G type chipbreaker)

● = Euro stock

Cutting Performance

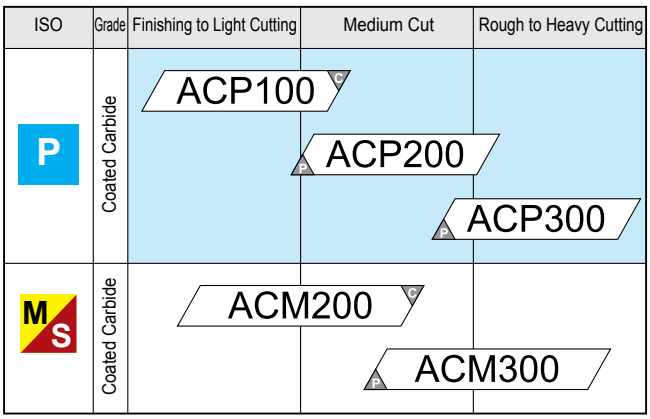
Squareness of Machined Shoulder

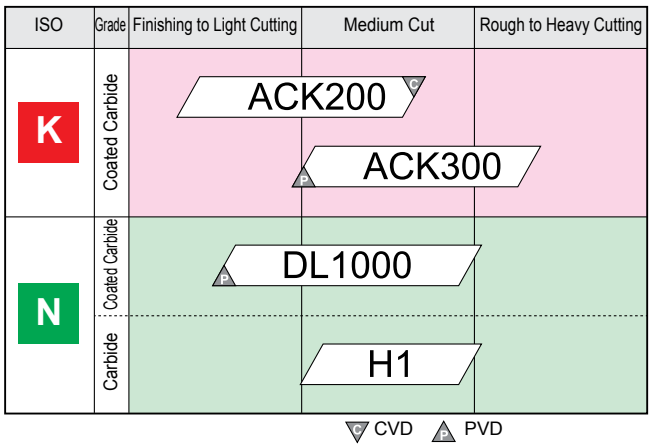




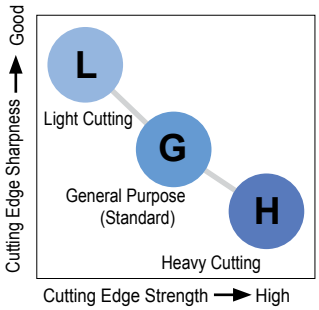
Work Material: C50
Tool: WFX12100RS (Ø100mm x 5 teeth)
Cutting Conditions: v_c = 200m/min, a_p = 8,0mmx3 times
f_t = 0,15mm/t, a_e = 20mm

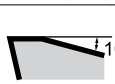
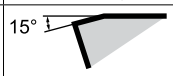
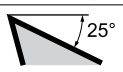
Grade Selection





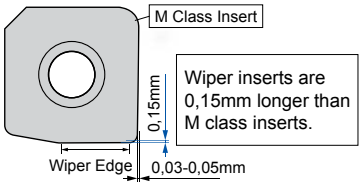
Chipbreaker Selection

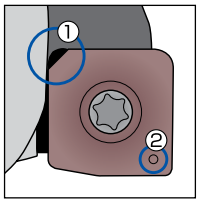


Work Material	Steel, Cast Iron				Aluminium Alloy
	L Type	**G Type**	**H Type**	**Wiper Type**	**S Type**
Breaker					
Characteristic	Low Cutting Force	General Purpose	Strong Edge	Wiper Edge	Sharp Edge
Cutting Edge Figure					
Work Material-Application	Light Cutting Low rigidity Milling Low-Burr Design	**Main Chipbreaker** General to Interrupted Milling	Heavy Cut Heavy Interrupted Machining Tempered Steel	Precision Finishing	Non-Ferrous Metal

Wiper Insert

Optimised wiper edge shape provides superior surface roughness.





Wiper inserts are single-cornered.
Attach the wiper insert so that the chamfered corner is in location ① shown in the figure.
Be sure to use the corner with the ID mark (② in the figure).
(08 size inserts have no marks)

WFX(M/F) 08000 RS

Shoulder Milling for Steel, Stainless Steel,
Die Steel, Cast Iron, Non-Ferrous Metal, Exotic Alloy

■ Body - Shell Type

New

Rake Angle		
	Radial	-6°
	Axial	12°

6 mm, 90°



WFX08000RS



WFXM08000RS



WFXF08000RS

Fig. 1

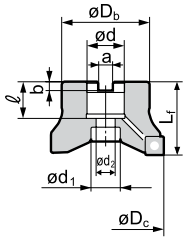
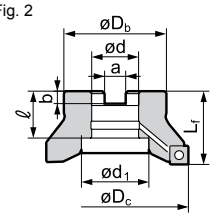


Fig. 2



● Body - WFX, Standard Pitch

Cat. No.	Stock	Dimensions (mm)									No. of Teeth	Weight (kg)	Figure
		øDc	øDb	Lf	ød	a	b	ℓ	ød1	ød2			
WFX 08040 RS	●	40	33	40	16	8,4	5,6	18	14	9	3	0,2	1
WFX 08050 RS	●	50	41	40	22	10,4	6,3	20	18	11	4	0,3	1
WFX 08063 RS	●	63	50	40	22	10,4	6,3	20	18	11	5	0,6	1
WFX 08080 RS	●	80*	55	50	27	12,4	7,0	25	20	14	6	1,0	1
WFX 08100 RS	●	100*	70	50	32	14,4	8,0	32	46	-	8	1,4	2

● Body - WFXM, Fine Pitch

Cat. No.	Stock	Dimensions (mm)									No. of Teeth	Weight (kg)	Figure
		øDc	øDb	Lf	ød	a	b	ℓ	ød1	ød2			
WFXM 08040 RS	●	40	33	40	16	8,4	5,6	18	14	9	4	0,2	1
WFXM 08050 RS	●	50	41	40	22	10,4	6,3	20	18	11	5	0,3	1
WFXM 08063 RS	●	63	50	40	22	10,4	6,3	20	18	11	6	0,5	1
WFXM 08080 RS	●	80*	55	50	27	12,4	7,0	25	20	14	8	1,0	1
WFXM 08100 RS	●	100*	70	50	32	14,4	8,0	32	46	-	10	1,4	2

● Body - WFXF, Extra-Fine Pitch

Cat. No.	Stock	Dimensions (mm)									No. of Teeth	Weight (kg)	Figure
		øDc	øDb	Lf	ød	a	b	ℓ	ød1	ød2			
WFXF 08040 RS	●	40	33	40	16	8,4	5,6	18	14	9	6	0,2	1
WFXF 08050 RS	●	50	41	40	22	10,4	6,3	20	18	11	7	0,3	1
WFXF 08063 RS	●	63	50	40	22	10,4	6,3	20	18	11	8	0,5	1
WFXF 08080 RS	●	80*	55	50	27	12,4	7,0	25	20	14	10	0,9	1
WFXF 08100 RS	●	100*	70	50	32	14,4	8,0	32	46	-	12	1,4	2

Inserts are not included.
*Please use JIS B1176 hexagonal bolt (Ø80: M12x30~35mm, Ø100: M16x40~45mm) for securing Ø80 / Ø100 cutter on the arbor.

■ Recommended Cutting Conditions

ISO	Work Material	Hardness (HB)	Cutting Speed	Feed Rate	DOC	Grades
P	General Steel	180~280	150-**200**-250	0,08-**0,12**-0,18	<6	ACP200 ACP300
P	Soft Steel	≤180	180-**250**-350	0,10-**0,15**-0,20	<6	ACP200 ACP300
P	Die Steel	200~220	100-**150**-200	0,08-**0,12**-0,18	<4	ACP200 ACP300
M	Stainless Steel	-	160-**200**-250	0,10-**0,15**-0,20	<6	ACM300
K	Cast Iron	250	100-**175**-250	0,10-**0,15**-0,20	<6	ACK200 ACK300
N	Non Ferrous Metal	-	300-**500**-1000	0,10-**0,15**-0,20	<6	H1 DL1000

Min. - **Optimum** - Max.

■ Identification Details

WFX	F	08	040	R	S
Cutter Series	M: Fine Pitch F: Extra-Fine Pitch	Insert Size	Cutter Diameter	Direction	Metric Type

■ Spare Parts

Screw		Wrench
		
BFTX0306IP	2,0	TRDR08IP

Recommended tightening torque

■ Inserts

Fig. 3

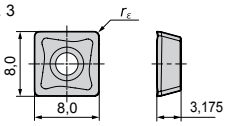
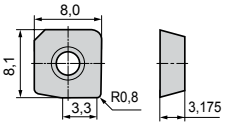


Fig. 4 Wiper Insert



Application	Coated Carbide							Carbide	DLC		
High Speed / Light cut	P			K		M S		K N	N		
General Purpose		P M	P M	K		M S	M S		N		
Roughing		P M	P M		K		M S				
Cat. No.	ACP100	ACP200	ACP300	ACK200	ACK300	ACM200	ACM300	H1	DL1000	Radius re	Fig.
SOMT 080304 PZER L	●	●	●	●	●	●	●	–	–	0,4	3
080308 PZER L	●	●	●	●	●	●	●	–	–	0,8	3
SOMT 080304 PZER G	●	●	●	●	●	●	●	–	–	0,4	3
080308 PZER G	●	●	●	●	●	●	●	–	–	0,8	3
080312 PZER G	●	●	●	●	●	●	●	–	–	1,2	3
SOMT 080308 PZER H	●	●	●	●	●	●	●	–	–	0,8	3
080312 PZER H	●	●	●	●	●	●	●	–	–	1,2	3
SOET 080304 PZER G	●	●	●	●	●	●	●	–	–	0,4	3
080308 PZER G	●	●	●	●	●	●	●	–	–	0,8	3
080312 PZER G	●	●	●	●	●	●	●	–	–	1,2	3
SOET 080302 PZFR S	–	–	–	–	–	–	–	●	●	0,2	3
080304 PZFR S	–	–	–	–	–	–	–	●	●	0,4	3
080308 PZFR S	–	–	–	–	–	–	–	●	●	0,8	3
XOEW 080308 PZTR W	–	–	–	–	●	–	–	–	–	0,8	4

● = Euro stock

"Wave Mill" Series
WFX(F) 12000 RS

Body - Shell Type

Rake Angle		
	Radial	-8°
	Axial	8°

10mm, 90°



WFX 12000RS



WFXF12000RS

Fig. 1

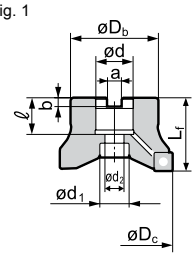


Fig. 2

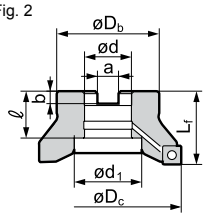
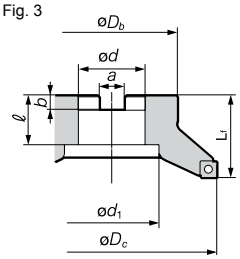


Fig. 3



Body - WFX, Standard Pitch

Cat. No.	Stock	Dimensions (mm)									No. of Teeth	Weight (kg)	Figure
		øDc	øDb	Lf	ød	a	b	ℓ	ød1	ød2			
WFX 12050 RS	●	50	40	40	22	10,4	6,3	20	18	11	3	0,2	1
WFX 12063 RS	●	63	50	40	22	10,4	6,3	20	18	11	4	0,4	1
WFX 12080 RS	●	80*	60	50	27	12,4	7,0	25	20	13,5	4	0,9	1
WFX 12100 RS	●	100*	70	50	32	14,4	8,5	32	46	-	5	1,3	2
WFX 12125 RS	●	125	90	63	40	16,4	9,5	29	52	-	6	2,7	2
WFX 12160 RS	●	160	130	63	40	16,4	9,5	29	88	-	8	4,8	3

Body - WFXF, Extra-Fine Pitch

Cat. No.	Stock	Dimensions (mm)									No. of Teeth	Weight (kg)	Figure
		øDc	øDb	Lf	ød	a	b	ℓ	ød1	ød2			
WFXF 12050 RS	●	50	40	40	22	10,4	6,3	20	18	11	4	0,2	1
WFXF 12063 RS	●	63	50	40	22	10,4	6,3	20	18	11	5	0,4	1
WFXF 12080 RS	●	80*	60	50	27	12,4	7,0	25	20	13,5	6	0,9	1
WFXF 12100 RS	●	100*	70	50	32	14,4	8,5	32	46	-	7	1,2	2
WFXF 12125 RS	●	125	90	63	40	16,4	9,5	29	52	-	8	2,6	2
WFXF 12160 RS	●	160	130	63	40	16,4	9,5	29	88	-	12	4,7	3

Inserts are not included.
*Please use JIS B1176 hexagonal bolt (Ø80: M12x30~35mm, Ø100: M16x40~45mm) for securing Ø80 / Ø100 cutter on the arbor.
Cutters ≥ Ø160 do not have coolant holes.

Recommended Cutting Conditions

ISO	Work Material	Hardness (HB)	Cutting Speed	Feed Rate	DOC	Grades
P	General Steel	180~280	150-**200**-250	0,10-**0,15**-0,20	<10	ACP200 ACP300
P	Soft Steel	≤180	180-**250**-350	0,10-**0,15**-0,20	<10	ACP200 ACP300
P	Die Steel	200~220	100-**150**-200	0,10-**0,15**-0,20	<6	ACP200 ACP300
M	Stainless Steel	-	160-**200**-250	0,10-**0,15**-0,20	<10	ACM300
K	Cast Iron	250	100-**175**-250	0,10-**0,15**-0,20	<10	ACK200 ACK300
N	Non Ferrous Metal	-	300-**500**-1000	0,10-**0,15**-0,20	<10	H1 DL1000

Min. - **Optimum** - Max.

Identification Details

WFX	F	12	050	R	S
Cutter Series	F: Extra-Fine Pitch	Insert Size	Cutter Diameter	Direction	Metric Type

Inserts

Fig. 3

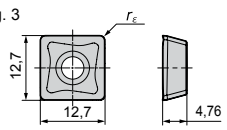
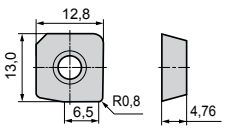


Fig. 4 Wiper Insert

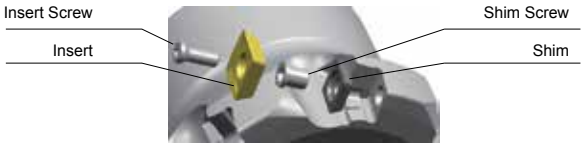


Application	Coated Carbide							Carbide	DLC		
High Speed / Light cut	P			K		MS		KN	N		
General Purpose		PM	PM	K		MS	MS		N		
Roughing		PM	PM		K		MS				
Cat. No.	ACP100	ACP200	ACP300	ACK200	ACK300	ACM200	ACM300	H1	DL1000	Radius rε	Fig.
SOMT 120408 PDER L	●	●	●	●	●	●	●	–	–	0,8	3
SOMT 120404 PDER G	●	●	●	●	●	●	●	–	–	0,4	3
120408 PDER G	●	●	●	●	●	●	●	–	–	0,8	3
120412 PDER G	●	●	●	●	●	●	●	–	–	1,2	3
120416 PDER G	●	●	●	●	●	●	●	–	–	1,6	3
SOMT 120408 PDER H	●	●	●	●	●	●	●	–	–	0,8	3
SOET 120408 PDFR S	–	–	–	–	–	–	–	●	●	0,8	3
XOEW 120408 PDTR W	–	–	–	–	●	–	–	–	–	–	4

Spare Parts

Shim	Shim Screw	Insert Screw		Wrench (Insert)	Wrench (Shim)
					
WFXS4R	BW0507F	BFTX03512IP	**3,0**	TRDR15IP	LH035

Recommended tightening torque



PWS (-F) Type



Features

Smooth and stable performance under rough milling conditions
Tangentially mounted inserts, offering positive rake angle and unique curved cutting edge, realize stable and long lasting smooth cutting actions.

Precision 4 cutting edge inserts
The 4 cutting edge inserts offer maximum cost performance.

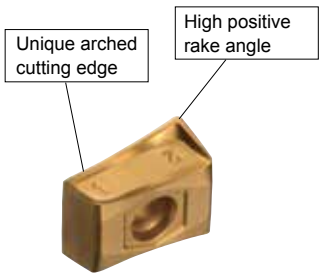
Less vibration under unstable condition
Optimized variable pitch design of the serrated inserts minimizes vibration during unstable conditions.

Tough and durable body
Cutter body shows excellent toughness and durability through special steel and surface treatment.

Inserts - Design and Performance

Comparison of Chip Shape

General Purpose: Type **G**

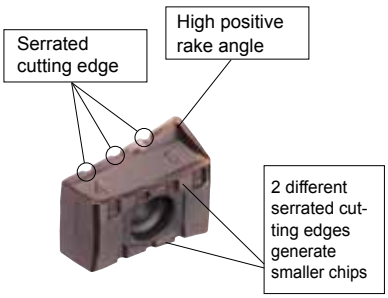




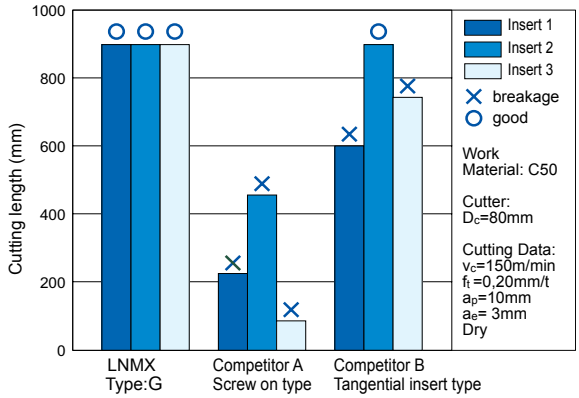
Work Material: C50
Cutter: D_c =100mm
Cutting Data: v_c =200m/min, f_t =0,20mm/t, a_p =20mm, a_e =10mm
Coolant: Dry
Evaluation: The serrated inserts achieve high efficient machining by reducing chattering.

Heavy Cut: Type **R**

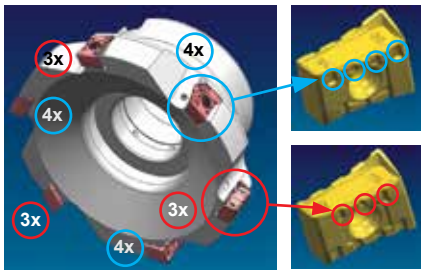




Comparison of Cutting Edge Stability (Type G)



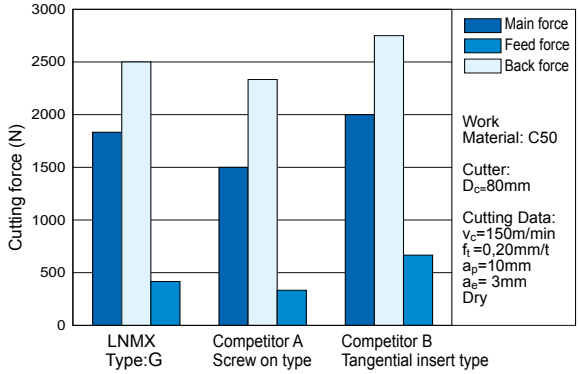
Serrated Insert Application Guidance (Type R)



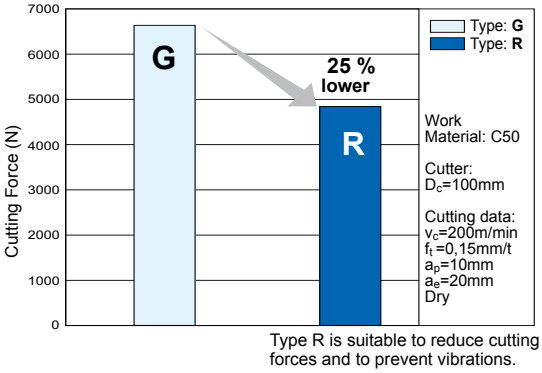
Setting instruction:
Please use two different serrated inserts (3x and 4x) as shown in the left figure.

Remark about cutting conditions:
Adjust feed rate up to f_t = 0,25mm/tooth.

Comparison of Cutting Force (Type G)



Comparison of Cutting Force (Type G and R)



Type R is suitable to reduce cutting forces and to prevent vibrations.

● = Euro stock
❑ = Delivery on request

Body - Dimensions



Rake Angle	Radial	-15°
	Axial	-6°

16mm 90°

Fig. 1

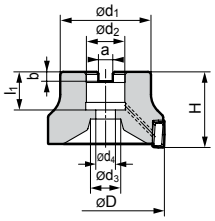


Fig. 2

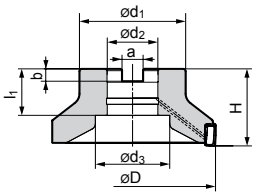


Fig. 3

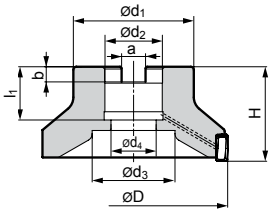


Fig. 4

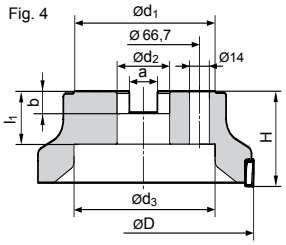
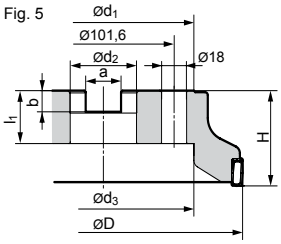


Fig. 5



Cutter body $ØD_c \geq 160$mm: no inner coolant
Cutter body $ØD_c \geq 200$mm: with seat PWSS4R

Body (Type PWS, Standard)

Type	Cat. No.	Stock	Dimensions (mm)			Mounting						No. of teeth	Weight (kg)	Fig.
			ØD	$Ød_1$	H	$Ød_2$	$Ød_3$	$Ød_4$	a	b	l_1			
PWS 4000	PWS 4080 RS	●	80	60	50	27	20	13,5	12,4	7	25	4	1,0	1
	PWS 4100 RS	●	100	70	50	32	46	-	14,4	8,5	32	6	1,4	2
	PWS 4125 RS	●	125	80	63	40	52	29	16,4	9,5	29	6	2,4	3
	PWS 4160 RS	●	160	100	63	40	88	-	16,4	9,5	29	8	4,2	4
	PWS 4200 RS	❑	200	130	63	60	130	-	25,7	14	35	10	6,3	5
	PWS 4250 RS	❑	250	130	63	60	160	-	25,7	14	35	12	11,1	5

Body (Type PWSF, Fine pitch)

Type	Cat. No.	Stock	Dimensions (mm)			Mounting						No. of teeth	Weight (kg)	Fig.
			ØD	$Ød_1$	H	$Ød_2$	$Ød_3$	$Ød_4$	a	b	l_1			
PWSF 4000	PWSF 4080 RS	●	80	60	50	27	20	13,5	12,4	7	25	6	0,9	1
	PWSF 4100 RS	●	100	70	50	32	46	-	14,4	8,5	32	8	1,3	2
	PWSF 4125 RS	●	125	80	63	40	52	29	16,4	9,5	29	8	2,3	3
	PWSF 4160 RS	●	160	100	63	40	88	-	16,4	9,5	29	10	4,1	4
	PWSF 4200 RS	❑	200	130	63	60	130	-	25,7	14	35	12	6,2	5
	PWSF 4250 RS	❑	250	130	63	60	160	-	25,7	14	35	14	11,0	5

Inserts are not included.

Inserts

Application	Coated Carbide				
High speed/Light cut	P			K	
General purpose		P M	M	K	
Roughing		P M	P M		K

Cat. No.	ACP100	ACP200	ACP300	ACK200	ACK300	Application	Remarks	Fig.
LNMX170808PNSR-**L**	●	●	●	●	●	Light cut		6
LNMX170808PNSR-**G**	●	●	●	●	●	General purpose	1st Choice	6
LNMX170808PNSR-**R**	●	●	●	●	●	Heavy cut	Serrated design	7

Fig. 6

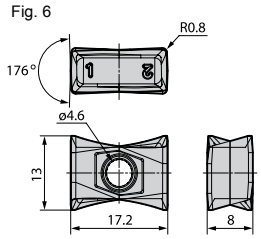
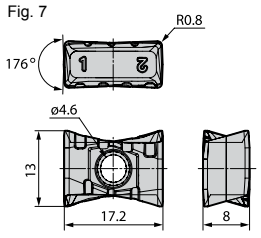


Fig. 7



Recommended Cutting Conditions

ISO	Work Material	Hardness	Cutting Speed v_c (m/min)	Feed Rate f_t (mm/t)	Grade
P	Carbon Steel	180-280HB	150-**250**-350	0,10-**0,23**-0,35	ACP200
	Alloy Steel	180-280HB	100-**175**-250	0,10-**0,18**-0,25	ACP200
M	Stainless Steel	-	100-**150**-200	0,15-**0,18**-0,25	ACP300
K	Cast Iron Ductile Iron	250HB	100-**175**-250	0,10-**0,23**-0,35	ACK200

Min.-**Optimum**-Max.

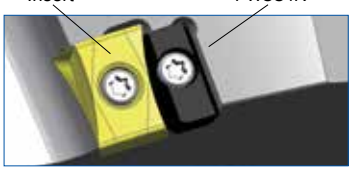
Spare Parts

Screw	Torx wrench	Sumi-Paste	Seat *
 3,0 Nm			
BFTX0412IP	TTR15IP	SUMI-P	PWSS4R

* from $ØD_c \geq 200$mm

Cutter Body $ØD_c \geq 200$mm
Please use seat PWSS4R for protection of cutter body.

Insert *PWSS4R



Special Cutter Type PWSR



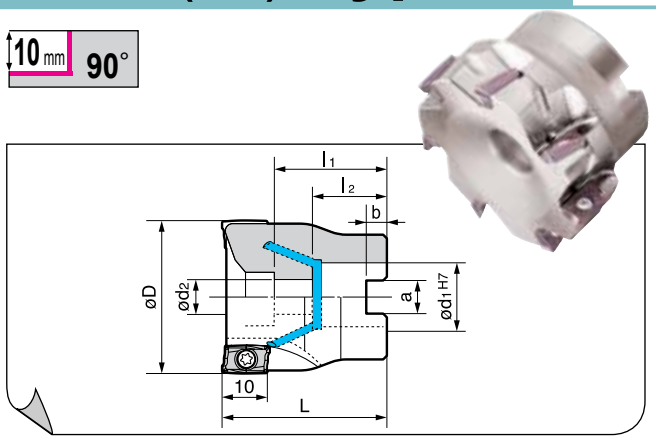
Rake Angle	Radial	-15°
	Axial	-6°

31mm 90°

Delivery on request

WEX (-F) Type

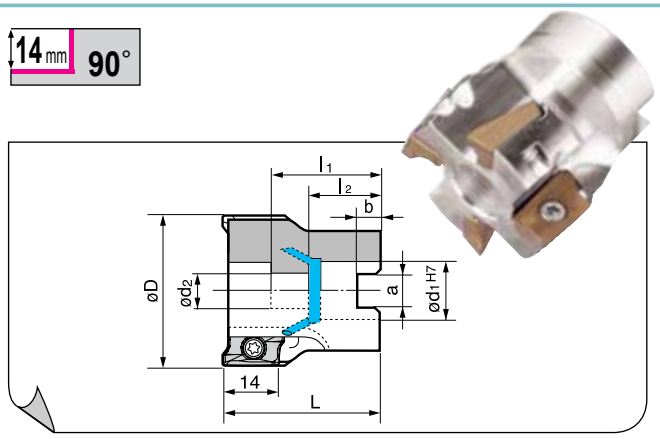
10 mm 90°



■ Body (Shell Type "F")

Cat. No.	Stock	Dimensions (mm)								No.of teeth
		øD	ød1	ød2	a	b	L	l1	l2	
WEX 2040 F	●	40	16	9	8,4	5,6	40	28	18	6
WEX 2050 F	●	50	22	11	10,4	6,3	40	26	20	7
WEX 2063 F	●	63	22	11	10,4	6,3	40	26	20	8
WEX 2080 F	●	80	27	13,5	12,4	7,0	50	31	25	10
WEX 2100 F		100	32	32	14,4	8,5	50	32	26	12

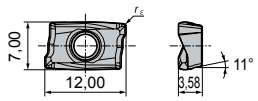
14 mm 90°



■ Body (Shell Type "F")

Cat. No.	Stock	Dimensions (mm)								No.of teeth
		øD	ød1	ød2	a	b	L	l1	l2	
WEX 3040 F	●	40	16	9	8,4	5,6	40	28	18	4
WEX 3050 F	●	50	22	11	10,4	6,3	40	26	20	5
WEX 3063 F	●	63	22	11	10,4	6,3	40	26	20	6
WEX 3080 F	●	80	27	13,5	12,4	7,0	50	31	25	7
WEX 3100 F	●	100	32	32	14,4	8,5	50	32	26	8

■ Inserts for WEX 2000 Type

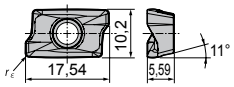


Application	Coated Carbide							Carbide	DLC	
High Speed / Light cut	P			K		MS		KN	N	
General Purpose		P		K		MS	MS		N	
Roughing		P	P		K		MS			
Cat. No.	ACP100	ACP200	ACP300	ACK200	ACK300	ACM200	ACM300	H1	DL1000	Radius r_ε
AXMT 123504 PEER-G	●	●	●	●	●			–	–	0,4
123508 PEER-G	●	●	●	●	●			–	–	0,8
123512 PEER-G	●	●	●	●	●			–	–	1,2
AXMT 123504 PEER-H	●	●	●	●	●			–	–	0,4
123508 PEER-H	●	●	●	●	●			–	–	0,8
123512 PEER-H	●	●	●	●	●			–	–	1,2
AXMT 123504 PEER-E						●	●	–	–	0,4
123508 PEER-E			●			●	●	–	–	0,8
123512 PEER-E						●	●	–	–	1,2
AXMT 123508 PEER-EH			●			●	●	–	–	0,8
AXET 123502 PEFR-S	–	–	–	–	–	–	–	●	●	0,2
123504 PEFR-S	–	–	–	–	–	–	–	●	●	0,4
123508 PEFR-S	–	–	–	–	–	–	–	●	●	0,8

– Unable to produce

L – Low cutting force
G – General type
H – Strong cutting edge
E – For stainless steel
EH– Strong edge for stainless steel
S – For aluminium

■ Inserts for WEX 3000 Type



Application	Coated Carbide							Carbide	DLC	
High Speed / Light cut	P			K		MS		KN	N	
General Purpose		P		K		MS	MS		N	
Roughing		P	P		K		MS			
Cat. No.	ACP100	ACP200	ACP300	ACK200	ACK300	ACM200	ACM300	H1	DL1000	Radius r_ε
AXMT 170508 PEER-L	●	●	●	●	●			–	–	0,8
AXMT 170504 PEER-G	●	●	●	●	●			–	–	0,4
170508 PEER-G	●	●	●	●	●			–	–	0,8
170512 PEER-G	●	●	●	●	●			–	–	1,2
170516 PEER-G	●	●	●	●	●			–	–	1,6
170520 PEER-G*	●	●	●	●	●			–	–	2,0
170530 PEER-G*	●	●	●	●	●			–	–	3,0
AXMT 170508 PEER-H	●	●	●	●	●			–	–	0,8
170512 PEER-H	●	●	●	●	●			–	–	1,2
AXMT 170504 PEER-E						●	●	–	–	0,4
170508 PEER-E			●			●	●	–	–	0,8
170512 PEER-E						●	●	–	–	1,2
170516 PEER-E						●	●	–	–	1,6
170520 PEER-E*						●	●	–	–	2,0
170530 PEER-E*						●	●	–	–	3,0
AXMT 170508 PEER-EH			●			●	●	–	–	0,8
AXET 170502 PEFR-S	–	–	–	–	–	–	–	●	●	0,2
170504 PEFR-S	–	–	–	–	–	–	–	●	●	0,4
170508 PEFR-S	–	–	–	–	–	–	–	●	●	0,8

* Cutter body modification is required.

■ Spare Parts

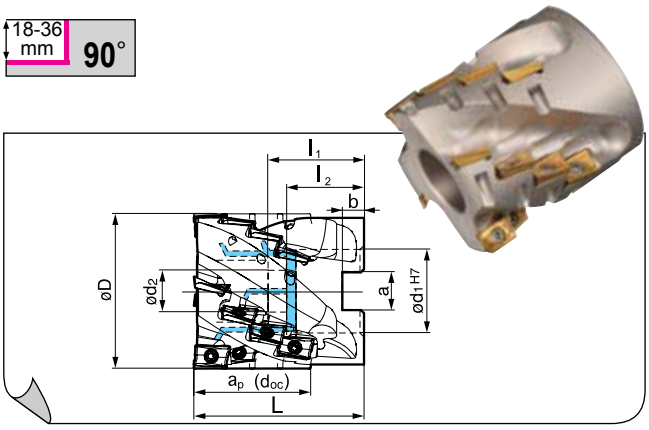
Screw	Wrench	Applicable Endmill
		
BFTX 0306 IP	TRDR 08 IP	WEX 2000 F
BFTX 0409 IP	TRDR 15 IP	WEX 3000 F

● = Euro stock
❑ = Delivery on request

☞ H16/H20

WRX (-F) Type

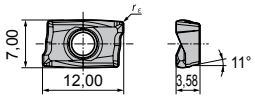
18-36 mm 90°



Body (Shell Type "F")

Cat. No.	Stock	Depth of cut (d_{oc})	Dimensions (mm)								No. of teeth	No. of rows	Effective teeth
			øD	$ød_1$	$ød_2$	a	b	l_1	l	l			
WRX2040RH18F16	❑	18	40	16	9	8,4	5,6	50	39	18	10	2	5
WRX2040RH36F16	●	36	40	16	9	8,4	5,6	55	44	18	16	4	4
WRX2050RH18F22	❑	18	50	22	11	10,4	6,3	50	36	20	10	2	5
WRX2050RH36F22	●	36	50	22	11	10,4	6,3	55	41,5	20	16	4	4

Inserts (Same as for Wavemill WEX 2000 Type)



Application	Coated Carbide							Carbide	DLC
High Speed / Light cut	P			K		M S		K N	N
General Purpose		P		K		M S	M S		N
Roughing		P	P		K		M S		

Cat. No.	ACP100	ACP200	ACP300	ACK200	ACK300	ACM200	ACM300	H1	DL1000	Radius r_ε
AXMT 123504 PEER-G	●	●	●	●	●			–	–	0,4
123508 PEER-G	●	●	●	●	●			–	–	0,8
123512 PEER-G	●	●	●	●	●			–	–	1,2
AXMT 123504 PEER-H	●	●	●	●	●			–	–	0,4
123508 PEER-H	●	●	●	●	●			–	–	0,8
123512 PEER-H	●	●	●	●	●			–	–	1,2
AXMT 123504 PEER-E						●	●	–	–	0,4
123508 PEER-E			●			●	●	–	–	0,8
123512 PEER-E						●	●	–	–	1,2
AXMT 123508 PEER-EH			●			●	●	–	–	0,8
AXET 123502 PEFR-S	–	–	–	–	–	–	–	●	●	0,2
123504 PEFR-S	–	–	–	–	–	–	–	●	●	0,4
123508 PEFR-S	–	–	–	–	–	–	–	●	●	0,8

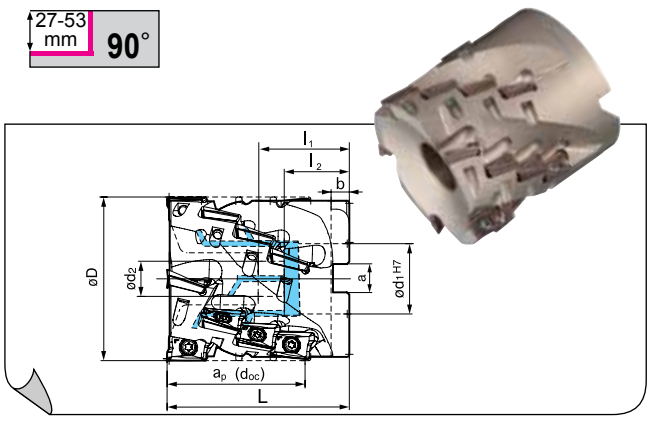
– Unable to produce

L – Low cutting force
G – General type
H – Strong cutting edge
E – For stainless steel
EH– Strong edge for stainless steel
S – For aluminium

Spare Parts

Screw	Wrench	Applicable Endmill
		
BFTX 0306 IP	TRDR 08 IP	WRX 2_ _ _ _ RH_ _F_ _
BFTX 0409 IP	TRDR 15 IP	WRX 3_ _ _ _ RH_ _F_ _

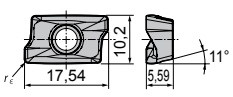
27-53 mm 90°



Body (Shell Type "F")

Cat. No.	Stock	Depth of Cut (d_{oc})	Dimensions (mm)								No. of teeth	No. of rows	Effective teeth
			øD	$ød_1$	$ød_2$	a	b	l_1	l	l			
WRX3050RH27F22	❑	27	50	22	11	10	6,3	50	36	20	8	2	4
WRX3050RH53F22	●	53	50	22	11	10	6,3	70	56	20	12	4	3
WRX3063RH27F27	❑	27	63	27	13,5	12	7	70	34	2	10	2	5
WRX3063RH53F27	●	53	63	27	13,5	12	7	70	54	2	16	4	4
WRX3080RH27F32	❑	27	80	32	17	14	8	50	30	2	12	2	6
WRX3080RH53F32	●	53	80	32	17	14	8	85	63	2	20	4	5
WRX3100RH27F40	❑	27	100	40	21	16	9,5	85	40	30	14	2	7
WRX3100RH53F40	●	53	100	40	21	16	9,5	85	59	30	24	4	6

Inserts (Same as for Wavemill WEX 3000 Type)



Application	Coated Carbide							Carbide	DLC
High Speed / Light cut	P			K		M S		K N	N
General Purpose		P		K		M S	M S		N
Roughing		P	P		K		M S		

Cat. No.		ACP100	ACP200	ACP300	ACK200	ACK300	ACM200	ACM300	H1	DL1000	Radius r_ε
AXMT	170508 PEER-L	●	●	●	●	●			–	–	0,8
AXMT	170504 PEER-G	●	●	●	●	●			–	–	0,4
	170508 PEER-G	●	●	●	●	●			–	–	0,8
	170512 PEER-G	●	●	●	●	●			–	–	1,2
	170516 PEER-G	●	●	●	●	●			–	–	1,6
	170520 PEER-G*	●	●	●	●	●			–	–	2,0
	170530 PEER-G*	●	●	●	●	●			–	–	3,0
AXMT	170508 PEER-H	●	●	●	●	●			–	–	0,8
	170512 PEER-H	●	●	●	●	●			–	–	1,2
AXMT	170504 PEER-E						●	●	–	–	0,4
	170508 PEER-E			●			●	●	–	–	0,8
	170512 PEER-E						●	●	–	–	1,2
	170516 PEER-E						●	●	–	–	1,6
	170520 PEER-E*						●	●	–	–	2,0
	170530 PEER-E*						●	●	–	–	3,0
AXMT	170508 PEER-EH			●			●	●	–	–	0,8
AXET	170502 PEFR-S	–	–	–	–	–	–	–	●	●	0,2
	170504 PEFR-S	–	–	–	–	–	–	–	●	●	0,4
	170508 PEFR-S	–	–	–	–	–	–	–	●	●	0,8

* Cutter body modification is required.

Identification Details

WRX **20** (Insert Size) **25** (Tool øD) **R** (Cutting Direction) **H** (Inner coolant) **27** (Cutting Edge Length) **W** (Arbor Type) **25** (Arbor Diameter)

E - Straight Shank
W - Weldon Shank
F - Shell Type

☞ H26/H29

PWC Type

Powerful Tangential Milling System for Cast Iron

Approach angle	:	88°
Axial rake angle	:	+ 5°
Radial rake angle	:	- 5°



Fig. 1

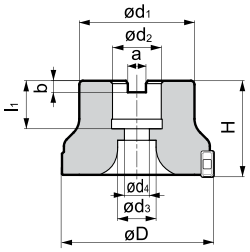


Fig. 2

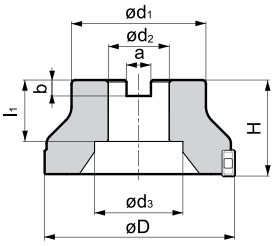
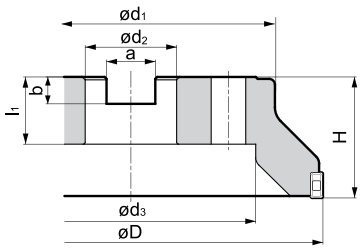


Fig. 3



■ Body (Standard, PWC Type)

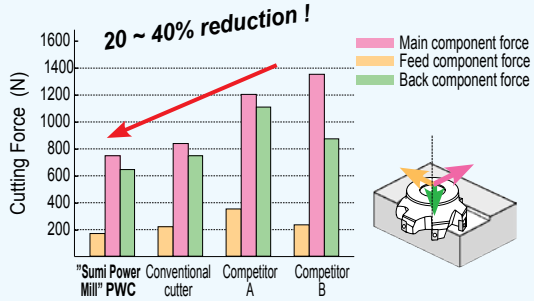
Type	Cat. No.	Stock		Dimensions (mm)			Mounting						Number of teeth	Max. Depth of Cut	Weight (Kg)	Fig.
		R	L	ø D	ød1	H	ød2	ød3	ød4	a	b	l1				
PWC 4000	PWC 4080 R/L-S	●	●	80	60	50	27	29,5	13	12,4	7,0	25	7	12,0	0,9	1.
	PWC 4100 R/L-S	●	●	100	70	50	32	46	–	14,4	8,5	29	8		1,3	2.
	PWC 4125 R/L-S	●	●	125	80	63	40	56	–	16,4	9,5	29	10		2,5	
	PWC 4160 R/L-S	●	●	160	100	63	40	88	–	16,4	9,5	29	12		4,2	3.
	PWC 4200 R/L-S	●	●	200	150	63	60	130	–	25,7	14,0	35	16		7,2	

■ Body (Close Pitch, PWCF Type)

Type	Cat. No.	Stock		Dimensions (mm)			Mounting						Number of teeth	Max. Depth of Cut	Weight (Kg)	Fig.
		R	L	ø D	ød1	H	ød2	ød3	ød4	a	b	l1				
PWCF 4000	PWCF 4080 R/L-S	●	●	80	60	50	27	29,5	13	12,4	7,0	25	9	12,0	0,9	1.
	PWCF 4100 R/L-S	●	●	100	70	50	32	46	–	14,4	8,5	29	12		1,4	2.
	PWCF 4125 R/L-S	●	●	125	80	63	40	56	–	16,4	9,5	29	15		2,6	
	PWCF 4160 R/L-S	●	●	160	100	63	40	88	–	16,4	9,5	29	18		4,3	3.
	PWCF 4200 R/L-S	●	●	200	150	63	60	130	–	25,7	14,0	35	24		7,4	

■ Performance

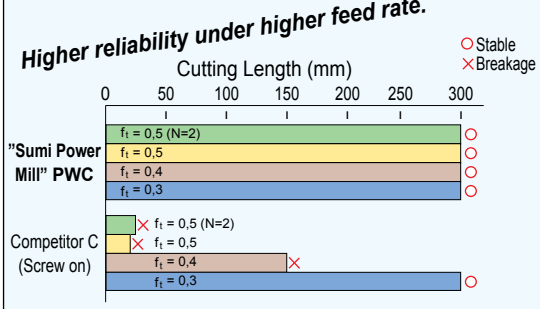
● Comparison of cutting force



Work Material : GG25
Tool : PWC 4080 RS, ø80
Insert : LNMX160608PNSN-G
Grade : ACK200

Cutting Conditions
v_c = 200 m/min
f_t = 0,1 mm/tooth
Depth of cut : 4,0 mm
Width of cut : 50 mm
Dry

● Comparison of cutting edge strength



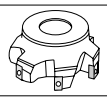
Work Material : GG25
Tool : PWC 4080 RS, ø80
Insert : LNMX160608PNSN-G
Grade : ACK200

Cutting Conditions
v_c = 160 m/min
f_t = 0,3 ~ 0,5 mm/tooth
Depth of cut : 5,0 mm
Width of cut : 80 mm
Dry

■ Recommended cutting Conditions

Material	Grey Cast Iron (GG)	Ductile Cast Iron (GGG)
Cutting speed (m/min)	100 150 200 250 300	100 150 200 250
Feed rate (mm/tooth)	0,1 0,2 0,3 0,4 0,5	0,05 0,1 0,2 0,25 0,3
Grade	ACK200, ACK300	

■ Spare Parts

Cutter	Screw	Wrench
	 3,0 N·m	
PWC (F) 4000	BFTX 0412 N	TTX 15 W

● = Eurostock

High Metal Removal
High Volume Insert Capacity
High Performance Inserts



● Geometry





Rake angle
G type : 20°
H type : 15°



Wiper width = 2,4 mm

■ Advantages

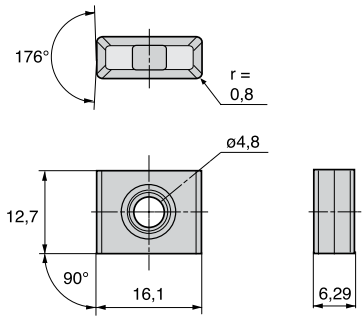
● High volume insert capacity
The tangential orientation of the strong carbide inserts increases the number of cutting edges (eg 3 edges /inch) maximising edge contact with the workpiece.

● Cost effective tooling
Using M Class precision sintered inserts with 8 cutting edges both acquisition and operating costs are substantially reduced.

● Increased tool life
New Cast Iron grades ACK200 for general cutting and ACK300 for heavy cutting provide increased tool life and high productivity

● Durable cutter body
The robust cutter body is manufactured from a special alloyed steel then coated with a hard surface to resist swarf damage, scratching, and corrosion.

■ Inserts



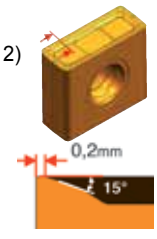
● G type insert
for light cutting

(Fig. 1)



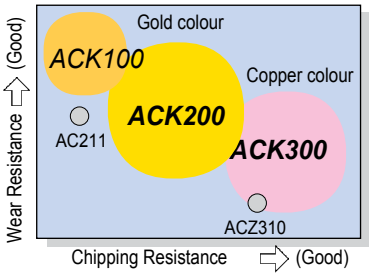
● H type insert
with strong cutting edge

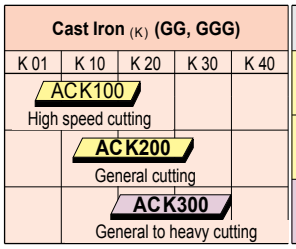
(Fig. 2)



Cat. No.	Nose Radius	CVD Coated		PVD Coated	Fig.	Application	Remark
		ACK100	ACK200	ACK300			
LNMX 160608 PNSN-G	0,8		●	●	1	General application	First remommendation
LNMX 160608 PNSN-H	0,8	●	●		2	Instable machining Heavy interruption	Suitable for instable condition

■ New Coated Grade for Cast Iron





Grade	Characteristic · Application
ACK100	High wear resistance with special hard substrate and fine Ti-based Al_2O_3 CVD coating for high speed machining
ACK200	Excellent wear resistance with fine Ti-based and tough Al_2O_3 CVD coating
ACK300	Excellent toughness with fine grain carbide substrate. Cr added new PVD coating could improve hardness and oxidation resistance.

Shoulder Milling for Steel, Stainless Steel & Cast Iron

Approach angle	:	90°
Axial rake angle	:	+ 10° ~ 17°
Radial rake angle	:	+ 10° ~ 16°



Fig. 1

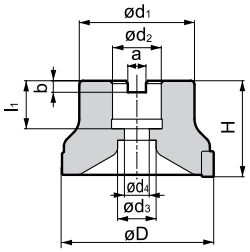


Fig. 2

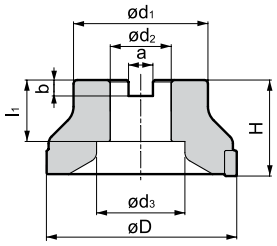
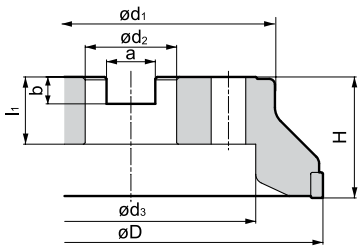


Fig. 3



Body (Standard, CNP Type)

Type	Cat. No.	Stock	Dimensions (mm) ø D	ød1	H	Mounting ød2	ød3	ød4	a	b	l1	Number of teeth	Max. Depth of Cut	Weight (Kg)	Fig.
CNP13000	**CNP 13040 RS**	●	40	36	40	22	14	9	8,4	5,6	18	4	12,0	0,3	1.
	CNP 13050 RS	●	50	40	40	27	18	11	10,4	6,3	20	4		0,4	
	CNP 13063 RS	●	63	40	40	22	18	11	10,4	6,3	20	5		0,4	
	CNP 13080 RS	●	80	60	50	27	20	13	12,4	7,0	25	5		0,9	
	CNP 13100 RS	●	100	70	50	32	–	–	14,4	8,5	32	6		1,3	2.
	CNP 13125 RS	●	125	80	63	40	–	–	16,4	9,5	38	7		2,5	
	CNP 13160 RS	●	160	100	63	40	–	–	16,4	9,5	38	8		4,2	
	CNP 13200 RS		200	150	63	60	–	–	25,7	14,0	34	10		7,2	3.

Body (Close Pitch, CNPF Type)

CNPF13000	**CNPF 13063 RS**	●	63	40	40	22	18	11	10,4	6,3	20	7	12,0	0,4	1.
	CNPF 13080 RS	●	80	60	50	27	20	13	12,4	7,0	25	7		0,9	
	CNPF 13100 RS	●	100	70	50	32	–	–	14,4	8,5	32	8		1,4	2.
	CNPF 13125 RS	●	125	80	63	40	–	–	16,4	9,5	38	9		2,4	
	CNPF 13160 RS	●	160	100	63	40	–	–	16,4	9,5	38	11		4,3	
	CNPF 13200 RS		200	150	63	60	–	–	25,7	14,0	34	13		7,4	3.



Inserts

Remarks:
-G: General purpose
-H: Strong cutting edge

Fig. 1

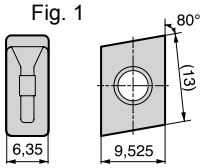
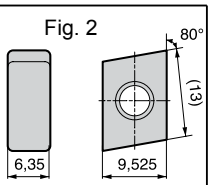


Fig. 2



Cat. No.	Tolerance Class	Nose Radius	Coated Carbide ACP100	ACP200	ACP300	ACK200	ACK300	Fig.
CNMU 130608 N-G	M	0,8	●	●	●	●	●	1.
CNMU 130608 N-H	M	0,8	●	●	●	●	●	
CNMQ 130608 N	M	0,8						2.
CNMQ 130616 N	M	1,6	●	●	●	●	●	
CNEQ 130608 N	E	0,8						

Spare Parts

Cutter	Screw	Wrench
		
CNP-(F) 13000	BFTX 0412 N	TTX 15 W

Recommended Cutting Conditions

[v_c =m/min, f_t =mm/tooth] [min.– **optimum** – max.]

Insert Type		CNMU / CNMQ 1306○○ N / -G/ -H												
Grade		ACP100			ACP200			ACP300		ACK200		ACK300		
Work Material / Type		Low carbon steel	Alloy steel	Die steel	Low carbon steel	Alloy steel	Die steel	Stainless steel austenitic	Stainless steel martensitic	Cast iron	Ductile cast iron	Cast iron	Ductile cast iron	
CNP 13000	v_c	100-**250**-400	80-**220**-280	80-**150**-250	80-**200**-370	70-**150**-250	60-**130**-220	120-**180**-240	100-**140**-200	220-**270**-450	150-**180**-250	180-**220**-270	130-**160**-220	
	f_t	0,1-**0,25**-0,4	0,1-**0,25**-0,35	0,1-**0,2**-0,3	0,1-**0,25**-0,4	0,1-**0,25**-0,35	0,1-**0,2**-0,3	0,1-**0,2**-0,25	0,1-**0,2**-0,25	0,1-**0,25**-0,4	0,1-**0,25**-0,4	0,1-**0,25**-0,4	0,1-**0,25**-0,4	
	d_{oc}	~**10**			~**10**			~**10**		~**10**		~**10**		

● = Eurostock

High Feed Milling of Steel, Stainless Steel, Die Steel and Cast Iron



1,5 mm 20° (MSX 08000■■)　2,0 mm 20° (MSX 12000■■)　2,5 mm 20° (MSX 14000■■)

Fig. 1

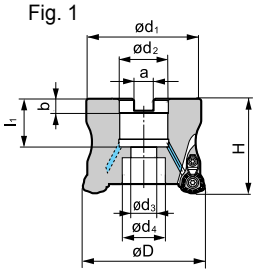
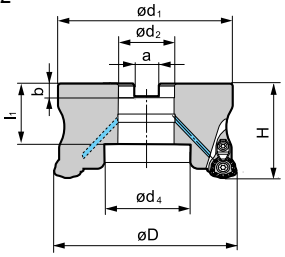


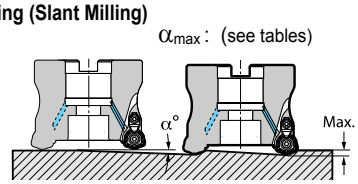
Fig. 2



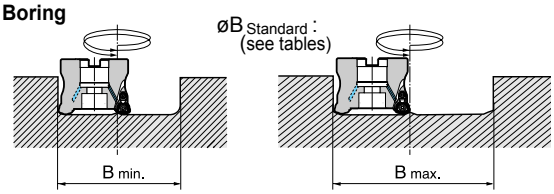
■ Body

Cat. No.	Stock	Dimensions (mm)			Mounting						No. of teeth	Helical Boring øB (max-min)	Ramping αmax.	Weight (Kg)	Fig.	Applicable Insert
		ø D	ød1	H	a	b	ød2	ød3	ød4	l1						
MSX 08040 RS	●	40	37	45	8,4	5,6	16	9	13,5	18	4	65 ~ 78	1°30′	0,2	1	WDMT 0804 ZDTR/-H
MSX 12050 RS	●	50	47	50	10,4	6,3	22	11	18	20	4	78 ~ 99	2°30′	0,3		
MSX 12052 RS	●	52	47	50	10,4	6,3	22	11	18	20	4	82 ~ 103	2°00′	0,3		
MSX 12063 RS	●	63	60	50	10,4	6,3	22	11	18	20	5	104 ~ 125	1°30′	0,4	1	WDMT 1205 ZDTR/-H
MSX 12066 RS	●	66	60	63	12,4	7,0	27	13,5	20	25	5	110 ~ 131	1°00′	0,4		
MSX 14050 RS	●	50	47	50	10,4	6,3	22	11	17	20	3	73 ~ 98	3°30′	0,3		
MSX 14063 RS	●	63	60	50	10,4	6,3	22	11	18	20	4	99 ~ 124	2°00′	0,6	1	WDMT 1406 ZDTR/-H
MSX 14066 RS	●	66	60	63	12,4	7,0	27	13,5	20	25	4	107 ~ 132	2°00′	0,7		
MSX 14080 RS	●	80	76	63	12,4	7,0	27	13,5	20	25	5	133 ~ 158	1°30′	1,2		
MSX 14100 RS	●	100	96	63	14,4	8,5	32	-	44	32	6	173 ~ 198	1°00′	1,8	2	

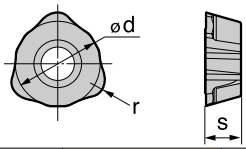
Ramping (Slant Milling)



Helical Boring



■ Inserts



Cat. No.	Coated Carbide			Dimensions (mm)			Max. doc
	ACP200	ACP300	ACK300	ød	s	r	
WDMT 0804 ZDTR	●	●	●	8,5	4,0	2,0	1,5
WDMT 0804 ZDTR-H	●	●	●				
WDMT 1205 ZDTR	●	●	●	12	5,0	2,0	2,0
WDMT 1205 ZDTR-H	●	●	●				
WDMT 1406 ZDTR	●	●	●	14	6,0	2,0	2,5
WDMT 1406 ZDTR-H	●	●	●				

ZDTR-H : Stronger cutting edge

■ Recommended Cutting Conditions

Depth of cut : doc (mm)
Feed rate : ft (mm/tooth)

Work Material	Insert Type	Cutting Speed vc (m/min)	Insert Cat. No.	ø40		ø50 ~ 66		ø80 ~ 100	
				doc	ft	doc	ft	doc	ft
General Steel (Below HB200)	ACP200	100-**150**-200	**WDMT 0804**	1,0	1,2	–	–	–	–
			WDMT 1205	–	–	1,2	1,4	–	–
			WDMT 1406	–	–	1,5	1,5	1,5	1,5
Alloy Steel (Below HRC45)	ACP200	80-**130**-180	**WDMT 0804**	0,8	1,2	–	–	–	–
			WDMT 1205	–	–	1,0	1,4	–	–
			WDMT 1406	–	–	1,3	1,5	1,3	1,5
Stainless Steel (X5CRNI1810)	ACP300	80-**120**-150	**WDMT 0804**	1,0	0,8	–	–	–	–
			WDMT 1205	–	–	1,2	1,2	–	–
			WDMT 1406	–	–	1,5	1,3	1,5	1,3
Cast Iron GG, GGG	ACK300	100-**150**-200	**WDMT 0804**	1,0	1,4	–	–	–	–
			WDMT 1205	–	–	1,2	1,5	–	–
			WDMT 1406	–	–	1,5	1,8	1,5	1,8
Hardened Steel (Below HRC50)	ACK300	40-**80**-100	**WDMT 0804**	0,5	0,8	–	–	–	–
			WDMT 1205	–	–	0,6	1,0	–	–
			WDMT 1406	–	–	1,0	1,2	1,0	1,2

- The above recommended cutting conditions may require adjustment according to machine rigidity and work rigidity.
- The above figures are guidelines for use with the BT50 machine tool.

■ Spare Parts

Screw		Wrench	Clamp	C Ring	Cramp screw	Applicable endmill
	N·m					
BFTX 0306 IP	**2,0**	TRDR 08 IP	CCH 3,5	CR 03	BFTX 03510 IP 08	MSX 08000RS
BFTX 0409 IP	**3,0**	TRDR 15 IP	CCH 3,5	CR 03	BFTX 03510 IP 08	MSX 12000RS
BFTX 0511 IP	**5,0**	TRDR 20 IP	CCH 4,5	CR 03	BFTX 03510 IP 08	MSX 14000RS



Remark: If depth-of-cut exceeds 5mm, reduce recommended feedrates by 50%.
The conditions above are meant as a guide, please adjust the cutting conditions according to actual work material and machine ridgidity.

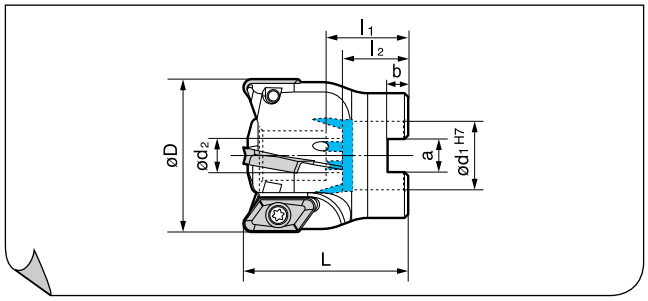
WAX 3000 RS Type

16-18 mm 90°

P M K S H

(Shellmill)





Body

(For inserts with nose radius ≤ 3,2mm)

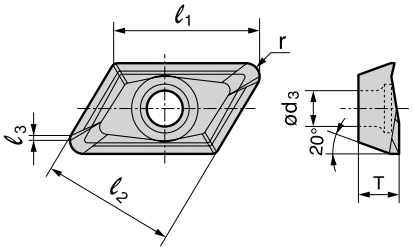
Cat. No.	Stock	Dimensions (mm)								No.of teeth	Weight (Kg)
		øD	ød1	L	ød2	a	b	ℓ1	ℓ2		
WAX 3050 RS-3.2	●	**50**	22	50	11	10,4	6.3	26	21	4	0,34
WAX 3063 RS-3.2	●	**63**	22	50	11	10,4	6.3	26	21	5	0,6
WAX 3080 RS-3.2	●	**80**	27	50	13,5	12,4	7	30	23	5	1,0
WAX 3100 RS-3.2	●	**100**	32	63	18	14,4	8	32	26	6	2,2
WAX 3125 RS-3.2	●	**125**	40	63	22	16,4	9	35	29	7	3,5

Body

(For inserts with nose radius ≥ 4,0mm)

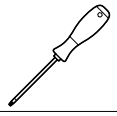
Cat. No.	Stock	Dimensions (mm)								No.of teeth	Weight (Kg)
		øD	ød1	L	ød2	a	b	ℓ1	ℓ2		
WAX 3050 RS-4.0	●	**50**	22	50	11	10,4	6.3	26	21	4	0,34
WAX 3063 RS-4.0	●	**63**	22	50	11	10,4	6.3	26	21	4	0,6
WAX 3080 RS-4.0	●	**80**	27	50	13,5	12,4	7	30	23	5	1,0
WAX 3100 RS-4.0	●	**100**	32	63	18	14,4	8	32	26	6	2,2
WAX 3125 RS-4.0	●	**125**	40	63	22	16,4	9	35	29	7	3,5

Inserts for WAX 3000 Type



Cat. No.	DLC Coated DL 1000	Carbide H1	Dimensions (mm)					
			ℓ1	ℓ2	ℓ3	r	T	ød3
AECT 160404 PEFRA	●	●	18	16,4	1,4	0,4	5	4,4
160408 PEFRA	●	●	18	16,4	1	0,8	5	4,4
160412 PEFRA	●	●	18	16,4	0,6	1,2	5	4,4
160416 PEFRA	●	●	17,5	16,4	0,5	1,6	5	4,4
160420 PEFRA	●	●	17,5	16,4	0,5	2	5	4,4
160430 PEFRA	●	●	17	16,4	0,7	3	5	4,4
160432 PEFRA	●	●	17	16,4	0,5	3,2	5	4,4
AECT 160440 PEFRA	●	●	16,5	16,4	0,5	4	5	4,4
160450 PEFRA	●	●	16	16,4	0,4	5	5	4,4

Spare Parts

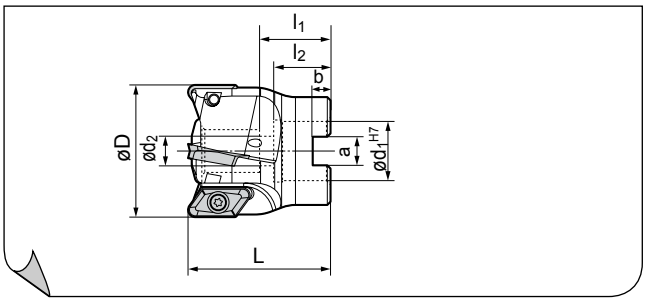
Screw	Wrench	Required Torque	Applicable Endmill
		**3,0** (N·m)	
BFTX 0408	TRD 15		Ø50 ~ Ø125

● = Euro stock
❑ = Delivery on request

WAX 4000 RS Type

22-24 mm 90°

(Shellmill



New



Body

(For inserts with nose radius ≤ 3,2mm)

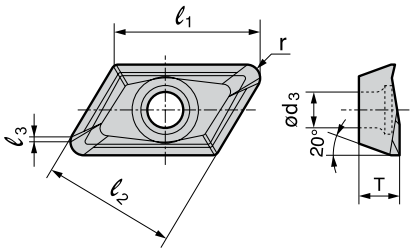
Cat. No.	Stock	Dimensions (mm)								No.of teeth	Weight (Kg)
		øD	ød1	L	ød2	a	b	ℓ1	ℓ2		
WAX 4050RS -3.2	❑	**50**	16	50	9	8,4	5,6	23	18	2	0,37
4063RS -3.2	❑	**63**	22	50	11	10,4	6,3	26	21	3	0,54
4080RS -3.2	❑	**80**	27	50	13,5	12,4	7	30	23	4	0,81
4100RS -3.2	❑	**100**	32	63	18	14,4	8	32	26	5	1,7
4125RS -3.2	❑	**125**	40	63	22	16,4	9	35	29	6	2,6

Body

(For inserts with nose radius ≥ 4,0mm)

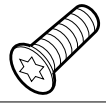
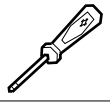
Cat. No.	Stock	Dimensions (mm)								No.of teeth	Weight (Kg)
		øD	ød1	L	ød2	a	b	ℓ1	ℓ2		
WAX 4050RS -4.0	❑	**50**	16	50	9	8,4	5,6	23	18	2	0,37
4063RS -4.0	❑	**63**	22	50	11	10,4	6,3	26	21	3	0,54
4080RS -4.0	❑	**80**	27	50	13,5	12,4	7	30	23	4	0,81
4100RS -4.0	❑	**100**	32	63	18	14,4	8	32	26	5	1,7
4125RS -4.0	❑	**125**	40	63	22	16,4	9	35	29	6	2,6

Inserts for WAX 4000 Type



Cat. No.	DLC Coated	Carbide	Dimensions (mm)					
	DL 1000	H1	ℓ1	ℓ2	ℓ3	r	T	ød3
AECT 220604 PEFRA	❑	❑	24	21,8	1,5	0,4	6,35	6,0
220608 PEFRA	❑	❑	24	21,8	1,2	0,8	6,35	6,0
220612 PEFRA	❑	❑	24	21,8	0,8	1,2	6,35	6,0
220616 PEFRA	❑	❑	24	21,8	0,4	1,6	6,35	6,0
220620 PEFRA	❑	❑	24	21,8	0,5	2,0	6,35	6,0
220630 PEFRA	❑	❑	23	21,8	0,6	3,0	6,35	6,0
220632 PEFRA	❑	❑	23	21,8	0,4	3,2	6,35	6,0
AECT 220640 PEFRA	❑	❑	22	21,8	1,2	**4,0**	6,35	6,0
220650 PEFRA	❑	❑	22	21,8	0,4	**5,0**	6,35	6,0

Spare Parts

Screw	Spanner	Required Torque	Applicable Endmill
		**5,0** (N·m)	
BFTX0511N	TRD20		Ø50 ~ Ø125

RF Type

High Speed Finishing of Aluminium Alloy

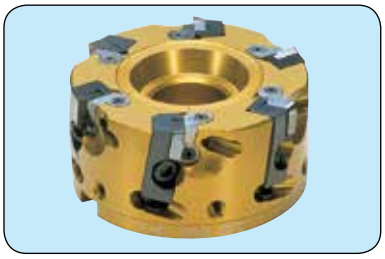


Fig. 1

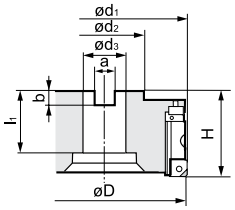


Fig. 2

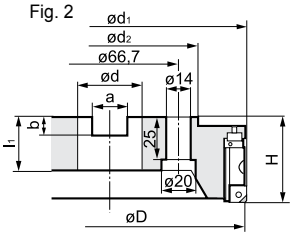
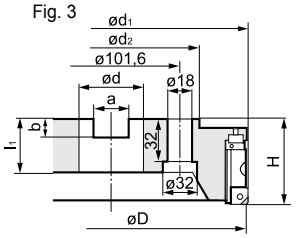


Fig. 3

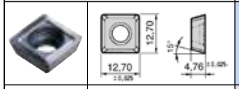
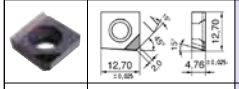


■ Body

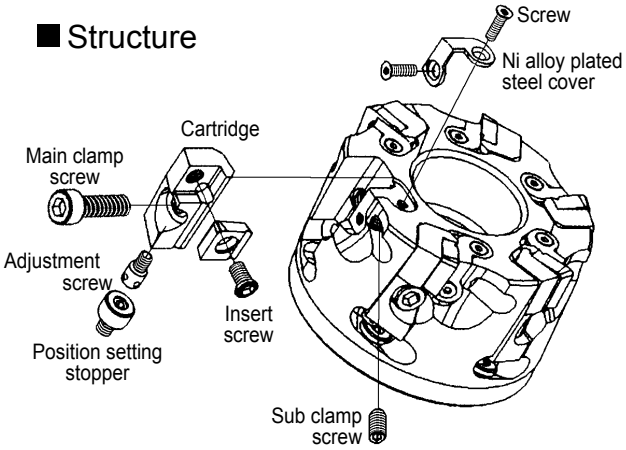
Type	Cat. No.	Stock	Dimensions (mm)				Mounting				Number of teeth	Max. Depth of Cut	Weight (Kg)	Fig.
			ø D	ø d_1	ø d_2	H	ø d_3	a	b	l_1				
RF 4000	**RF 4080 R-S**	●	80	82	60	50	27	12,4	7,0	29	6	3,0	0,7	
	RF 4100 R-S	●	100	102	75	50	32	14,4	8,5	29	6		1,0	1.
	RF 4125 R-S	●	125	127	75	63	40	16,4	9,5	29	8		1,6	
	RF 4160 R-S	❑	160	162	100	63	40	16,4	9,5	29	10		2,6	2.
	RF 4200 R-S	❑	200	202	130	63	60	25,7	14,0	38	12		3,6	
	RF 4250 R-S	❑	250	252	130	63	60	25,7	14,0	38	16		6,0	3.
	RF 4315 R-S	❑	315	317	240	80	60	25,7	14,0	40	18		11,0	

Remark: PCD blades and inserts are not included.

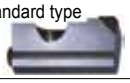
■ Insert for Roughing and Finishing

Shape	Cat. No.	Grade	Stock
	Carbide insert **SDET 1204 ZDFR**	**H1**	●
	PCD insert **SNEW 1204 ADFR-NF**	**DA1000** ● DA2200 ▲	
	PCD insert wiper type **SNEW 1204 ADFR-W-NF**	**DA1000** ● DA2200 ▲	

■ Structure



■ "Sumidia" Blade

PCD grade DA2200	Cat. No.	Stock
Standard type 	**RFB**	❑
Wiper type 	**RFBW**	❑

■ Dummy Blade

	**RFD**	❑

■ Cartridge

Shape	Cat. No.	Stock
For carbide insert 	**RFR**	●
For Sumidia insert 	**RFF**	●

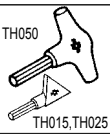
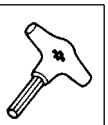
■ Cutting Insert Selection

For easy assembling:
PCD blade **RFB**
PCD blade **RFB** (wiper type)

For finishing:
Cartridge **RFF**
PCD insert SNEW 1204 ADFR-NF (standard type)
SNEW 1204 ADFR-W-NF (wiper type)
PCD grade: DA1000

For roughing:
Cartridge **RFR**
Uncoated carbide insert
SDET 1204 ZDFR, grade: H1

■ Spare Parts

								
Cover	Position setting stoper	Main clamp screw	Sub clamp screw	Cover clamp screw	Adjustment screw	Insert clamp screw	Hex wrench	Torque wrench
RFC	RFS	BX0620	BTD0510	FBUP2-A0-8	RFJ	BFTX0509N	TH015, TH025 TH050	TTX20

■ Setting Gauge



RF-SET

Dial-gauge is not included.

● = Euro stock

❑ = Delivery on request
▲ = To be replaced by new item

High Speed Finishing of Aluminium Alloy



Fig. 1

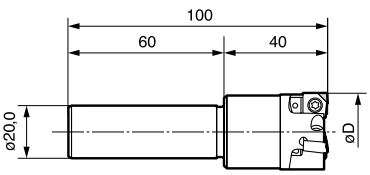
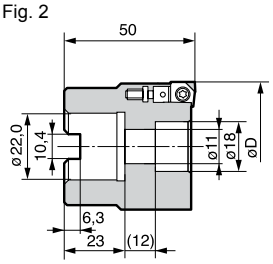


Fig. 2

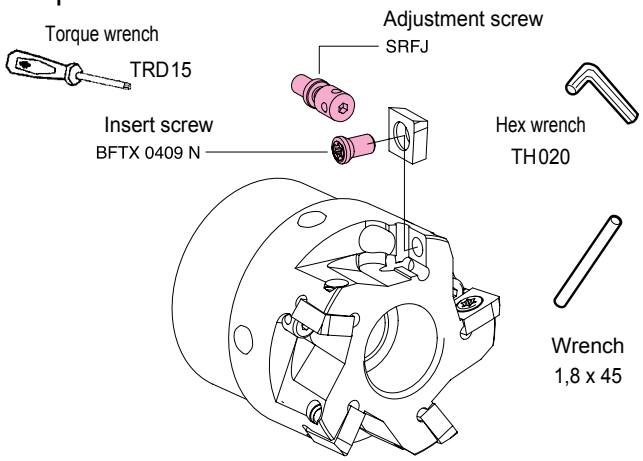


Body

Cat. No.	Stock	øD(mm)	No. of teeth	Fig.	Weight (Kg)
SRF 30 R-ST	❑	30	3	1	0,34
SRF 40 R-ST	❑	40	4	1	0,50
SRF 50 RS	❑	50	5	2	0,59
SRF 63 RS	❑	63	6	2	0,67

Inserts are sold seperately.

Spare Parts



Insert

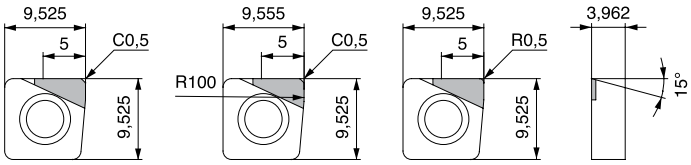


Fig. 1 Fig. 2 Fig. 3

Cat. No.	Cutting Edge	SUMIDIA DA2200	Fig.
SNEW 09T3 ADTR-NF	Standard	❑	1
SNEW 09T3 ADTR-U-NF	Wiper	❑	2
SNEW 09T3 ADTR-R-NF	Nose Radius	❑	3

- Standard inserts and Wiper inserts can be used on the same cutter body.
- Standard inserts with nose radius should be used where vibration is present. As such, Wiper-inserts will not be appliccable.
- Inserts can be regrind 3 times (up to minimum IC diameter 9,225mm).
- When using reground inserts, it is advisable to reconfirm insert height and cutting diameter with a tool pre-setter.
- Do not mix new and reground inserts, or even inserts with different regrind amount on the same cutter.

Maximum D.O.C. Guide (SRF50RS, 5 teeth)

The contains guidelines on the maximum D.O.C., determined from internal tests. "O" mark indicates the possible application range. Actual cutting conditions should be set, based on actual machine and work characteristics.

Feed / D.O.C. (mm)	Feed Speed, v_f (mm/min) 2.500	4.000	5.000
	Feed Rate, f_t (mm/tooth) 0,05	0,08	0,10
0,5	○	○	○
1,0	○	○	○
1,5	○	○	○
2,0	○	○	○
2,5	○	○	○
3,0	○	○	○
3,5	○	○	–
4,0	○	–	–
4,5	○	–	–
5,0	○	–	–

● Cutting Conditions

Cutter: SRF 50 RS
Insert: SNEW 09T3 ADFR-NF (DA2200)
n : 10.000 rpm
Width: 35mm at D.O.C. indicated above



Recommended Cutting Conditions for RF and SRF Type Cutters

Work Material		Process	Grade	Cutting Speed (m/min) RF Type	SRF Type	Feed Rate (mm/tooth)	Depth of Cut (mm) RF Type	SRF Type
Aluminium Alloy	Si < 13%	Finishing	**DA2200** (PCD)	2.000 ~ 5.000	~ 4.000	0,05 ~ 0,2	~ 3,0	~ 5,0
		Roughing	H1 (Carbide)	1.000 ~ 2.500	–			
	Si ≥ 13%	Finishing	**DA2200** (PCD)	400 ~ 800	~ 800			
		Roughing	H1 (Carbide)	200 ~ 400	–			

High Speed Finishing of Grey Cast Iron



Features

- High speed machining v_c=1.500m/min
- Excellent surface roughness Rz=3,2 (Ra=1,0)
- Safety structure for the centrifugal force under high speed cutting conditions
- Run-out is less than 10µm
- Easy assembling method using the setting gauge
- Running cost is reduced because of economical insert

SUMIBORON ”BN Finish Mill”

Application

GG25~GG30 (HB200~250) grey cast iron with pearlite matrix, and ferrite matrix (HB130~160)
Application examples: engine block, cylinder block, etc



Specifications

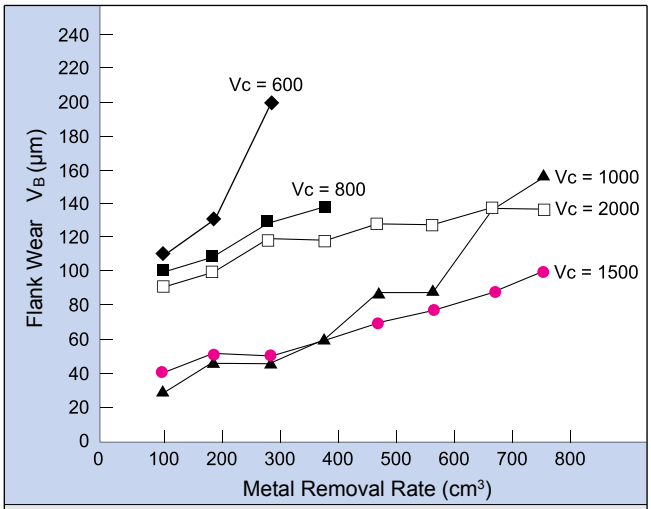
FMU Type: ø80 ~ ø315 mm
Insert: SNEW1203ADTR/L
Low cutting force type: SNEW1203ADTR/L-S

Recommended Cutting Conditions

Speed: v_c = 800 ~ 2000 m/min
Feed: f_t = 0,1 ~ 0,3 mm/tooth
Depth: d_{oc} = 0,5 mm or less
Dry cutting

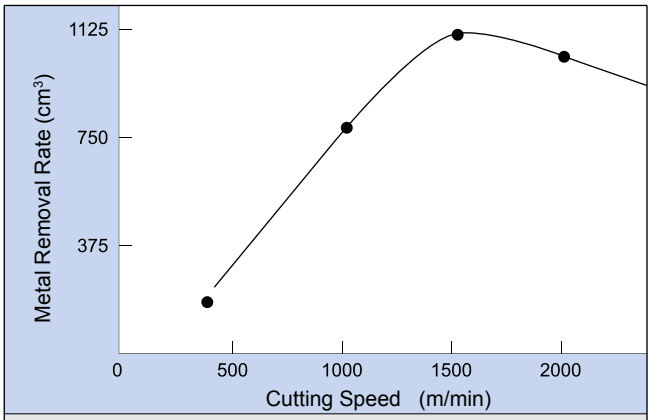
Performance

● Tool Life Diagram



Work Material : GG25 H_B240 (Pearlite)
Cutting Speed : v_c = 600 ~ 4000 m/min
Feed Rate : f_t = 0,15 mm/tooth
Depth of Cut : d_{oc} = 0,5 mm, Dry

● Estimated Tool Life



Work Material : GG25 H_B240 (Pearlite)
Cutting Speed : v_c = 400 ~ 4000 m/min
Feed Rate : f_t = 0,15 mm/tooth
Depth of Cut : d_{oc} = 0,5 mm, Dry

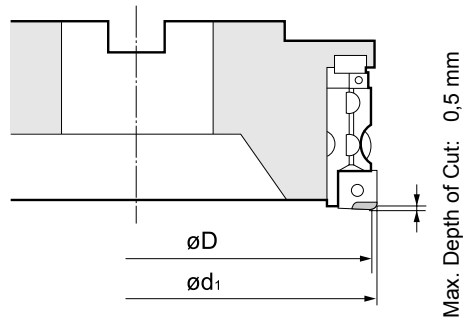
- Milling of ductile cast iron and alloy steel casting do not produce the best results.
- Dry cutting is recommended. Wet cutting will result in chipping of cutting edges in the early stages due to thermal cracking.

● = Euro stock
❑ = Delivery on request

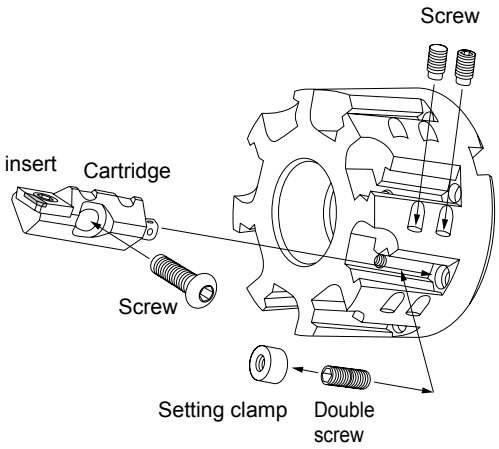
FMU Type

Specifications

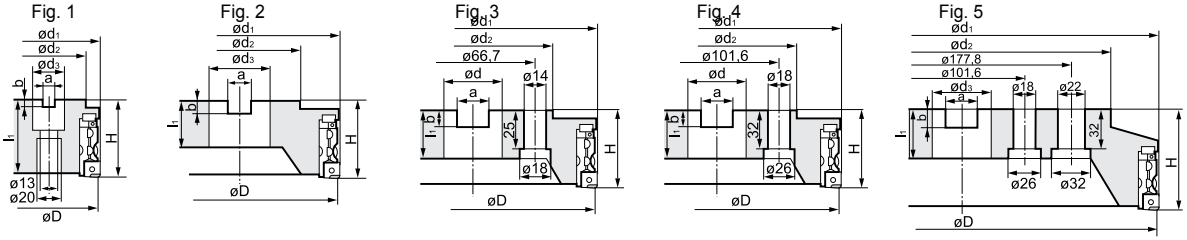
Approach angle: 90°
Axial rake angle: + 8°
Radial rake angle: + 2°



Structure

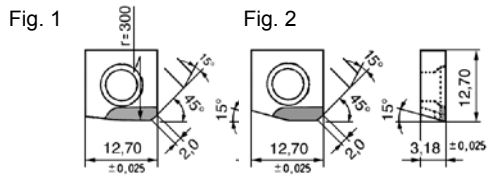


Body



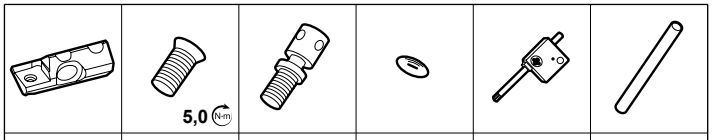
Type	Cat. No.	Stock R	Stock L	Dimensions (mm) ø D	ø d1	ø d2	H	Mounting ø d3	a	b	l1	Number of teeth	Max. Depth of Cut	Weight (Kg)	Fig.
FMU 4000	**FMU 4080 R-S**	●		80	82,8	60	63	27	12,4	7,0	25	6	0,5	1,6	1.
	FMU 4100 R-S	●		100	102,8	76	63	32	14,4	8,5	29	8		2,4	2.
	FMU 4125 R-S	❑		125	127,8	75	63	40	16,4	9,5	29	10		3,4	
	FMU 4160 R-S	❑		160	162,8	100	63	40	16,4	9,5	29	12		5,6	3.
	FMU 4200 R-S	❑		200	202,8	130	63	60	25,7	14,0	38	16		9,2	4.
	FMU 4250 R-S	❑		250	252,8	130	63	60	25,7	14,0	38	20		14,3	
	FMU 4315 R-S			315	317,8	240	80	60	25,7	14,0	40	24		27,8	5.

Insert



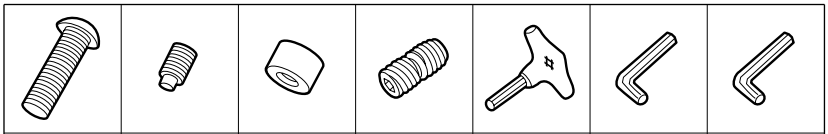
Cat. No.	Stock R	Stock L	CBN grade	Figure
SNEW 1203 ADT L/R	●		BN700	1
SNEW 1203 ADT L/R**-S**			BN700	2

Cartridge



Cartridge	Screw	Adjustment screw	O-ring	Wrench	Wrench
FMUU	BFTX0509N	FMUJ	P3	TRX20	1,8 x 45

Spare Parts



Screw	Screw	Setting clamp	Double screw	Wrench	Wrench	Wrench
BH0620	BTD0609	FMUE	WB5-10	TH040	LH030	LH025

Gauge

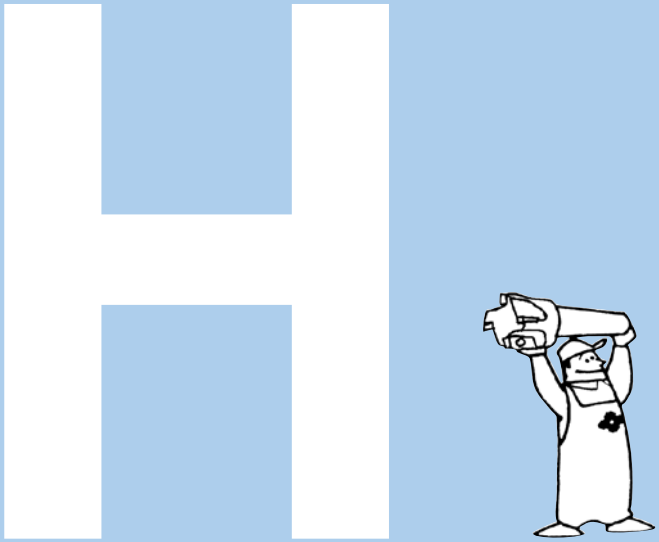


RF-SET

Dial-gauge is not included.

Indexable Endmills

H1 ~ H38



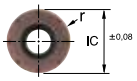
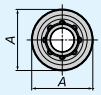
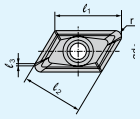
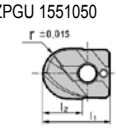
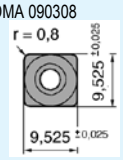


	Selection Guide	**"Wavemill"**	H 2 -3
	Exchangeable Head Endmills	According to Work Materials / Applications	
		Modular Tools	H 4 -5
Face Mills	"Sumi Dual" Face Mill	**DGC** 13000 **EW**	H 6
	"Sumi Wave" Face Mill	**WGX** 13000 **EW**	H 7
	"Metal Slash" High Feed Multi-Function Mill	**MSX** 06000/08000/12000/14000 **ES/EM/EW**	H 8 -9
		06000/08000/12000/12000 **M**	H10-11
Shoulder Mills	"Sumi Dual" Mill	**DFC(M)** 09000 **E** New	H12-13
	"Sumi Wave" Shoulder Mill	**WFX(F/M)** 08000/12000 **E** New	H14-15
		WFX 08000 **M** New	H14
	"Wave Mill" Series	**WEX** 2000/3000/12000/14000 **E/EL/EW/M**	H16-20
	"Wave Mill" for Aluminium	**WAX** 3000 **E/EL**	H21-22
		4000 **E/EL**	H23
	"Wave Multi-Function Mill"	**WMM(H)** 2000 / 3000 **E/EL/EW/ELW**	H24-25
	"Wave Repeater Mill"	**WRX** 2000 / 3000	H26-29
Others	"Wave Ball-Mill" for Roughing	**WBMR** 2000/2000**L**	H30-31
	"Wave Ball-Mill" for Finishing	**WBMF** 1000	H32-33
	"Wave Radius Mill"	**WRCX** 08000/10000 **E**	H34
		08000/10000/12000 **M**	H35
		RSX(F) 10000/12000 **ES** New	H36
		10000/12000 **M** New	H37
	SEC-Chamferlng Endmill	**SCP** 300/400	H38

Selection Guide

Application	Endmill Type	Series	Insert Type	Approach Angle / Max. Depth of Cut (mm)	External Diameter (mm)	Application: Face Milling – General Purpose	Face Milling – Finishing	Face Milling – High Feed	Shoulder Milling	Slot Milling	Ramping	Copying	Chamfering	Boring	Finishing	Work Material: P – Carbon Steel / Alloy Steel	P – Tempered Steel / Die Steel	M – Stainless Steel	K – Cast Iron / Ductile Cast Iron	N – Non-Ferrous Metal	N – Aluminium Alloy	S – Ti Alloy / Heat Resistant Alloy	H – Hardened Steel HRC 45 ~ 55	Ref. Page
Face Milling	DGC	DGC 13000-EW	SNMU13T6ANER-L/G/H ONMU13T6ANER-L/G	3 ~ 6 mm, 45°	ø40 (42,9) ~ ø63 (65,9)	◎				○			○			◎	◎	○	○					H6
Face Milling	WGX	WGX 13000-EW	SEMT 13T3 AGSR - L / G / H / FG	6 mm, 45°	ø32 ~ ø63	◎				○			○			◎	◎	○	○					H7
High Feed Milling	MSX	MSX(ES/EM/EW) 06000 08000 12000 14000	WDMT0603ZDTR (d=6,35) WDMT0804ZDTR (d=8,5) WDMT1205ZDTR (d=12) WDMT1406ZDTR (d=14)	1,0 ~ 2,5 mm, 20°	ø16 ~ ø63			○		○	○					◎	◎	◎	◎				○	H9
High Feed Milling	MSX-M	MSX 06000-M 08000-M 12000-M		1,0 ~ 2,0 mm, 20°	ø16 ~ ø40	○			◎	◎	◎					◎	◎	◎	◎	◎	◎	◎		H10
Shoulder Milling	DFC New	DFC (M) 09000-E	XNMU 0606_PNER L/G/H	6 mm, 90°	ø25 ~ ø80	○		◎	◎	○						◎	◎	○	◎					H13
Shoulder Milling	WFX New	WFX(M/F) 08000-E 12000-E	SOMT 080308	6 mm, 90°	ø20 ~ ø80	○			◎	○						◎	◎	◎	◎	◎	◎			H14 H15
Shoulder Milling	WFX-M New	WFX 08000-M	SOMT 120408	10 mm, 90°																				
Shoulder Milling	WEX	WEX 2000-E/EL	AXMT123504PEER-G (WEX 2000 E/F/M)	10 mm, 90°	ø14 ~ ø63	○			◎	◎	◎					◎	◎	◎	◎	◎	◎	◎		H18 H19
Shoulder Milling	WEX	WEX 3000-E/EL		14 mm, 90°	ø25 ~ ø63																			
Shoulder Milling	WEX-M	WEX 2000-M	AXMT170508PEER-G (WEX 3000 E/F/M)	10 mm, 90°	ø16 ~ ø40	○			◎	◎	◎					◎	◎	◎	◎	◎	◎	◎		H18 H19
Shoulder Milling	WEX-M	WEX 3000-M		14 mm, 90°	ø25 ~ ø40																			
Shoulder Milling	WRX	WRX 2000-E/W	AXMT123504PEER-G (WRX2000)	18 ~ 36 mm, 90°	ø20 ~ ø40	○			◎	◎	◎					◎	◎	◎	◎	◎	◎	◎		H27 H28
Shoulder Milling	WRX	WRX 3000-E/W	AXMT170508PEER-G (WRX3000)	27 ~ 53 mm, 90°	ø32 ~ ø50																			

◎ : Preferred choice
○ : Suitable

Application	Endmill Type	Series	Insert Type	Approach Angle / Max. Depth of Cut (mm)	External Diameter (mm)	Application: Face Milling – General Purpose	Face Milling – Finishing	Face Milling – High Feed	Shoulder Milling	Slot Milling	Ramping	Copying	Chamfering	Boring	Finishing	Work Material: P – Carbon Steel / Alloy Steel	P – Tempered Steel / Die Steel	M – Stainless Steel	K – Cast Iron / Ductile Cast Iron	N – Non-Ferrous Metal	N – Aluminium Alloy	S – Ti Alloy / Heat Resistant Alloy	H – Hardened Steel HRC 45 ~ 55	Ref. Page
Multi-Purpose	WRCX 	WRCX 08000-E 10000-E	QPMT 080330PPEN/-H 10T335PPEN/-H 120440PPEN/-H 160660PPEN/-H 200670PPEN/-H QPET 10T350PPFR-S 120460PPFR-S 160680PPFR-S	4 ~ 5 mm	ø12 ~ ø32	◎				○	◎	◎				◎	◎	◎	◎		◎	○	○	H34
	WRCX-M 	WRCX 08000-M 12000-M 16000-M		4 ~ 6 mm	ø20 ~ ø40	◎				○	◎	◎				◎	◎	◎	◎		◎	○	○	H35
	RSX New 	RSX(F) 10000-ES 12000-ES	RDET10T3MOEN 	5 mm 6 mm	ø25 ~ ø32	◎				○	◎	◎						◎				◎		H36 H37
	RSX-M New 	RSX(F) 10000-M 12000-M																						
	WMM(H) 	WMM(H) 2000 3000	APMT 103504PDER/-H 160508PDER/-H APET 103504PDER-F/S 160508PDER-F/S 	17 ~ 26 mm 90° 39 mm 90°	ø20 ~ ø25 ø32 ~ ø40	◎			◎	◎	◎	◎		◎		◎	◎	◎	◎	◎	◎	◎		H25
Alumimium	WAX 	WAX 3000-E/EL	AECT160404PEFRA (WAX 3000E/EL) 	16 ~ 18 mm 90°	ø20 ~ ø40	○			◎	◎	◎	◎				×	×	×	×	○	◎			H22 H23
		WAX 4000-E/EL	AECT220608PEFRA (WAX 4000E/EL)	22 ~ 24 mm 90°	ø25 ~ ø40																			
3D Profilling	WBMR 	WBMR 2000 WBMR 2000-L	ZNMT 1804100-C 2004100-S 	20 ~ 43 mm	R10 (ø20) ~ R25 (ø50)					◎		◎				◎	◎	◎	◎			○	○	H31
	WBMF 	WBMF 1000	ZPGU 1551050 	0,1 ~ 0,4 mm	R5 (ø10) ~ R15 (ø30)					◎		◎			◎	◎	◎	◎	◎				○	H33
Chamfering	SCP 	SCP	SDMA 090308 	45°	ø8 ~ ø32								○			○	○	○	○					H38

Modular Tools



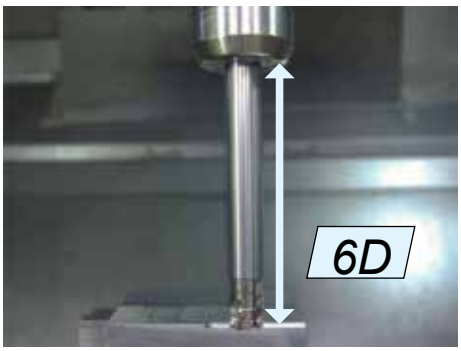
■ General Features

- ● Exchangeable head endmills are available in 3 types !
  - • High Efficiency Endmill
    WEX Type：15 Items
  - • Multipurpose Radius Endmill
    WRCX Type：7 Items
  - • Ultra-High Feed Endmill
    MSX Type：13 Items
- ● A wide variety of possible combinations with carbide arbors (16 items) and steel arbors (4 items) !

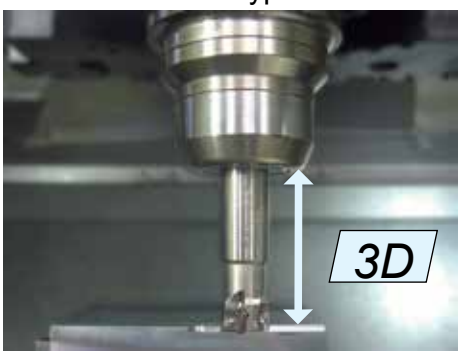
■ Characteristics

● Up to 6 x D from Modular End Mill with Carbide Arbor

Modular Head + Carbide Arbor



Standard Shank Type Endmill

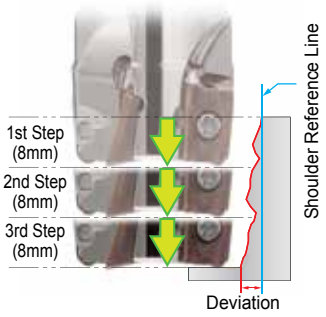


Work Material	:	C50
Tool	:	WEX2025M12Z4 (øD=25, 4 teeth)
Cutting Conditions:		v_c = 100m/min, f_t = 0,1mm/tooth
		d_{oc} = 8mm x 3 passes, w_{oc} = 2,0mm, Equipment: M/C BT50

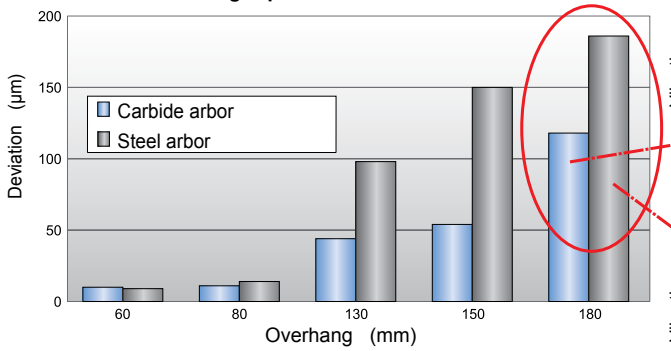
Note
Cutting conditions can vary according to cutter reach, rigidity of machine tool / workpiece etc.

■ Performance

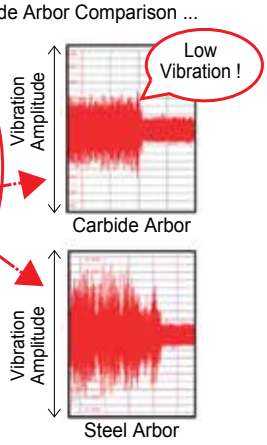
● A Carbide Arbor improves feed rates, surface finish, sizing, and tool life.



● **Shoulder Milling Squareness**



Carbide Arbor Comparison ...



Work Material	:	C50
Tool	:	WEX2025M12Z4 (øD=25, 4 teeth)
Cutting Conditions:		v_c = 100m/min, f_t = 0,1mm/tooth
		d_{oc} = 8mm x 3 passes, w_{oc} = 2,0mm, Equipment: M/C BT50

Suitable for milling with **long overhangs** when combined with carbide or steel arbors !

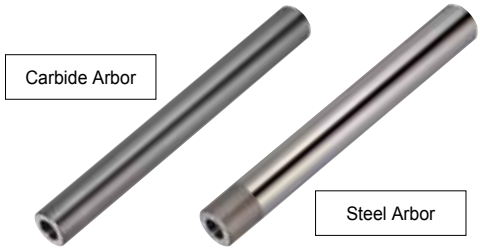
Economically designed exchangeable head!

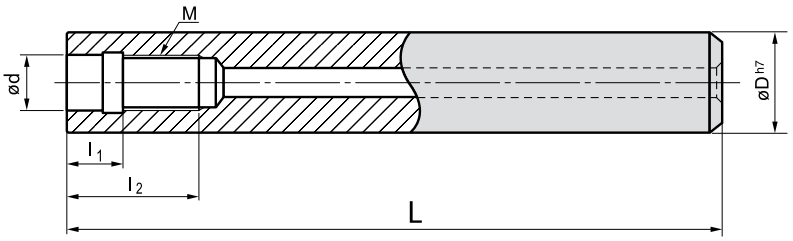


Easy to change screw-on endmill type WEX and carbide arbor

● = Euro stock

Carbide and Steel Arbor for Modular Tools





Carbide Arbor

Cat. No.	Stock	Dimensions (mm)						
		M	ød	øD	L	l_1	l_2	L_M
MA 15 M08 L120C	●	M8	8,5	15	120	10	18	145
MA 15 M08 L160C	●	M8	8,5	15	160	10	18	185
MA 16 M08 L120C	●	M8	8,5	16	120	10	18	145
MA 16 M08 L160C	●	M8	8,5	16	160	10	18	185
MA 18 M10 L150C	●	M10	10,5	18	150	10	20	180
MA 18 M10 L200C	●	M10	10,5	18	200	10	20	230
MA 20 M10 L150C	●	M10	10,5	20	150	10	20	180
MA 20 M10 L200C	●	M10	10,5	20	200	10	20	230
MA 23 M12 L200C	●	M12	12,5	23	200	10	22	235
MA 23 M12 L250C	●	M12	12,5	23	250	10	22	285
MA 25 M12 L200C	●	M12	12,5	25	200	10	22	235
MA 25 M12 L250C	●	M12	12,5	25	250	10	22	285
MA 28 M16 L200C	●	M16	17,0	28	200	10	24	240
MA 28 M16 L300C	●	M16	17,0	28	300	10	24	340
MA 32 M16 L200C	●	M16	17,0	32	200	10	24	240
MA 32 M16 L300C	●	M16	17,0	32	300	10	24	340

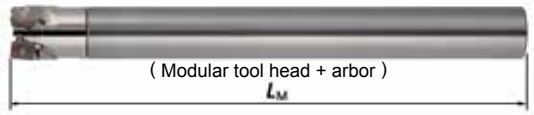
Steel Arbor

Cat. No.	Stock	Dimensions (mm)						
		M	ød	øD	L	l_1	l_2	L_M
MA 16 M08 L120S	●	M8	8,5	16	120	10	18	145
MA 20 M10 L150S	●	M10	10,5	20	150	10	20	180
MA 25 M12 L200S	●	M12	12,5	25	200	10	22	235
MA 32 M16 L200S	●	M16	17,0	32	200	10	24	240

Identification of Catalogue No.

MA Modular Arbor
15 Shank Diameter
M08 Mounting Screw
L120 Arbor Length
C Material (C: Carbide, S: Steel)

● Modular Tool System



Recommended Tightening Torque

Screw	Wrench		Torque (N·m)
	W	S	
M 8	8	13	23
M10	8	15	46
M12	10	19	80
M16	10	24	90



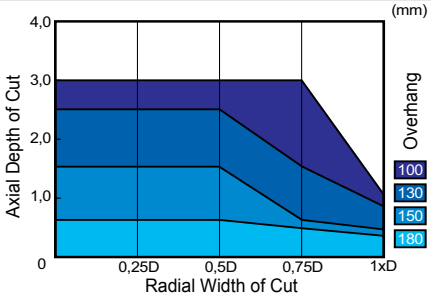
Notes about tightening the head:
- Refer to the Head Cat. No. chart on pages H18, H19, H35 and H37 to select the arbor size in the table above.
- Check the mounting screw size of the head and arbor beforehand.
- When attaching head to an arbor, follow the standard tighting torque in the table above.

Application Range

Work Material: C50, Equipment : Vertical Machine M/C BT50 (Dry)

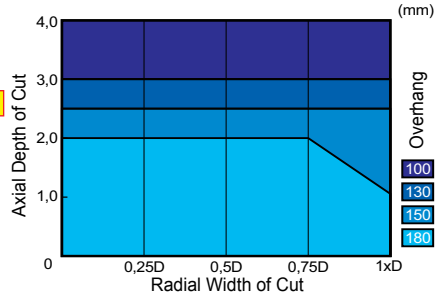
WEX2025M12Z4
(v_c =180m/min, f_t =0,1mm)
☞ H18





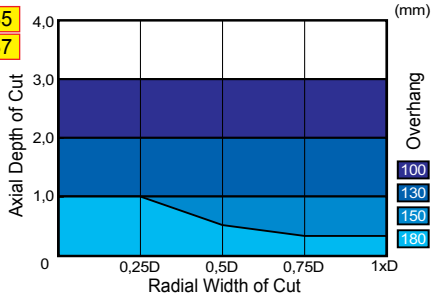
WEX3035M16Z3
(v_c =180m/min, f_t =0,1mm)
☞ H19





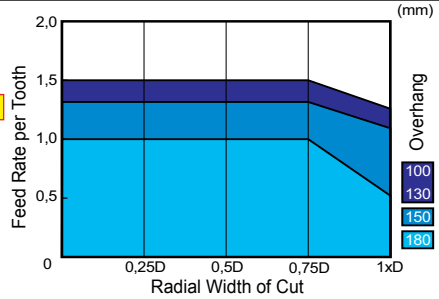
WRCX10025M12Z2 ☞ H35
RSX10025M12Z2 ☞ H37
(v_c =160m/min, f_t =0,2mm)





MSX12032M16Z2
(v_c =160m/min, d_{oc} =1,2mm)
☞ H10





Note: These tables indicate reference machining conditions. Actual machining parameters should be adjusted based on machine rigidity and work clamp rigidity.

"Sumi Dual" Face Mill
DGC (EW) Type

General Milling for Steel and Cast Iron

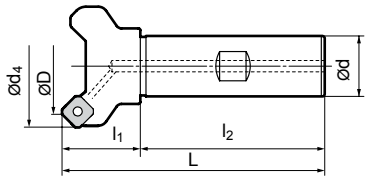
Rake Angle		
	Radial	-10°
	Axial	-5°

SNMU / SNEU: 6mm, 45°

ONMU / ONEU: 3mm, 45°

■ Body – Shank Type





■ Body

Cat. No.	Stock	Dimensions (mm)						No. of Teeth	Weight (kg)
		ØD	Ød4	Ød	l1	l2	L		
DGC 13040 EW	●	40 (42,90)	54	32	40 (38,44)	85	125	3	0,7
DGC 13050 EW	●	50 (52,90)	65	32	40 (38,44)	85	125	3	0,9
DGC 13063 EW	●	63 (65,90)	77	32	40 (38,44)	85	125	4	1,1

( ) Figures in brackets indicate values for inserts of type ONMU

■ Identification Details

DGC	13	040	EW
Cutter Series	Insert Size	Cutter Diameter	Endmill Type Weldon

■ Inserts

New

Application	Coated Carbide							
High Speed/Light cut	P			K		MS		
General Purpose		PM	M	K		MS		
Roughing		PM	PM		K		MS	
Cat. No.	ACP100	ACP200	ACP300	ACK200	ACK300	ACM200	ACM300	Fig.
SNMU 13T6ANER L	●	●	●	●	●			1
SNMU 13T6ANER G	●	●	●	●	●			1
SNMU 13T6ANER H	●	●	●	●	●			1
SNMU 13T6ANER FL	●	●	●	●	●			2
SNMU 13T6ANER FG	●	●	●	●	●			2
SNEU 13T6ANER L						●	●	1
SNEU 13T6ANER G						●	●	1
SNEU 13T6ANER FL						●	●	2
SNEU 13T6ANER FG						●	●	2
XNEU 13T6ANER W		●			●			3
ONMU 05T6ANER L	●	●	●	●	●			4
ONMU 05T6ANER G	●	●	●	●	●			4
ONEU 05T6ANER L						●	●	4
ONEU 05T6ANER G						●	●	4

Fig. 1

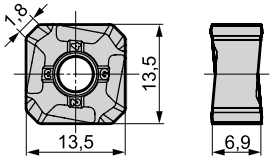


Fig. 2

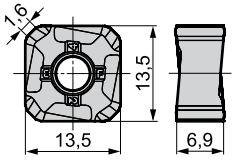


Fig. 3

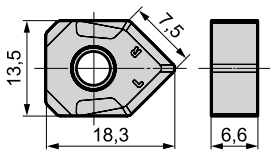
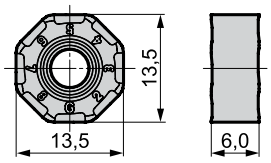


Fig. 4

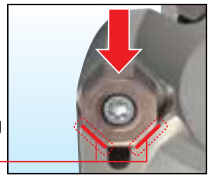




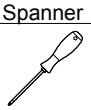
Attaching Octagonal Inserts

Firmly align insert with supporting face, press down in the direction of the arrow and tighten the screw to fix the insert.

Press down firmly from above



■ Spare Parts

Shim	Shim Screw	L Type Wrench	Insert Srew	Spanner
				
DGCS 13 R	BW 0609 F	LH 040	BFTX 0412 IP	TRDR 15 IP

Optional

Insert Srew (*)

BFTX 0418 IP

*Corners can be changed simply by loosening the screw. (Only suitable for DGC / DGCM types with body size ≥ Ø80).

■ SNMU – Recommended Cutting Conditions

ISO	Work Material	Fit-ness	Cutting Speed v_c (m/min)	Feed Rate f_t (min/t)	Depth of Cut (mm)	Grade
P	General Steel	◎	150-**200**-250	0,10-**0,25**-0,40	<4	ACP200 ACP300
P	Alloyed Steel	◎	180-**250**-350	0,10-**0,30**-0,45	<4	ACP200 ACP300
P	Die Steel	◎	100-**150**-200	0,15-**0,25**-0,35	<4	ACP200 ACP300
M	Stainless Steel	○	160-**200**-250	0,15-**0,23**-0,30	<3	ACM200 ACM300 ACP300
K	GG+GGG	◎	100-**200**-250	0,10-**0,25**-0,40	<5	ACK200 ACK300

Min. – **Optimum** – Max.

■ ONMU – Recommended Cutting Conditions

ISO	Work Material	Fit-ness	Cutting Speed v_c (m/min)	Feed Rate f_t (min/t)	Depth of Cut (mm)	Grade
P	General Steel	◎	150-**200**-250	0,10-**0,30**-0,50	<2	ACP200 ACP300
P	Alloyed Steel	◎	180-**250**-350	0,10-**0,50**-0,50	<2	ACP200 ACP300
P	Die Steel	◎	100-**150**-200	0,15-**0,25**-0,30	<2	ACP200 ACP300
M	Stainless Steel	○	160-**200**-250	0,15-**0,23**-0,30	<2	ACM200 ACM300 ACP300
K	GG+GGG	◎	100-**200**-250	0,10-**0,30**-0,50	<2	ACK200 ACK300

◎ Preferred choice ○ Suitable

● = Euro stock
○ = Japan stock

☞ G6/G7

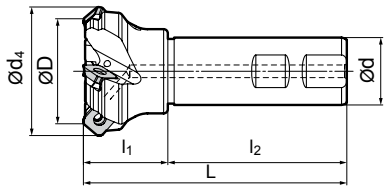
General Milling for Steel and Cast Iron

Rake Angle		
	Radial	-20° ~ 24°
	Axial	20° ~ 22°

6mm 45°

Body – Shank Type





Body – Dimensions

Cat. No.	Stock	Dimensions (mm)						No. of Teeth
		ØD	Ød4	Ød	l1	l2	L	
WGX 13032 EW	❍	32	44	32	40	85	125	3
WGX 13040 EW	❍	40	52	32	40	85	125	3
WGX 13050 EW	❍	50	62	32	40	85	125	4
WGX 13063 EW	❍	63	76	32	40	85	125	5

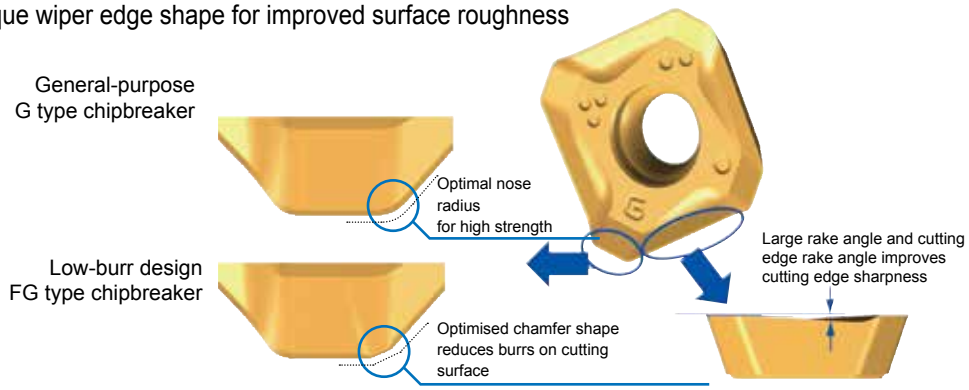
Inserts are not included.
ø 32 mm cutters do not have a seat.

Identification Details

WGX	13	032	EW
Cutter Series	Insert Size	Cutter Diameter	Endmill Type Weldon

Insert Shape Characteristics

Unique wiper edge shape for improved surface roughness



Inserts

Application	Coated Carbide							Carb.	DLC	
High Speed/Light Cut	P			K		MS		KN	N	
General Purpose		PM	M	K		MS	MS		N	
Roughing		PM	PM		K		MS			
Cat. No.	ACP100	ACP200	ACP300	ACK200	ACK300	ACM200	ACM300	H1	DL1000	Fig.
SEET 13T3AGFR-L								❍	❍	1
New SEET 13T3AGSR-L	●	●	●	●	●	●	●			1
SEET 13T3AGSR-G	●	●	●	●	●	●	●			1
SEMT 13T3AGSR-L	●	●	●	●	●	●	●			1
SEMT 13T3AGSR-G	●	●	●	●	●	●	●			1
SEMT 13T3AGSR-H	●	●	●	●	●	●	●			1
SEMT 13T3AGSR-FG	●	●	●	●	●	●	●			2
New XEEW 13T3AGER-WR		●			●					3

Fig. 1

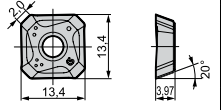


Fig. 2

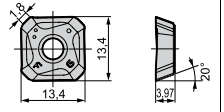
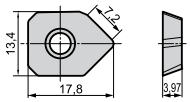
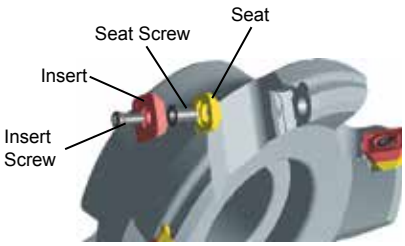


Fig. 3





Spare Parts

Applicable Cutters	Seat	Seat Screw	Insert Screw	Spanner (for Insert)	Torque (N·m)	Spanner (for Seat)
WGX 130__EW						
øD = 32	–	–	BFTX 03512 IP	TRDR 15 IP	3,0	–
øD = 40~63	WGCS 13 R	BW 0507 F	BFTX 03512 IP	TRDR 15 IP	3,0	LH 035

Recommended Cutting Conditions

ISO	Work Material	Hardness	Cutting Speed v_c (m/min)	Feed Rate f_t (mm/tooth)	Grade
P	General Steel	180~280HB	150-**200**-250	0,15-**0,20**-0,25	ACP200
P	Soft Steel	≤180HB	180-**265**-350	0,10-**0,25**-0,40	ACP200
P	Die Steel	200~220HB	100-**150**-200	0,15-**0,20**-0,25	ACP200
M	Stainless Steel	-	160-**205**-250	0,15-**0,23**-0,30	ACM300
K	Cast Iron	250HB	100-**175** -250	0,15-**0,23**-0,30	ACK200
S	Exotic Alloy	-	30 - **50**- 80	0,10-**0,20**-0,30	ACM300

Minimum-**Optimum**-Maximum

"METAL SLASH MILL"
MSX Type

Ultra High Feed

Boosts Productivity – Cuts Costs



Features

The Metal Slash Mill type MSX is a new multi function high shear milling cutter with ultra high feed capability suitable for face milling, slotting, plunging and helical boring. At 50GPa the ultra hard Super ZX coated inserts feature a sharp cutting edge which demonstrates extreme resistance to wear and heat massively boosting productivity and tool life.

The vibration free cutting action ensures accurate sizing, improved surface finish, and protection of the machine tool/workpiece from damage. Inserts are double clamped in wide chip gullets to maximise rigidity and chip evacuation with temperature at the cutting edge being easily controlled via an optional air blast through integral coolant holes.The MSX cutter is readily applied to general purpose machining across the P (steel) M (stainless) and K (cast iron) range of workpiece materials with impressive results.

Advantages

Integral Coolant Hole

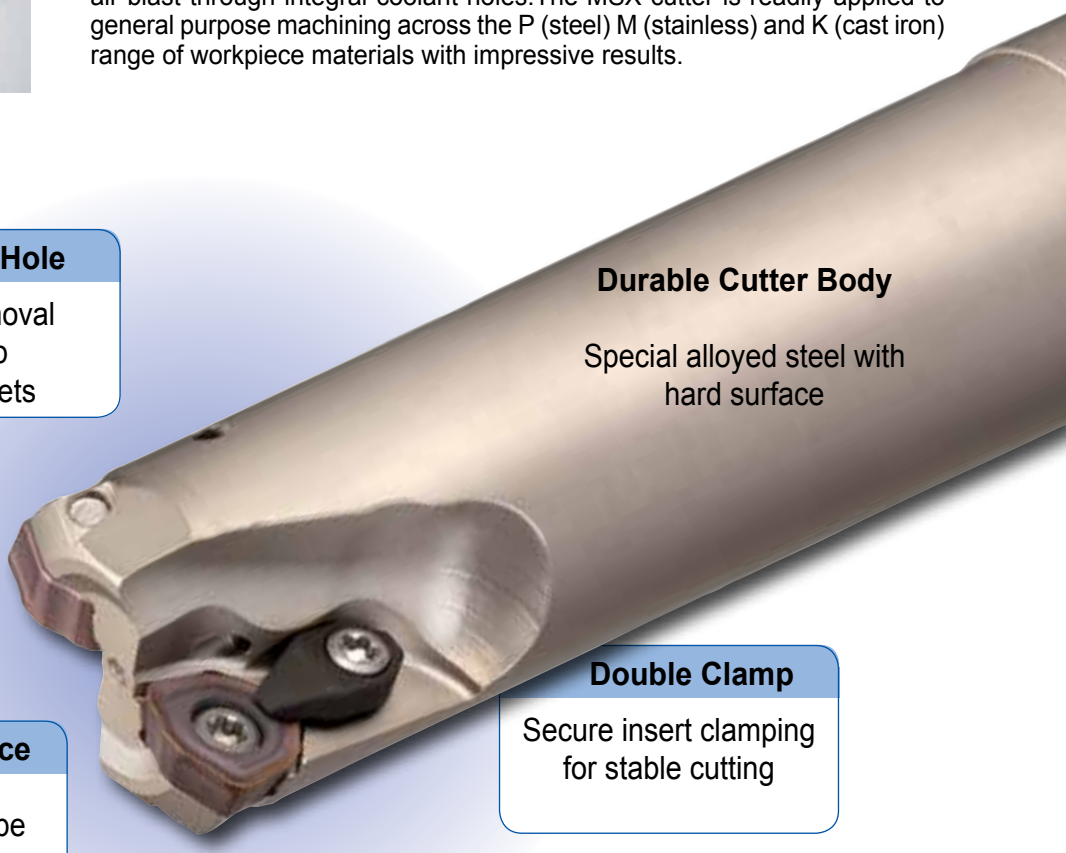
Otimised chip removal – massive chip avacuation pockets

Wide Application Range

Face milling, slotting, helical boring and plunging

Low Cutting Force

Unique insert shape reduces cutting force



Durable Cutter Body

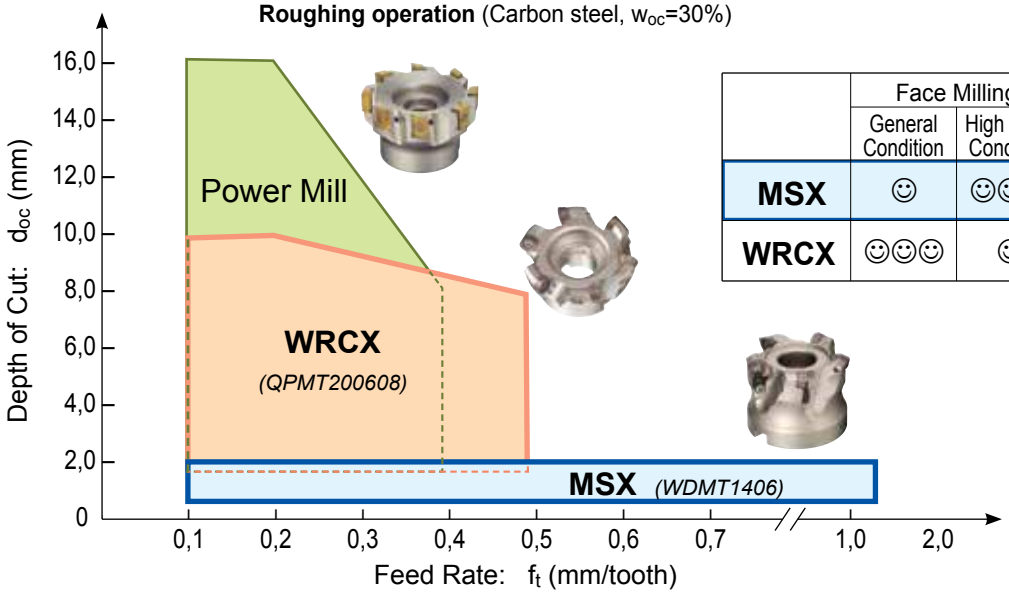
Special alloyed steel with hard surface

Double Clamp

Secure insert clamping for stable cutting

Application Range

Roughing operation (Carbon steel, w_{oc}=30%)



	Face Milling		Slotting	Helical Boring	Profiling
	General Condition	High Feed Condition			
MSX	☺	☺☺☺	☺	☺☺☺	–
WRCX	☺☺☺	☺	☺	☺☺	☺☺

☺☺☺ excellent
☺☺ very good
☺ good

● = Euro stock
❑ = Delivery on request

"METAL SLASH MILL"
MSX 06000/08000 ES/EM/EW

"METAL SLASH MILL"
MSX 12000/14000 ES/EM/EW

1,0 mm 20° | 1,5 mm 20° | 2,0 mm 20° | 2,5 mm 20°



Fig. 1

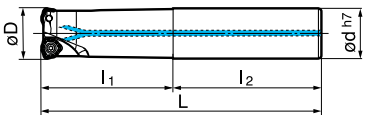
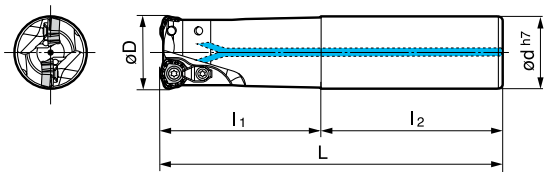


Fig. 2



Body

For insert type : WDMT 0603

Shank	Cat. No.	Stock	Dimensions (mm) øD	ød	l1	l2	L	No.of teeth	Fig.
	MSX 06016 ES	❑	16	16	30	80	110	2	1
	MSX 06016 EM	●	16	16	70	80	150	2	1
	MSX 06016 EM15	❑	16	15	30	120	150	2	1
	MSX 06017 EM	❑	17	16	20	130	150	2	1
	MSX 06018 EM	❑	18	16	20	130	150	2	1
	MSX 06020 ES	●	20	20	50	80	130	3	1
	MSX 06020 EM	●	20	20	100	80	180	3	1
	MSX 06020 EM19	❑	20	19	50	130	180	3	1
	MSX 06022 EM	❑	22	20	30	150	180	3	1
	MSX 06025 ES	●	25	25	60	80	140	3	1
	MSX 06025 ES24	❑	25	24	60	80	140	3	1
	MSX 06025 EM	●	25	25	120	130	250	3	1
	MSX 06025 EM24	❑	25	24	60	190	250	3	1
	MSX 06020 EW	●	20	20	50	80	130	3	1
	MSX 06025 EW	●	25	25	60	80	140	3	1

Body

For insert type : WDMT 0804

Shank	Cat. No.	Stock	Dimensions (mm) øD	ød	l1	l2	L	No.of teeth	Fig.
	MSX 08020 ES	●	20	20	50	80	130	2	1
	MSX 08020 EM	●	20	20	100	80	180	2	1
	MSX 08020 EM19	❑	20	19	50	130	180	2	1
	MSX 08022 EM	❑	22	20	30	150	180	2	1
	MSX 08025 ES	●	25	25	60	80	140	2	2
	MSX 08025 EM	●	25	25	120	130	250	2	2
	MSX 08025 EM24	❑	25	24	60	190	250	2	2
	MSX 08028 EM	❑	28	25	40	210	250	2	2
	MSX 08032 ES	❑	32	32	70	80	150	3	2
	MSX 08032 EM	❑	32	32	120	130	250	3	2
	MSX 08035 EM	❑	35	32	50	200	250	3	2
	MSX 08020 EW	●	20	20	50	80	130	2	1
	MSX 08025 EW	●	25	25	60	80	140	2	2
	MSX 08032 EW	●	32	32	70	80	150	3	2

ES : Short type with cylindrical shank
EM : Long type with cylindrical shank
EW : Short type with Weldon shank

Body

For insert type : WDMT 1205

Shank	Cat. No.	Stock	Dimensions (mm) øD	ød	l1	l2	L	No.of teeth	Fig.
	MSX 12032 ES	●	32	32	70	80	150	2	2
	MSX 12032 EM	●	32	32	120	130	250	2	2
	MSX 12035 EM	❑	35	32	50	200	250	2	2
	MSX 12040 ES	❑	40	32	50	100	150	3	2
	MSX 12040 EM	❑	40	32	50	200	250	3	2
	MSX 12050 EM	❑	50	42	50	200	250	4	2
	MSX 12032 EW	●	32	32	70	80	150	2	2

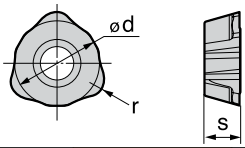
Body

For insert type : WDMT 1406

Shank	Cat. No.	Stock	Dimensions (mm) øD	ød	l1	l2	L	No.of teeth	Fig.
	MSX 14040 ES	❑	40	32	50	100	150	2	2
	MSX 14040 EM	❑	40	32	50	200	250	2	2
	MSX 14050 ES	❑	50	42	50	100	150	3	2
	MSX 14050 EM	❑	50	42	50	200	250	3	2
	MSX 14063 ES	❑	63	42	50	100	150	4	2
	MSX 14063 EM	❑	63	42	50	200	250	4	2

ES : Short type with cylindrical shank
EM : Long type with cylindrical shank
EW : Short type with Weldon shank

Inserts



Cat. No.	Coated Carbide ACP200	ACP300	ACK300	Dimensions (mm) ød	s	r	Max. doc
WDMT 0603 ZDTR	●	●	●	6,35	2,0	1,5	1,0
WDMT 0603 ZDTR-H	●	●	●				
WDMT 0804 ZDTR	●	●	●	8,5	4,0	2,0	1,5
WDMT 0804 ZDTR-H	●	●	●				
WDMT 1205 ZDTR	●	●	●	12	5,0	2,0	2,0
WDMT 1205 ZDTR-H	●	●	●				
WDMT 1406 ZDTR	●	●	●	14	6,0	2,0	2,5
WDMT 1406 ZDTR-H	●	●	●				

ZDTR-H : Stronger cutting edge

Spare Parts

Insert Screw	Wrench	Clamp	C Ring	Clamp Screw	Applicable Endmill
					MSX - EO
BFTX 02505 IP	TRDR 08 IP	–	–	–	MSX 06000EO
BFTX 0306 IP	TRDR 08 IP	–	–	–	MSX 08020EO, MSX 08022EO
BFTX 0306 IP	TRDR 08 IP	CCH 3,5	CR 03	BFTX 03510 IP 08	MSX 08025EO, MSX 08028EO, MSX 08032EO, MSX 08035EO
BFTX 0409 IP	TRDR 15 IP	CCH 3,5	CR 03	BFTX 03510 IP 15	MSX 12000EO
BFTX 0511 IP	TRDR 20 IP	CCH 4,5	CR 03	BFTX 04513 IP 20	MSX 14000EO

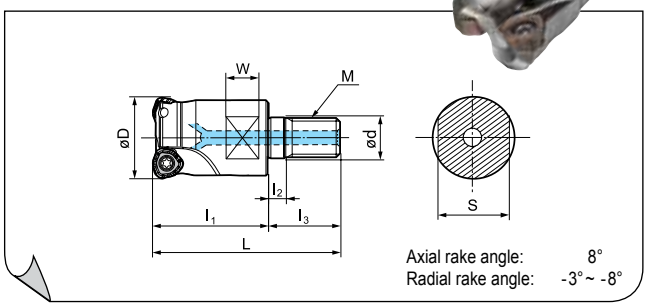
Exchangeable Head Endmills
MSX 06000/08000 M Type

Modular Tools

1,0 mm 20°

High feed and high efficiency machining endmills





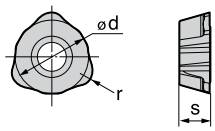
Heads

For insert type : WDMT 0603

Cat. No.	Stock	Dimensions (mm)									No. of teeth
		øD	ød	M	L	l_1	l_2	l_3	W	S	
MSX06016M08Z2	●	16	8,5	M8	42	25	5	17	8	13	2
MSX06018M08Z2	❑	18	8,5	M8	42	25	5	17	8	13	2
MSX06020M10Z3	●	20	10,5	M10	49	30	5	19	8	15	3
MSX06022M10Z3	❑	22	10,5	M10	49	30	5	19	8	15	3
MSX06025M12Z3	●	25	12,5	M12	56	35	5	21	10	19	3

Inserts are not included.

Inserts for MSX 06000M Type



Cat. No.	Coated Carbide			Dimensions (mm)			Max. d_{oc}
	ACP 200	ACP 300	ACK 300	ød	s	r	
WDMT 0603 ZDTR		●	●	6,35	3,0	1,5	1,0
WDMT 0603 ZDTR-H	❑	●	●				

H – Strong Cutting Edge

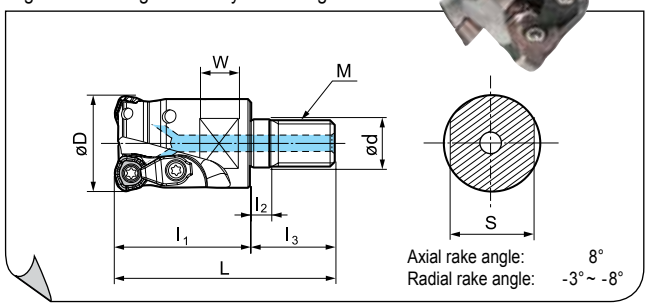
Exchangeable Head Endmills
MSX 08000/12000 M Type

1,5 mm 20° (MSX 08000M)

2,0 mm 20° (MSX 12000M)

High feed and high efficiency machining endmills





Heads

For insert type : WDMT 0804

Cat. No.	Stock	Dimensions (mm)									No. of teeth
		øD	ød	M	L	l_1	l_2	l_3	W	S	
MSX08025M12Z2	●	25	12,5	M12	56	35	5	21	10	19	2
MSX08028M12Z2	❑	28	12,5	M12	56	35	5	21	10	19	2
MSX08030M16Z3	❑	30	17,0	M16	63	40	5	23	10	24	3
MSX08032M16Z3	●	32	17,0	M16	63	40	5	23	10	24	3
MSX08035M16Z3	❑	35	17,0	M16	63	40	5	23	10	24	3

Inserts are not included.

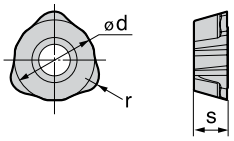
Heads

For insert type : WDMT 1205

Cat. No.	Stock	Dimensions (mm)									No. of teeth
		øD	ød	M	L	l_1	l_2	l_3	W	S	
MSX12032M16Z2	●	32	17,0	M16	63	40	5	23	10	24	2
MSX12035M16Z2	❑	35	17,0	M16	63	40	5	23	10	24	2
MSX12040M16Z3	●	40	17,0	M16	63	40	5	23	10	24	3

Inserts are not included.

Inserts for MSX 08000M/12000M Type



Cat. No.	Coated Carbide			Dimensions (mm)			Max. d_{oc}
	ACP 200	ACP 300	ACK 300	ød	s	r	
WDMT 0804 ZDTR	❑	●	●	8,5	4,0	2,0	1,5
WDMT 0804 ZDTR-H	❑	●	●				
WDMT 1205 ZDTR	❑	●	●	12	5,0	2,0	2,0
WDMT 1205 ZDTR-H	❑	●	●				

H – Strong Cutting Edge

● Identification of Catalogue No.

MSX 06 016 M08 Z2

- MSX: Cutter type
- 06: Insert size
- 016: Diameter
- M08: Mounting screw
- Z2: No. of teeth



Spare Parts

Clamp	C Ring	Clamp Screw	Wrench	Insert Screw	Required Torque (N·m)	Applicable Endmill
–	–	–	TRDR 08 IP	BFTX 02505 IP	1,5	MSX 06016M ~ MSX 06025M
CCH 3,5	CR 03	BFTX 03510 IP 08	TRDR 08 IP	BFTX 0306 IP	2,0	MSX 08025M ~ MSX 08035M
CCH 3,5	CR 03	BFTX 03510 IP 15	TRDR 15 IP	BFTX 0409 IP	3,0	MSX 12032M ~ MSX 12040M

● = Euro stock
❑ = Delivery on request

■ Recommended Cutting Conditions

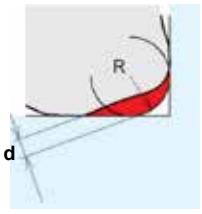
Work Material	Coated Carbide Grade	Cutting Speed v_c (m/min)	Insert Cat. No.	Endmill Type (øD) ø16 d_{oc} (mm)	ø16 Feed rate (mm/tooth)	ø20 d_{oc} (mm)	ø20 Feed rate (mm/tooth)	ø25 d_{oc} (mm)	ø25 Feed rate (mm/tooth)	ø32 d_{oc} (mm)	ø32 Feed rate (mm/tooth)	ø40 d_{oc} (mm)	ø40 Feed rate (mm/tooth)	Shell Type (øD) ø50~66 d_{oc} (mm)	ø50~66 Feed rate (mm/tooth)	ø80~100 d_{oc} (mm)	ø80~100 Feed rate (mm/tooth)
General Steel (Below HB200)	ACP200	100-**150**-200	**WDMT 0603**	0,8	0,8	0,8	0,8	0,8	0,8	–	–	–	–	–	–	–	–
			WDMT 0804	–	–	1,0	1,0	1,0	1,2	1,0	1,2	–	–	–	–	–	–
			WDMT 1205	–	–	–	–	–	–	1,2	1,4	1,2	1,4	1,2	1,4	–	–
			WDMT 1406	–	–	–	–	–	–	–	–	1,5	1,5	1,5	1,5	1,5	1,5
Alloy Steel (Below HRC45)	ACP200	80-**130**-180	**WDMT 0603**	0,7	0,8	0,7	0,8	0,7	0,8	–	–	–	–	–	–	–	–
			WDMT 0804	–	–	0,8	1,0	0,8	1,2	0,8	1,2	–	–	–	–	–	–
			WDMT 1205	–	–	–	–	–	–	1,0	1,4	1,0	1,4	1,0	1,4	–	–
			WDMT 1406	–	–	–	–	–	–	–	–	1,3	1,5	1,3	1,5	1,3	1,5
Stainless Steel X5CRNI1810, Others	ACP300	80-**120**-150	**WDMT 0603**	0,8	0,7	0,8	0,7	0,8	0,7	–	–	–	–	–	–	–	–
			WDMT 0804	–	–	1,0	0,8	1,0	0,8	1,0	0,8	–	–	–	–	–	–
			WDMT 1205	–	–	–	–	–	–	1,2	1,2	1,2	1,2	1,2	1,2	–	–
			WDMT 1406	–	–	–	–	–	–	–	–	1,5	1,3	1,5	1,3	1,5	1,3
Cast Iron GG, GGG	ACK300	100-**150**-200	**WDMT 0603**	0,8	1,0	0,8	1,0	0,8	1,0	–	–	–	–	–	–	–	–
			WDMT 0804	–	–	1,0	1,2	1,0	1,4	1,0	1,4	–	–	–	–	–	–
			WDMT 1205	–	–	–	–	–	–	1,2	1,5	1,2	1,5	1,2	1,5	–	–
			WDMT 1406	–	–	–	–	–	–	–	–	1,5	1,8	1,5	1,8	1,5	1,8
Hardened Steel (Below HRC50)	ACK300	40-**80**-100	**WDMT 0603**	0,5	0,5	0,5	0,5	0,5	0,5	–	–	–	–	–	–	–	–
			WDMT 0804	–	–	0,5	0,6	0,5	0,8	0,5	0,8	–	–	–	–	–	–
			WDMT 1205	–	–	–	–	–	–	0,6	1,0	0,6	1,0	0,6	1,0	–	–
			WDMT 1406	–	–	–	–	–	–	–	–	1,0	1,2	1,0	1,2	1,0	1,2

Insert Cat. No.	Max d_{oc}	r
WDMT 0603....	1,0	1,5
WDMT 0804....	1,5	2,0
WDMT 1205....	2,0	2,0
WDMT 1406....	2,5	2,0

- The above recommended cutting conditions may require adjustment according to machine rigidity and work rigidity.
  The above figures are guidelines for use with the BT50 machine tool.
- The above cutting conditions assume a tool overhang length of L/D=3 (i.e. overhang length is 3 times tool diameter) or less.
  When tool overhang is **more than L/D=3 and less than or equal L/D=5**, settings should be adjusted to approximately **70 to 80%** of those indicated in the above cutting conditions (i.e. d_{oc} and Feed Rate).
  When tool overhang is **more than L/D=5 and less than or equal L/D=8**, settings should be adjusted to approximately **50 to 60%** of those indicated in the above cutting conditions (i.e. d_{oc} and Feed Rate).

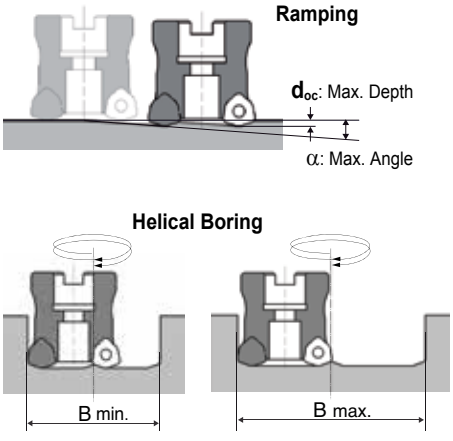
■ Information for Programming

For machine programming, please use the theoretical corner radius (R) shown in the list.
Maximum depth (d) between theoretical radius and actual profile will be left on the finished surface, as shown below.



Body	Insert	Theoretical Radius (R)	Remaining Depth (d)
MSX **06**000	WDMT **06**03....	2,0	0,403
MSX **08**000	WDMT **08**04....	2,5	0,593
MSX **12**000	WDMT **12**05....	3,0	1,030
MSX **14**000	WDMT **14**06....	3,5	1,219

■ Plunging and Helical Boring



Cutter Ø	WDMT0603ZDTR d_{oc} : max 1,0			WDMT0804ZDTR d_{oc} : max 1,5			WDMT1205ZDTR d_{oc} : max 2,0			WDMT1406ZDTR d_{oc} : max 2,5		
	Ramping	Helical boring		Ramping	Helical boring		Ramping	Helical boring		Ramping	Helical boring	
	α max.	min. øB	max. øB	α max.	min. øB	max. øB	α max.	min. øB	max. øB	α max.	min. øB	max. øB
16	**6°00'**	**21**	**31**									
17	5°00'	23	33									
18	4°30'	25	35									
20	**3°30'**	**29**	**39**	**7°30'**	**25**	**38**						
22	3°00'	33	43	5°30'	29	42						
25	**2°00'**	**39**	**48**	**4°00'**	**35**	**48**						
28				3°00'	41	54						
32				**2°30'**	**49**	**62**	**6°30'**	**42**	**63**			
35				2°00'	55	68	5°00'	48	69			
40				**1°30'**	**65**	**78**	**4°00'**	**58**	**79**	**6°00'**	**53**	**78**
50							**2°30'**	**78**	**99**	**3°30'**	**73**	**98**
63							**2°00'**	**103**	**124**	**2°00'**	**99**	**124**
66							1°30'	109	130	1°45'	105	130
80										**1°30'**	**133**	**158**
100										**1°00'**	**173**	**198**

DFC Type

General Features

The Sumi Dual Mill DFC type employs cost effective double-sided inserts for high toughness and enhanced accuracy.
The double-side inserts are flexible and reduces costs.



Large Line-up

- Diameter from Ø25mm to Ø160mm
- Available as standard, fine and extra-fine pitch
- Bore diameter: metric
- Insert geometry: L, G, H

Cutter Body

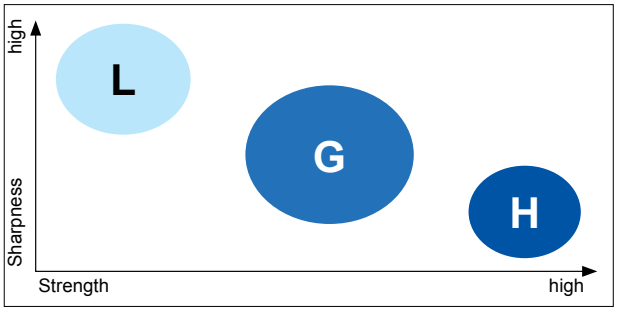
Type		Cat. No.	Diameter (mm)	No. of Teeth	Image
Shank	Standard Pitch	DFC 09000 E	Ø25~Ø80	2~5	
	Fine Pitch	DFCM 09000 E	Ø32~Ø80	3~7	
Shell	Standard Pitch	DCF 09000 RS	Ø50~Ø160	4~8	
	Fine Pitch	DFCM 09000 RS	Ø50~Ø160	5~12	
	Extra-Fine Pitch	DFCF 09000 RS	Ø50~Ø160	6~16	

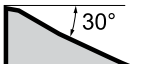
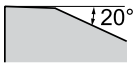
New Insert Design Provides Excellent Machining Accuracy

Inserts

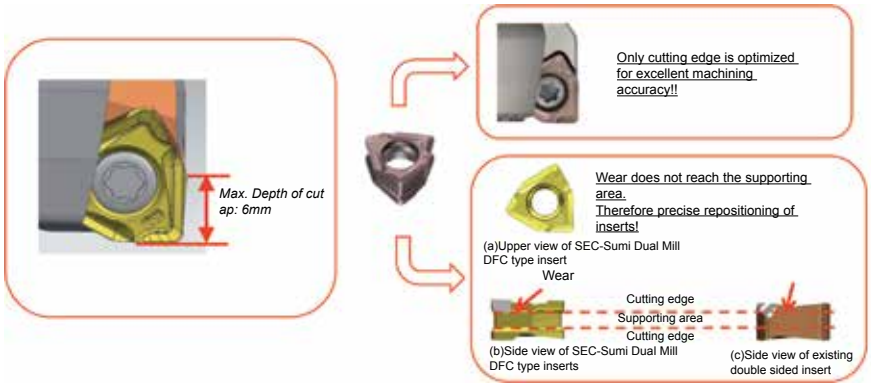
Cat. No.	R0,8
XNMU0606__PNER-L	●
XNMU0606__PNER-G	●
XNMU0606__PNER-H	●

Chipbreaker Selection Map



Work Material	Steel, Cast Iron		
	L type	G type	H type
Chipbreaker			
Feature	Low cutting force	General purpose	Strong edge
Cutting edge geometry			
Application	Light cut, low rigidity milling and reduced burrs	Main breaker for general purpose applications	Roughing, heavy interrupted and hardness steel milling

Stable and High Cutting Performance Combined with High Toughness



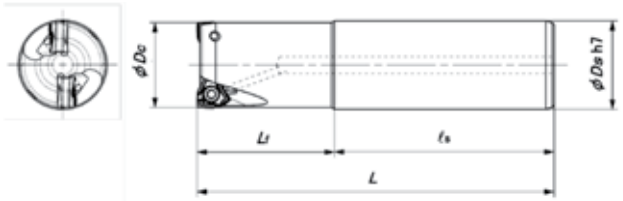
● = Euro stock
❍ = Japan stock

Body – Shank Type

Rake Angle	Radial	-9°
	Axial	-5°

Max. a_p: 6mm





Body – Dimensions

DFC type, Standard Pitch

Cat. No.	Stock	Dimensions (mm)					No. of Teeth
		Dc	Ds	Lf	ℓs	L	
DFC09025E	●	25	25	40	80	120	2
DFC09032E	●	32	32	50	80	130	2
DFC09040E	●	40	32	50	80	130	3
DFC09050E	●	50	32	50	80	130	3
DFC09050E-42	❍	50	42	50	100	150	3
DFC09063E	●	63	32	50	80	130	4
DFC09063E-42	❍	63	42	50	100	150	4
DFC09080E	●	80	32	50	80	130	5
DFC09080E-42	❍	80	42	50	100	150	5

DFCM type, Medium Pitch

Cat. No.	Stock	Dimensions (mm)					No. of Teeth
		Dc	Ds	Lf	ℓs	L	
DFCM09032E	●	32	32	50	80	130	3
DFCM09040E	●	40	32	50	80	130	4
DFCM09050E	●	50	32	50	80	130	5
DFCM09050E-42	❍	50	42	50	100	150	5
DFCM09063E	●	63	32	50	80	130	6
DFCM09063E-42	●	63	42	50	100	150	6
DFCM09080E	❍	80	32	50	80	130	7
DFCM09080E-42	●	80	42	50	100	150	7

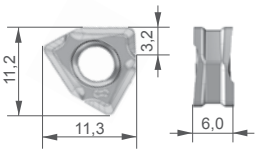
Identification Details

DFC	M	09	050	E
Cutter Series	M: Medium	Insert Size	Cutter Diameter	Shank Type

Inserts

Grade		Coated Carbide							P	Steel
Application	High Speed / Light Cutting	P			K		MS		M	Stainless Steel
	General Purpose Cutting		P		K		MS	MS	K	Cast Iron
	Rough Cutting		P	P		K		MS	S	Exotic Alloy

Cat. No.	ACP100	ACP200	ACP300	ACK200	ACK300	ACM200	ACM300	Radius rε
XNMU060608PNER-L	-	●	●	-	●	-	●	0,8
XNMU060608PNER-G	●	●	●	●	●	●	●	0,8
XNMU060608PNER-H	●	●	●	●	●	●	●	0,8



Spare Parts

Screw	Wrench
BFTX03512IP BFTX03512IP	TRDR15IP Torque: 3,0 N·m

Recommemded Cutting Conditions

ISO	Work-material	Hardness	Cutting Speed (m/min) Min. - Optimum - Max.	Feed Rate Min. - Optimum - Max.	Depth of Cut (mm)	Grade
P	General Steel	180~280HB	150 - **200** - 250	0,10 - **0,20** - 0,30	< 6	ACP200 ACP300
P	Soft Steel	≤ 180HB	180 - **250** - 350	0,15 - **0,25** - 0,35	< 6	ACP200 ACP300
P	Die Steel	200~220HB	100 - **150** - 200	0,10 - **0,18** - 0,25	< 4	ACP200 ACP300
M	Stainless Steel	-	160 - **205** - 250	0,12 - **0,18** - 0,25	< 6	ACM200 ACM300
K	Cast Iron	250HB	100 - **175** - 250	0,10 - **0,20** - 0,30	< 6	ACK200 ACK300

Suitable Applications

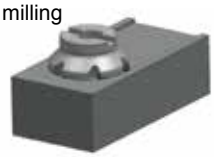
Face milling



Shoulder milling



Shot milling



Side face milling



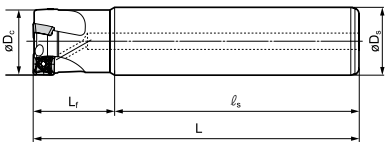
"Sumi Wave" Shoulder Mill
WFX (M) 08000 E Type

New

Body - Shank Type



WFX08000E



Body - WFX_E, Standard Pitch

Cat. No.	Stock	Dimensions (mm)					No. of Teeth
		øDc	øDs	Lf	ℓ	L	
WFX 08020 E-16	●	20	16	30	80	110	2
WFX 08020 E	●	20	20	30	80	110	2
08022 E	●	22	20	30	90	120	2
WFX 08025 E-20	●	25	20	30	90	120	2
WFX 08025 E	●	25	25	30	90	120	2
08028 E	●	28	25	30	90	120	2
08030 E	●	30	25	30	90	120	3
WFX 08032 E	●	32	32	30	90	120	3
08033 E	●	33	32	30	90	120	3
08040 E	●	40	32	30	90	120	3
08050 E	●	50	32	30	90	120	4
08063 E	●	63	32	30	90	120	5

Inserts are not included.

Body - WFXM_E, Medium Pitch

Cat. No.	Stock	Dimensions (mm)					No. of Teeth
		øDc	øDs	Lf	ℓ	L	
WFXM 08025 E	●	25	25	30	90	120	3
WFXM 08032 E	●	32	32	30	90	120	4
08040 E	●	40	32	30	90	120	4
08050 E	●	50	32	30	90	120	5
08063 E	●	63	32	30	90	120	6

Inserts are not included.

Identification Details

WFX	M	08	025	E
Cutter Series	M: Medium	Insert Size	Cutter Diameter	Endmill Type

Recommended Cutting Conditions

ISO	Work Material	Hardness (HB)	Cutting Speed	Feed Rate	DOC	Grades
P	General Steel	180~280	150-**200**-250	0,08-**0,12**-0,18	<6	ACP200 ACP300
P	Soft Steel	≤180	180-**250**-350	0,10-**0,15**-0,20	<6	ACP200 ACP300
P	Die Steel	200~220	100-**150**-200	0,08-**0,12**-0,18	<4	ACP200 ACP300
M	Stainless Steel	-	160-**200**-250	0,10-**0,15**-0,20	<6	ACM300
K	Cast Iron	250	100-**175**-250	0,10-**0,15**-0,20	<6	ACK200 ACK300
N	Non Ferrous Metal	-	300-**500**-1000	0,10-**0,15**-0,20	<6	H1 DL1000

Min. - **Optimum** - Max.

"Sumi Wave" Shoulder Mill
WFX 08000 M Type

New

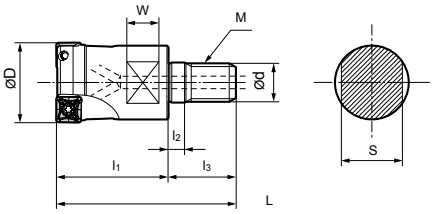
Modular Tools

Rake Angle		
	Radial	-6°
	Axial	12°

6 mm, 90°



WFX08000M



Head

Cat. No.	Stock	Dimensions (mm)									No. of Teeth
		øD	ød	M	L	l1	l2	l3	W	S	
WFX 08020 M10Z2	●	20	10,5	M10	49	30	5	19	8	15	2
08022 M10Z2	●	22	10,5	M10	49	30	5	19	8	15	2
WFX 08025 M12Z2	●	25	12,5	M12	56	35	5	21	10	19	2
08028 M10Z2	●	28	12,5	M12	56	35	5	21	10	19	2
WFX 08030 M16Z3	●	30	17,0	M16	63	40	5	23	10	24	3
08032 M16Z3	●	32	17,0	M16	63	40	5	23	10	24	3
08040 M16Z3	●	40	17,0	M16	63	40	5	23	10	24	3

Identification Details

WFX	08	020	M10	Z2
Cutter Series	Insert Size	Cutter Diameter	Screw Size	No. of Teeth



Inserts

Fig. 1

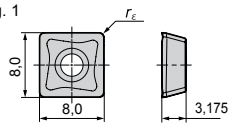
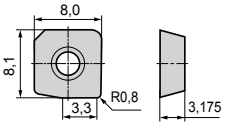


Fig. 2 Wiper Insert



Application	Coated Carbide							Carbide	DLC		
High Speed / Light cut	P			K		M S		K N	N		
General Purpose		P M	P M	K		M S	M S		N		
Roughing		P M	P M		K		M S				
Cat. No.	ACP100	ACP200	ACP300	ACK200	ACK300	ACM200	ACM300	H1	DL1000	Radius rε	Fig.
SOMT 080304 PZER L	●	●	●	●	●	●	●	–	–	0,4	1
080308 PZER L	●	●	●	●	●	●	●	–	–	0,8	1
SOMT 080304 PZER G	●	●	●	●	●	●	●	–	–	0,4	1
080308 PZER G	●	●	●	●	●	●	●	–	–	0,8	1
080312 PZER G	●	●	●	●	●	●	●	–	–	1,2	1
SOMT 080308 PZER H	●	●	●	●	●	●	●	–	–	0,8	1
080312 PZER H	●	●	●	●	●	●	●	–	–	1,2	1
SOET 080304 PZER G	●	●	●	●	●	●	●	–	–	0,4	1
080308 PZER G	●	●	●	●	●	●	●	–	–	0,8	1
080312 PZER G	●	●	●	●	●	●	●	–	–	1,2	1
SOET 080302 PZFR S	–	–	–	–	–	–	–	●	●	0,2	1
080304 PZFR S	–	–	–	–	–	–	–	●	●	0,4	1
080308 PZFR S	–	–	–	–	–	–	–	●	●	0,8	1
XOEW 080308 PZTR W	–	–	–	–	●	–	–	–	–	–	2

Spare Parts

Screw		Wrench
		
BFTX0306IP	2,0	TRDR08IP

● = Euro stock

☞ G28/G29

"Sumi Wave" Shoulder Mill
WFX (F) 12000 E Type

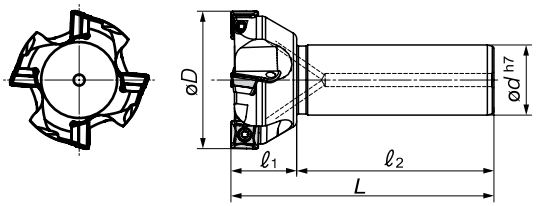
Body - Shank Type

Rake Angle		
	Radial	-8°
	Axial	8°

10mm, 90°



WFX12000E



Body - WFX_E, Standard Pitch

Cat. No.	Stock	Dimensions (mm)					No. of Teeth
		øDc	øDs	Lf	ℓ	L	
WFX 12040 E	●	40	32	30	90	120	3
12050 E	●	50	32	30	90	120	3
12063 E	●	63	32	30	90	120	4
12080 E	●	80	32	30	90	120	4

Inserts are not included.

Body - WFXF_E, Fine Pitch

Cat. No.	Stock	Dimensions (mm)					No. of Teeth
		øDc	øDs	Lf	ℓ	L	
WFXF 12050 E	●	50	32	30	90	120	4
12063 E	●	63	32	30	90	120	5
12080 E	●	80	32	30	90	120	6

Inserts are not included.

Identification Details

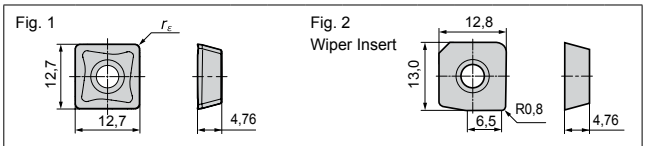
WFX	F	12	050	E
Cutter Series	F: Fine	Insert Size	Cutter Diameter	Endmill Type

Recommended Cutting Conditions

ISO	Work Material	Hardness (HB)	Cutting Speed	Feed Rate	DOC	Grades
P	General Steel	180~280	150-**200**-250	0,10-**0,15**-0,20	<10	ACP200 ACP300
P	Soft Steel	≤180	180-**250**-350	0,10-**0,15**-0,20	<10	ACP200 ACP300
P	Die Steel	200~220	100-**150**-200	0,10-**0,15**-0,20	<6	ACP200 ACP300
M	Stainless Steel	-	160-**200**-250	0,10-**0,15**-0,20	<10	ACM300
K	Cast Iron	250	100-**175**-250	0,10-**0,15**-0,20	<10	ACK200 ACK300
N	Non Ferrous Metal	-	300-**500**-1000	0,10-**0,15**-0,20	<10	H1 DL1000

Min. - **Optimum** - Max.

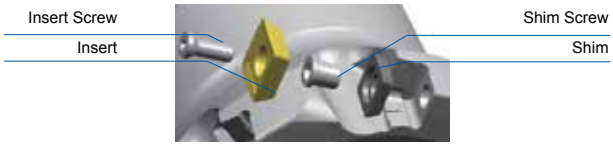
Inserts



Application	Coated Carbide							Carbide	DLC		
High Speed / Light cut	P			K		M S		K N	N		
General Purpose		P M	P M	K		M S	M S		N		
Roughing		P M	P M		K		M S				
Cat. No.	ACP100	ACP200	ACP300	ACK200	ACK300	ACM200	ACM300	H1	DL1000	Radius rε	Fig.
SOMT 120408 PDER L	●	●	●	●	●	●	●	–	–	0,8	1
SOMT 120404 PDER G	●	●	●	●	●	●	●	–	–	0,4	1
120408 PDER G	●	●	●	●	●	●	●	–	–	0,8	1
120412 PDER G	●	●	●	●	●	●	●	–	–	1,2	1
120416 PDER G	●	●	●	●	●	●	●	–	–	1,6	1
SOMT 120408 PDER H	●	●	●	●	●	●	●	–	–	0,8	1
SOET 120408 PDFR S	–	–	–	–	–	–	–	●	●	0,8	1
XOEW 120408 PDTR W	–	–	–	–	●	–	–	–	–	–	2

Spare Parts

Shim	Shim Screw	Insert Screw		Wrench (Insert)	Wrench (Shim)
			N·m		
WFXS4R	BW0507F	BFTX03512IP	**3,0**	TRDR15IP	LH035



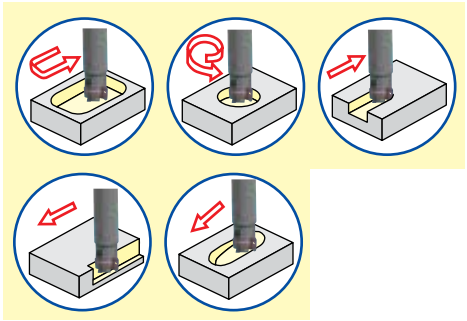
WEX Type

For the Smooth and Reliable Cutting Action



■ General Features

Wide Application Range



■ Ramping (Slant Milling)

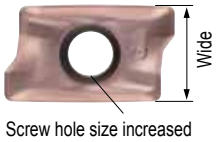
Tool Diam. Ø D	Max. Ramping Angle Type 2000	Type 3000
Ø 14	5°	
Ø 16	4°	
Ø 20	4°	
Ø 25	2°	
Ø 32	1°30'	
Ø 40	1°	2°
Ø 50	0°30'	1°
Ø 63		0°30'
Ø 80		0°30'
Ø100		–

Maximum ramping angle (α max. max.) depends on cutter diameter.

● Precision insert with strong cutting edge and low cutting force

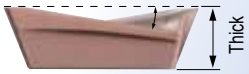
Wave shaped cutting edge design lowers cutting resistance yet improves cutting edge strength.
Achieving high quality finish with high precision cutting edge.
Smooth cutting even for deep grooves and low rigidity machines.

High precision curved cutting edge



Screw hole size increased

High rake wave cutting edge



● Internal Coolant Holes

Improved chip evacuation with air or coolant supply.

● Wide Variety of Inserts

6 types of chipbreaker design
(L, G, H, E, EH and S)
9 milling grades for a wide range of work materials and applications.
- ACP100, ACP200, ACP300 (steel milling grades)
- ACK200, ACK300 (cast iron milling grades)
- ACM200, ACM300 (stainless steel, exotic alloy milling grades)
- DL1000, H1 (aluminium milling grades)

● High Durable Body

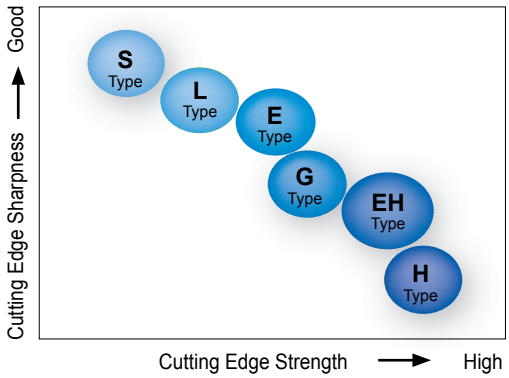
Special surface treatment improves corrosion resistance as well as scratch resistance.
Increased screw size improves clamping force and durability.

■ Product Range

Type	Cat. No.	Series	Diameter Range (mm) Ø10 Ø20 Ø40 Ø60	Image
Shank	WEX 2000E	Short Type	14 – 63	
	WEX 2000EL	Long Type	14 – 40	
	WEX 2000EW	Weldon Shank Short Type	16 – 20	
	WEX 3000E	Short Type	25 – 63	
	WEX 3000EL	Long Type	25 – 40	
	WEX 3000EW	Weldon Shank Short Type	25 – 32	
Shell	WEX 2000F	Shell Type	40 – 63	
	WEX 3000F	Shell Type	40 – 63	
Modular	WEX 2000M	ModularType	16 – 40	
	WEX 3000M	Modular Type	25 – 40	

Inserts for WEX Type

Chipbreaker Selection



Series Expansion

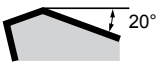
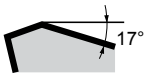
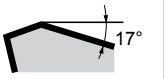
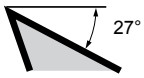
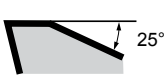
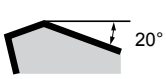
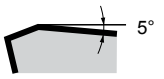
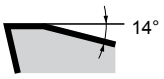
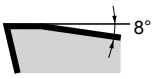
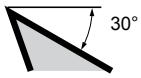
E Type chipbreaker for exotic alloys

For 2000 Type
R0,4 / R0,8 / R1,2

For 3000 Type
R0,4 / R0,8 / R1,2 / R1,6 / R2,0 / R3,0



Characteristics

Work Material	Steel, Cast Iron			Stainless Steel, Exotic Alloy		Aluminium
Chipbreaker	L	G	H	E	EH	S
						
Features	Low Cutting Force	General Purpose	Strong Edged	General Purpose	Strong Edged	High Rake
Chipbreaker Profile for 2000 Series Insert		 28°	 20°	 17°	 17°	 27°
Chipbreaker Profile for 3000 Series Insert	 25°	 20°	 5°	 14°	 8°	 30°
Application	Light cut, low rigidity milling and reduced burrs	**Main chipbreaker** general purpose to interrupted milling	Roughing, heavy interrupted and hardened steel milling	Light cutting to general purpose	Heavy interrupted machining	Aluminium, non-ferrous metal

Chipbreaker for Stainless Steel, Exotic Alloys E / EH Type

Features of E / EH Type

– Improved adhesion resistance
Smooth cutting edge design allows smooth chip flow.
– Improved cutting performance
Optimized rake angle and edge treatment.

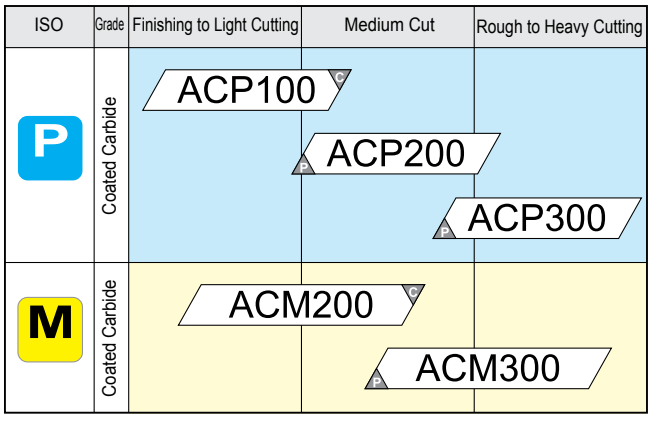


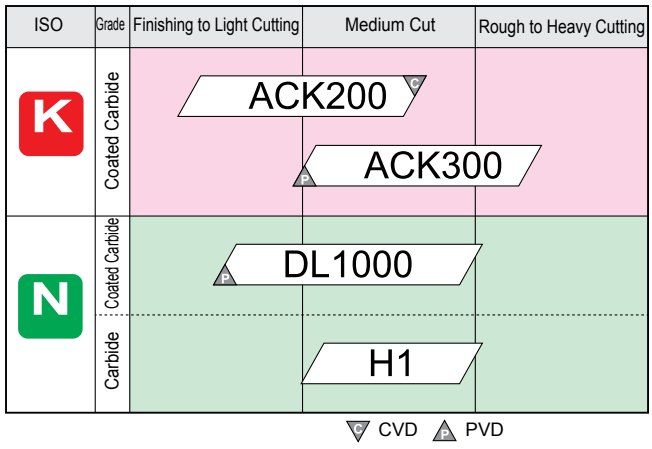
E / EH Type



L Type / G Type

Grade Selection



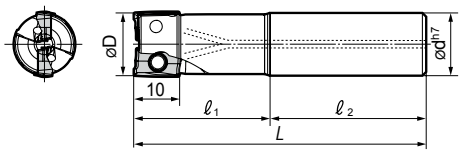


Wavemill Series
WEX 2000E Type

WEX 2000 E/EL

Rake Angle		
	Radial	8°~ 15°
	Axial	16°~ 24°

10mm 90°



■ Shank Type

● Body (Short Type „E“)

Cat. No.	Stock	Dimensions (mm)					No. of Teeth	Weight (kg)
		øD	ød	ℓ1	ℓ2	L		
WEX 2014 E	●	14	16	25	55	80	1	0,10
2016 E	●	16	16	25	75	100	2	0,13
2018 E	❑	18	16	25	75	100	2	0,14
2020 E	●	20	20	30	80	110	3	0,22
2022 E	❑	22	20	30	80	110	3	0,23
WEX 2025 E	●	25	25	35	85	120	4	0,38
2028 E	❑	28	25	35	85	120	4	0,39
2030 E	❑	30	25	35	85	120	4	0,40
2032 E	●	32	32	40	90	130	5	0,70
2040 E	❑	40	32	30	120	150	6	0,91
WEX 2050 E	❑	50	32	30	120	150	7	1,02
2063 E	❑	63	32	30	120	150	8	1,22

● Body (Long Type „EL“)

Cat. No.	Stock	Dimensions (mm)					No. of Teeth	Weight (kg)
		øD	ød	ℓ1	ℓ2	L		
WEX 2014 EL	●	14	16	25	95	120	1	0,14
2016 EL	●	16	16	25	120	145	2	0,19
2018 EL	❑	18	16	25	120	145	2	0,19
2020 EL	●	20	20	40	110	150	2	0,32
2022 EL	❑	22	20	30	120	150	2	0,33
WEX 2025 EL	●	25	25	50	120	170	2	0,55
2028 EL	❑	28	25	30	140	170	2	0,59
2030 EL	❑	30	25	30	140	170	2	0,60
2032 EL	❑	32	32	60	120	180	2	0,99
2040 EL	❑	40	32	30	150	180	2	1,12

● Body (Long Type „E“ + Small Shank)

Cat. No.	Stock	Dimensions (mm)					No. of Teeth	Weight (kg)
		øD	ød	ℓ1	ℓ2	L		
WEX 2016 EL15	●	16	15	25	120	145	2	0,17
2020 EL19	●	20	19	40	110	150	2	0,30
2025 EL24	●	25	24	50	120	170	2	0,53
2025 EL24Z3	❑	25	24	50	120	170	3	0,50
3032 EL30	❑	32	30	60	120	180	2	0,95

● Body (Weldon Shank Short Type „EW“)

Cat. No.	Stock	Dimensions (mm)					No. of Teeth	Weight (kg)
		øD	ød	ℓ1	ℓ2	L		
WEX 2016 EW	●	16	16	25	75	100	2	0,12
2020 EW	●	20	20	30	80	110	3	0,21

Inserts are not included.

■ Cutter Identification

WEX	2	016	EL	15
Cutter Series	2000 Series	Cutter Diameter	Shank Type	Shank Diameter

■ Spare Parts

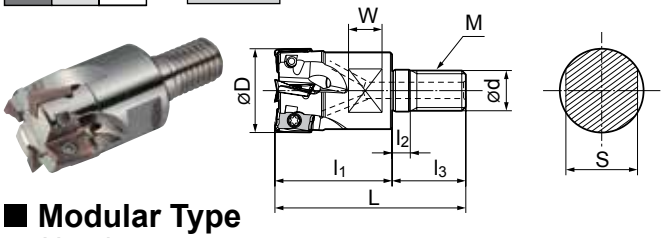
Screw	Wrench	Recommended Tightening Torque (N·m)	Applicable Endmill
BFTX 0305 IP	TRDR 08 IP	2,0	WEX 2014 ~ WEX 2018
BFTX 0306 IP			WEX 2020 ~ WEX 2063

Wavemill Series
WEX 2000M Type

WEX 2000 M

Rake Angle		
	Radial	10°~ 18°
	Axial	14°~ 25°

10mm 90°



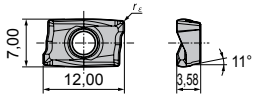
■ Modular Type

● Head

Cat. No.	Stock	Dimensions (mm)									No. of Teeth
		øD	ød	M	L	l1	l2	l3	W	S	
WEX 2016M08Z2	●	16	8,5	M8	42	25	5	17	8	13	2
2018M08Z2	❑	18	8,5	M8	42	25	5	17	8	13	2
WEX 2020M10Z3	●	20	10,5	M10	49	30	5	19	8	15	3
2022M10Z3	❑	22	10,5	M10	49	30	5	19	8	15	3
WEX 2025M12Z4	●	25	12,5	M12	56	35	5	21	10	19	4
2028M12Z4	❑	28	12,5	M12	56	35	5	21	10	19	4
WEX 2030M16Z4	❑	30	17,0	M16	63	40	5	23	10	24	4
2032M16Z5	●	32	17,0	M16	63	40	5	23	10	24	5
2040M16Z6	❑	40	17,0	M16	63	40	5	23	10	24	6

Inserts are not included.

■ Inserts for WEX2000 Type



Application	Coated Carbide							Carbide	DLC	
High Speed / Light cut	P			K		M S		K N	N	
General Purpose		P		K		M S	M S		N	
Roughing		P	P		K		M S			
Cat. No.	ACP100	ACP200	ACP300	ACK200	ACK300	ACM200	ACM300	H1	DL1000	Radius r_ε
AXMT 123504 PEER-G	●	●	●	●	●			–	–	0,4
123508 PEER-G	●	●	●	●	●			–	–	0,8
123512 PEER-G	●	●	●	●	●			–	–	1,2
AXMT 123504 PEER-H	●	●	●	●	●			–	–	0,4
123508 PEER-H	●	●	●	●	●			–	–	0,8
123512 PEER-H	●	●	●	●	●			–	–	1,2
AXMT 123504 PEER-E						●	●	–	–	0,4
123508 PEER-E			●			●	●	–	–	0,8
123512 PEER-E						●	●	–	–	1,2
AXMT 123508 PEER-EH			●			●	●	–	–	0,8
AXET 123502 PEFR-S	–	–	–	–	–	–	–	●	●	0,2
123504 PEFR-S	–	–	–	–	–	–	–	●	●	0,4
123508 PEFR-S	–	–	–	–	–	–	–	●	●	0,8

G - General type
H - Strong cutting edge
E - For stainless steel / exotic alloy
EH - Strong edge for stainless steel / exotic alloy
S - For aluminium alloy

– Unable to produce

■ Cutter Identification

WEX	2	016	M08	Z2
Cutter Series	2000 Series	Cutter Diameter	Mounting Screw Size	No. of Teeth



■ Spare Parts

Screw	Wrench	Recommended Tightening Torque (N·m)	Applicable Endmill
BFTX 0305 IP	TRDR 08 IP	2,0	WEX 2016M, WEX 2018M
BFTX 0306 IP		2,0	WEX 2020M ~ WEX 2040M
BFTX 0407 IP	TRDR 15 IP	3,0	WEX 3025M ~ WEX 3030M
BFTX 0409 IP		3,0	WEX 3032M ~ WEX 3040M

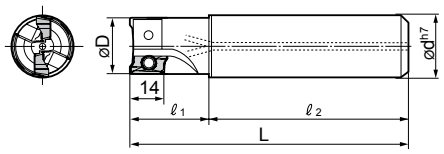
● = Euro stock
❑ = Delivery on request

Wavemill Series
WEX 3000E Type

WEX 3000 E/EL

Rake Angle		
	Radial	8°~ 15°
	Axial	16°~ 24°

14mm 90°



■ Shank Type

● Body (Short Type „E“)

Cat. No.	Stock	Dimensions (mm)					No. of Teeth	Weight (kg)
		øD	ød	ℓ1	ℓ2	L		
WEX 3025 E	●	25	25	35	85	120	2	0,37
3028 E	❑	28	25	35	85	120	2	0,39
3030 E	❑	30	25	40	90	130	3	0,42
WEX 3032 E	●	32	32	40	90	130	3	0,67
3035 E	❑	35	32	40	90	130	3	0,69
3040 E	●	40	32	50	120	170	4	1,01
3050 E	❑	50	32	50	120	170	5	1,23
3063 E	❑	63	32	50	120	170	6	1,58

● Body (Short Type „E“ + Small Shank)

Cat. No.	Stock	Dimensions (mm)					No. of Teeth	Weight (kg)
		øD	ød	ℓ1	ℓ2	L		
WEX 3025 E20	❑	25	20	35	85	120	2	0,25
3032 E25	❑	32	25	40	90	130	3	0,43

● Body (Long Type „EL“)

Cat. No.	Stock	Dimensions (mm)					No. of Teeth	Weight (kg)
		øD	ød	ℓ1	ℓ2	L		
WEX 3025 EL	●	25	25	50	120	170	2	0,54
3028 EL	❑	28	25	50	120	170	2	0,56
3030 EL	❑	30	25	60	120	180	2	0,60
3032 EL	●	32	32	60	120	180	2	0,95
3035 EL	❑	35	32	60	120	180	2	0,98
WEX 3040 EL	●	40	32	80	140	220	2	1,38

● Body (Weldon Shank Short Type „EW“)

Cat. No.	Stock	Dimensions (mm)					No. of Teeth	Weight (kg)
		øD	ød	ℓ1	ℓ2	L		
WEX 3025 EW	●	25	25	35	85	120	2	0,36
3032 EW	●	32	32	40	90	130	3	0,65

Inserts are not included.

* **ATTENTION**: If nose radius of inserts is 2,0 mm or more please modify cutter body as indicated.



Standard Chamfer is 0,5 mm by 45 degrees

Increase Chamfer to 1mm x 45 degrees
when using 2,0mm radius inserts
AXMT 170520PEER

Increase chamfer to 1,5mm x 45 degrees
when using 3,0 mm radius inserts
AXMT 170530 PEER

■ Spare Parts

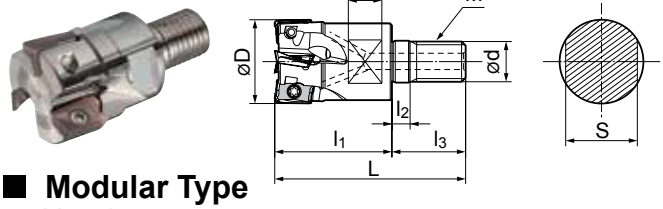
Screw	Wrench	Recommended Tightening Torque (N·m)	Applicable Endmill
			
BFTX 0407 IP BFTX 0409 IP	TRDR 15 IP	3,0	WEX 3025 ~ WEX 3030 WEX 3032 ~ WEX 3063

Wavemill Series
WEX 3000M Type

WEX 3000 M

Rake Angle		
	Radial	8°~ 15°
	Axial	16°~ 24°

14mm 90°



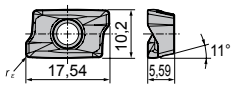
■ Modular Type

● Head

Cat. No.	Stock	Dimensions (mm)									No. of Teeth
		øD	ød	M	L	l1	l2	l3	W	S	
WEX 3025M12Z2	❑	25	12,5	M12	56	35	5	21	10	19	2
3028M12Z2	❑	28	12,5	M12	56	35	5	21	10	19	2
WEX 3030M16Z3	❑	30	17,0	M16	63	40	5	23	10	24	3
3032M16Z3	❑	32	17,0	M16	63	40	5	23	10	24	3
3035M16Z3	❑	35	17,0	M16	63	40	5	23	10	24	3
WEX 3040M16Z4	❑	40	17,0	M16	63	40	5	23	10	24	4

Inserts are not included.

■ Inserts for WEX3000 Type



Application	Coated Carbide							Carbide	DLC	
High Speed / Light cut	P			K		MS		KN	N	
General Purpose		P		K		MS	MS		N	
Roughing		P	P		K		MS			
Cat. No.	ACP100	ACP200	ACP300	ACK200	ACK300	ACM200	ACM300	H1	DL1000	
AXMT 170508 PEER-L	●	●	●	●	●			–	–	0,8
AXMT 170504 PEER-G	●	●	●	●	●			–	–	0,4
170508 PEER-G	●	●	●	●	●			–	–	0,8
170512 PEER-G	●	●	●	●	●			–	–	1,2
170516 PEER-G	●	●	●	●	●			–	–	1,6
170520 PEER-G*	●	●	●	●	●			–	–	2,0
170530 PEER-G*	●	●	●	●	●			–	–	3,0
AXMT 170508 PEER-H	●	●	●	●	●			–	–	0,8
170512 PEER-H	●	●	●	●	●			–	–	1,2
AXMT 170504 PEER-E						●	●	–	–	0,4
170508 PEER-E			●			●	●	–	–	0,8
170512 PEER-E						●	●	–	–	1,2
170516 PEER-E						●	●	–	–	1,6
170520 PEER-E*						●	●	–	–	2,0
170530 PEER-E*						●	●	–	–	3,0
AXMT 170508 PEER-EH			●			●	●	–	–	0,8
AXET 170502 PEFR-S	–	–	–	–	–	–	–	●	●	0,2
170504 PEFR-S	–	–	–	–	–	–	–	●	●	0,4
170508 PEFR-S	–	–	–	–	–	–	–	●	●	0,8

L - Low cutting force
G - General type
H - Strong cutting edge
E - For stainless steel / exotic alloy
EH - Strong edge for stainless steel / exotic alloy
S - For aluminium alloy

– Unable to produce
* Cutter body modification is required

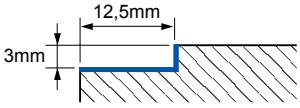
■ Cutter Identification

WEX	3	025	M12	Z2
Cutter Series	3000 Series	Cutter Diameter	Mounting Screw Size	No. of Teeth



■ Recommended Cutting Conditions

● WEX2000 Series



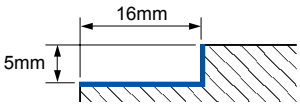
Cutter: WEX2025E Insert: AXMT123508PEER - □

Cutting Data: a_p = 3mm, a_e = 12,5mm, dry

ISO	Material	HB	Chipbreaker	Coated Carbide																					„Diamond like Carbon" Coated Carbide		
				ACP100			ACP200			ACP300			ACK200			ACK300			ACM200			ACM300			DL1000		
				Feed Rate (mm/tooth)																							
				0,08	0,15	0,20	0,08	0,15	0,20	0,08	0,15	0,20	0,08	0,15	0,20	0,08	0,15	0,20	0,08	0,15	0,20	0,08	0,15	0,20	0,05	0,15	0,22
				Cutting Speed v_c (m/min)																							
P	Unalloyed steel, <0, 15%C, annealed	125	G	380	350	330	350	330	315	330	315	295															
	" , <0, 45%C, annealed	190	G	285	255	235	255	235	220	235	220	220															
	" , <0, 45%C, tempered	250	G	235	210	190	210	190	170	190	170	150															
	" , <0, 75%C, annealed	270	G	190	162	143	171	152	133	152	133	115															
	" , <0, 75%C, tempered	300	G	145	115	95	115	95	75	95	75	55															
	Low alloyed steel, annealed	180	G	265	235	220	235	220	200	220	200	180															
	" , tempered	275	G	170	145	125	150	130	115	130	115	95															
	" , tempered	300	G	150	125	105	135	115	95	115	95	75															
	" , tempered	350	G	125	95	75	105	85	65	85	65	45															
	High alloyed and tool steel, annealed	200	G	235	210	190	210	190	170	190	170	150															
	" , tempered	325	G	125	95	75	95	75	55	75	55	35															
M	Stainless steel, ferritic/martensitic, annealed	200	E																175	155	125	155	140	110			
	Martensitic, tempered	240	EH																160	140	110	145	125	100			
	Austenitic, plunged	180	E																190	170	140	170	150	125			
K	Grey cast iron		G										285	255	235	255	235	220									
	Nodular cast iron		G										190	160	140	160	140	125									
S	High tempered resist. alloys, Fe based, annealed	300	E																50	40		45	35				
	" , hardened	330	E																35	25		30	20				
N	Aluminium alloy, Si < 13%		S																						1000	750	500
	Aluminium alloy, Si > 13%		S																						250	200	170
	Copper alloy		S																						350	330	300

The above recommended cutting conditions are meant as a guide. Actual conditions will depend on the individual machine, work shape and clamping. They will need to be adjusted according to machine rigidity, work clamp rigidity, cutting depth and other factors.
For groove milling, reduce the feed rate approximately 70% of the corresponding value shown above.

● WEX3000 Series



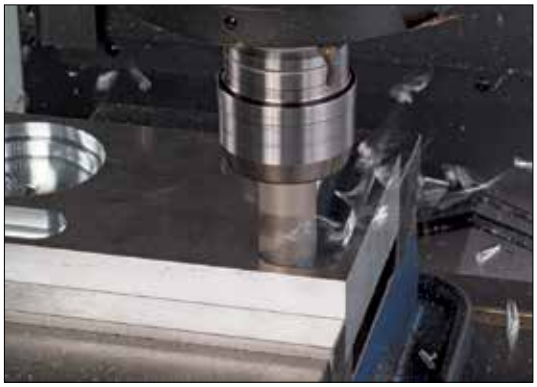
Cutter: WEX30325E Insert: AXMT170508PEER - □

Cutting Data: a_p = 5mm, a_e = 16mm, dry

ISO	Material	HB	Chipbreaker	Coated Carbide																					„Diamond like Carbon" Coated Carbide		
				ACP100			ACP200			ACP300			ACK200			ACK300			ACM200			ACM300			DL1000		
				Feed Rate (mm/tooth)																							
				0,12	0,25	0,35	0,12	0,25	0,35	0,12	0,25	0,35	0,12	0,25	0,35	0,12	0,25	0,35	0,12	0,25	0,35	0,12	0,25	0,35	0,05	0,15	0,25
				Cutting Speed v_c (m/min)																							
P	Unalloyed steel, <0, 15%C, annealed	125	G	400	370	350	370	350	330	350	330	310															
	" , <0, 45%C, annealed	190	G	300	270	250	270	250	230	250	230	210															
	" , <0, 45%C, tempered	250	G	250	220	200	220	200	180	200	180	160															
	" , <0, 75%C, annealed	270	G	200	170	150	180	160	140	160	140	120															
	" , <0, 75%C, tempered	300	G	150	120	100	120	100	80	100	80	60															
	Low alloyed steel, annealed	180	G	280	250	230	250	230	210	230	210	190															
	" , tempered	275	G	180	150	130	160	140	120	140	120	100															
	" , tempered	300	G	160	130	110	140	120	100	120	100	80															
	" , tempered	350	G	130	100	80	110	90	70	90	70	50															
	High alloyed and tool steel, annealed	200	G	250	220	200	220	200	180	200	180	160															
	" , tempered	325	G	130	100	80	100	80	60	80	60	40															
M	Stainless steel, ferritic/martensitic, annealed	200	E																185	165	135	165	150	120			
	Martensitic, tempered	240	EH																170	150	120	150	135	110			
	Austenitic, plunged	180	E																200	180	150	180	160	135			
K	Grey cast iron		G										300	270	250	270	250	230									
	Nodular cast iron		G										200	170	150	170	150	130									
S	High tempered resist. alloys, Fe based, annealed	300	E																50	30		45	25				
	" , hardened	330	E																50	30		45	25				
N	Aluminium alloy, Si < 13%		S																						1000	750	500
	Aluminium alloy, Si > 13%		S																						250	200	170
	Copper alloy		S																						350	330	300

The above recommended cutting conditions are meant as a guide. Actual conditions will depend on the individual machine, work shape and clamping. They will need to be adjusted according to machine rigidity, work clamp rigidity, cutting depth and other factors.
For groove milling, reduce the feed rate approximately 70% of the corresponding value shown above.

Wavemill Series
WAX Type

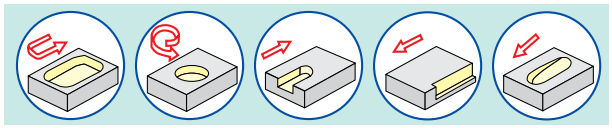


Overview

Based on our proven Wavemill design this new range of WAX cutters is capable of rough and finishing Aluminium Alloys and other Non Ferrous Metals. It is ideal for high productivity Aluminium machining to exacting tolerances in the Aircraft, Electronics, and Automotive industries. The award winning Auroracoat DLC (diamond like carbon) inserts resist chip adhesion and substantially increase both tool life and productivity when dry machining Aluminium helping customers boost compliance with ISO14001 accreditation standards

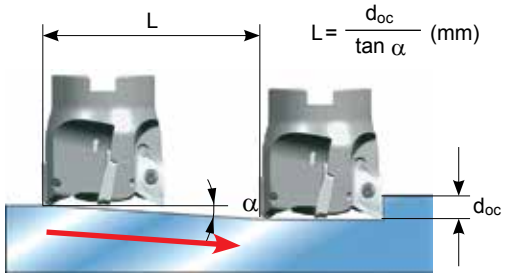
Advantages

- **High Productivity**
- **Dry machining capability** with MQL system
- **DLC (diamond like carbon) inserts**
- **True 90 degree shoulder milling**
- **Chip adhesion resistance**
- **Wide range of nose radius**



Ramping (Slant Milling)

Maximum ramping angle (α max. max.) depends on cutter diameter.
Minimum milling length (L min) is the ramping distance required to reach the maximum cutting depth (d_{oc} max) at the maximum ramping angle of that cutter.
Minimum milling length (L) for any depth can be calculated by the equation below:





WAX3000 E/EL Type

(mm)

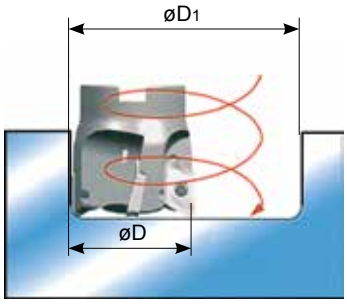
Cutter Diameter øD	Ramping Angle α max.	Depth- of Cut d_{oc} max.	Milling Distance L min.
20	8°	10	72
25	17°	10	33
32	12°	10	47
40	9°	10	64

WAX3000 RS Type

(mm)

Cutter Diameter øD	Ramping Angle α max.	Depth- of Cut d_{oc} max.	Milling Distance L min.
50	7°	10	82
60	5°	10	115
80	3°	10	191
100	3°	10	191
125	2°	10	287

Helical Milling





Helical Milling Diameter

(mm)

Cutter Diameter øD	Milling Diameter $øD_1$	
	Min.	Max.
20	22	33
25	29	43
32	43	57
40	59	73
50	79	93
63	105	119
80	139	153
100	179	193
125	229	243

Maximum Allowable Spindle Speed

Cutter Diameter øD	Spindle Revolution n (min^{-1})	Cutting Speed v_c (m/min)
20	14.000	880
25	29.000	2.200
32	25.000	2.500
40	23.000	2.900
50	20.000	3.100
63	18.000	3.500
80	16.000	4.000
100	14.000	4.400
125	13.000	5.100

Recommended Cutting Conditions

Work Material	Aluminum Alloy
Cutting Speed	600 ~ 1.200 m/min
Feed Rate	0,05 ~ 0,25 mm/tooth

WAX 3000 E/EL Type

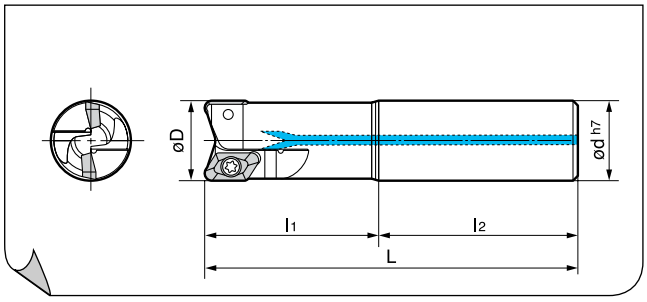
16-18 mm | 90°

Axial rake angle	6°
Radial rake angle	19~25°



(Endmill)

Short Type "E"
Long Type "EL"



Body

(For inserts with nose radius ≤ 3,2mm)

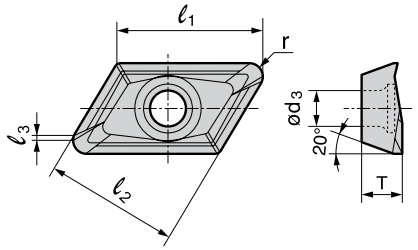
Cat. No.	Stock	Dimensions (mm)					No.of teeth	Weight (Kg)
		øD	ød	L	ℓ_1	ℓ_2		
WAX 3020 E -3.2	●	**20**	20	130	60	70	1	0,25
WAX 3025 E -3.2	●	**25**	25	140	60	80	2	0,42
WAX 3025 EL-3.2	●	**25**	25	200	60	140	2	0,63
WAX 3032 E -3.2	●	**32**	32	150	70	80	2	0,75
WAX 3032 EL-3.2	●	**32**	32	220	70	150	2	1,2
WAX 3040 E -3.2	●	**40**	32	160	70	90	3	1,0
WAX 3040 EL-3.2	●	**40**	32	220	70	150	3	1,4

Body

(For inserts with nose radius ≥ 4,0mm)

Cat. No.	Stock	Dimensions (mm)					No.of teeth	Weight (Kg)
		øD	ød	L	ℓ_1	ℓ_2		
WAX 3020 E -4.0	●	**20**	20	130	60	70	1	0,25
WAX 3025 E -4.0	●	**25**	25	140	60	80	2	0,42
WAX 3025 EL-4.0	●	**25**	25	200	60	140	2	0,63
WAX 3032 E -4.0	●	**32**	32	150	70	80	2	0,75
WAX 3032 EL-4.0	●	**32**	32	220	70	150	2	1,2
WAX 3040 E -4.0	●	**40**	32	160	70	90	3	1,0
WAX 3040 EL-4.0	●	**40**	32	220	70	150	3	1,4

Inserts for WAX 3000 Type



Cat. No.	DLC Coated	Carbide	Dimensions (mm)					
	DL 1000	H1	ℓ_1	ℓ_2	ℓ_3	r	T	ød3
AECT 160404 PEFRA	●	●	18	16,4	1,4	0,4	5	4,4
160408 PEFRA	●	●	18	16,4	1	0,8	5	4,4
160412 PEFRA	●	●	18	16,4	0,6	1,2	5	4,4
160416 PEFRA	●	●	17,5	16,4	0,5	1,6	5	4,4
160420 PEFRA	●	●	17,5	16,4	0,5	2	5	4,4
160430 PEFRA	●	●	17	16,4	0,7	3	5	4,4
160432 PEFRA	●	●	17	16,4	0,5	3,2	5	4,4
AECT 160440 PEFRA	●	●	16,5	16,4	0,5	4	5	4,4
160450 PEFRA	●	●	16	16,4	0,4	5	5	4,4

Spare Parts

Screw	Wrench	Required Torque (N·m)	Applicable Endmill
		**3,0**	
BFTX 0408	TRD 15		WAX 3000 E/EL

● = Euro stock
❑ = Delivery on request

WAX 4000 E/EL Type

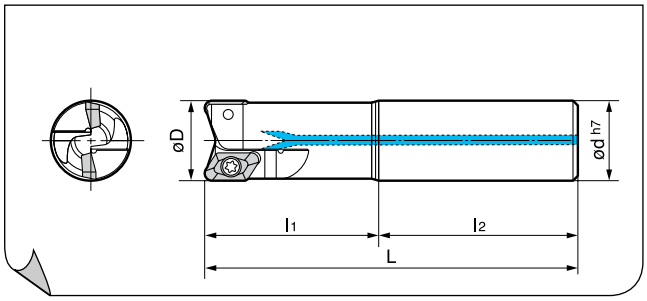
22-24 mm | 90°

Axial rake angle	6°
Radial rake angle	19~25°



(Endmill)

Short Type "E"
Long Type "EL"



■ Body

(For inserts with nose radius ≤ 3,2mm)

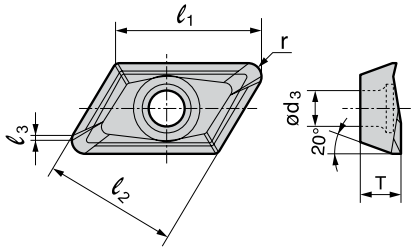
Cat. No.	Stock	Dimensions (mm)					No.of teeth	Weight (Kg)
		øD	ød	L	ℓ_1	ℓ_2		
WAX 4025E -3.2	❑	**25**	25	140	60	80	1	0,41
4025EL-3.2	❑	**25**	25	200	60	140	1	0,63
4032E -3.2	❑	**32**	32	150	70	80	1	0,72
4032EL-3.2	❑	**32**	32	220	70	150	1	1,2
WAX 4040E -3.2	❑	**40**	32	160	70	90	2	0,88
4040EL-3.2	❑	**40**	32	220	70	150	2	1,2

■ Body

(For inserts with nose radius ≥ 4,0mm)

Cat. No.	Stock	Dimensions (mm)					No.of teeth	Weight (Kg)
		øD	ød	L	ℓ_1	ℓ_2		
WAX 4025E -4.0	❑	**25**	25	140	60	80	1	0,41
4025EL-4.0	❑	**25**	25	200	60	140	1	0,63
4032E -4.0	❑	**32**	32	150	70	80	1	0,72
4032EL-4.0	❑	**32**	32	220	70	150	1	1,2
WAX 4040E -4.0	❑	**40**	32	160	70	90	2	0,88
4040EL-4.0	❑	**40**	32	220	70	150	2	1,2

■ Inserts for WAX 4000 Type



Cat. No.	DLC Coated	Carbide	Dimensions (mm)					
	DL 1000	H1	ℓ_1	ℓ_2	ℓ_3	r	T	ød3
AECT 220604 PEFRA	❑	❑	24	21,8	1,5	0,4	6,35	6,0
220608 PEFRA	❑	❑	24	21,8	1,2	0,8	6,35	6,0
220612 PEFRA	❑	❑	24	21,8	0,8	1,2	6,35	6,0
220616 PEFRA	❑	❑	24	21,8	0,4	1,6	6,35	6,0
220620 PEFRA	❑	❑	24	21,8	0,5	2,0	6,35	6,0
220630 PEFRA	❑	❑	23	21,8	0,6	3,0	6,35	6,0
220632 PEFRA	❑	❑	23	21,8	0,4	3,2	6,35	6,0
AECT 220640 PEFRA	❑	❑	22	21,8	1,2	**4,0**	6,35	6,0
220650 PEFRA	❑	❑	22	21,8	0,4	**5,0**	6,35	6,0

■ Spare Parts

Screw	Spanner	Required Torque (N·m)	Applicable Endmill
		**5,0**	
BFTX0509N	TRD20		Ø25 ~ Ø32
BFTX0511N	TRD20		Ø40 ~ Ø125

Wave Multi-Function Mill
WMM Type



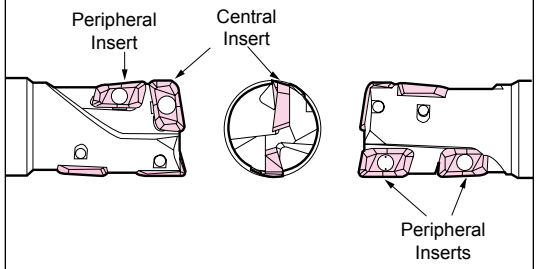
Features

Utilising some of the design features, which made the Wave-Mill so successful, this multi-functional cutter, which utilizes standard wavy shaped inserts mounted radially and axially, performs a variety of operations.
These include slotting, shoulder milling, ramping, pocketing, drilling, helical cutting etc and eliminates the need to stock a variety of application specific tools.

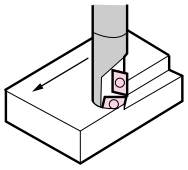
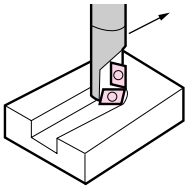
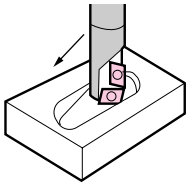
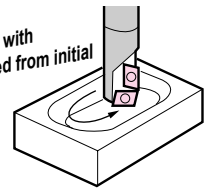
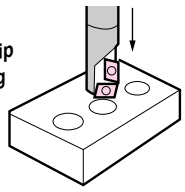
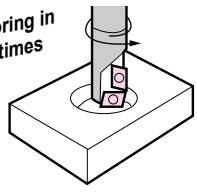
Advantages

- Multi-functional cutter efficiently performs a number of cutting operations.
- Excellent for ramping, helical cutting, and pocketing.
- Uses standard inserts interchangeable with those used on other Wave-Mill cutters
- Strong high rake inserts gives smooth cutting action.
- Good dimensional stability thanks to long life inserts

● Insert Orientation of WMM Type Cutter



Multi-purpose Applications

● Shoulder Cutting	● Slotting	● Ramping (Slant Milling)
DIN X5CrNi810 **Cutting of stainless steel tool** 	GG25 **Deep grooving can be performed easily. Easy chip removal** 	C50 **Capable of tapered recess cutting of a prepared hole** 
Tool Dia. : 25mm Insert : APMT103504PDER (Grade : ACZ350) v_c =200m/min, f_t =0,1mm/tooth Axial d_{oc} : 15mm, Radial w_{oc} : 25mm, Air blow	Tool Dia. : 25mm Insert : APMT103504PDER (Grade : ACZ310) v_c =180m/min, f_t =0,12mm/tooth Axial d_{oc} : 15mm, Radial w_{oc} : 25mm, Air blow	Tool Dia. : 25mm Insert : APMT103504PDER (Grade : ACZ310) v_c =180m/min, f_t =0,12mm/tooth Axial d_{oc} : 15mm, Radial w_{oc} : 25mm, Air blow
● Pocketing	**● Drilling**	**● Helical Cutting**
C50 **Capable of pocketing with continuous lateral feed from initial drilling or taper cutting process** 	C50 **Capable of easy chip removal and drilling without tool damage** 	C50 **Capable of large boring in diameter of 1,2-1,8 times the cutter diameter without prepared hole** 
Tool Dia. : 25mm Insert : APMT103504PDER (Grade : ACZ350) v_c =200m/min, f_t =0.1mm/tooth Axial d_{oc} : 15mm, Radial w_{oc} : 25mm Air blow	Tool Dia. : 25mm Insert : APMT103504PDER (Grade : ACZ350) Bore size : 25mm, Depth : d=15mm v_c =200m/ min, f =0.1mm/ rev Step feed : 0,5mm, Air blow	Tool Dia. : 25mm Insert : APMT103504PDER (Grade : ACZ350) Bore size : 40mm, Depth : d=30mm v_c =300m/ min, f =0.1mm/ rev Axial feed : t=15mm/pitch, Air blow

Recommended Cutting Conditions for WMM(H)2000

øD (mm) \ Material			Carbon steel (ex. C50)	Stainless steel (ex. 10CrNiS189)	Cast iron (ex. GG20)	Aluminium alloy
20 ~ 26	v_c	—	80-**120**-160	80-**100**-120	70-**150**-180	200-**300**-500
	f_t	Shoulder milling	0,05-0,20	0,05-0,15	0,05-0,20	0,1-0,15-0,2
		Slotting	0,05-0,12	0,05-0,10	0,05-0,12	0,05-0,10
		Drilling	0,05-0,18	0,05-0,12	0,05-0,18	0,05-0,10
Grade			ACZ330	ACZ350	ACZ310	DL1000 (H1)

[v_c =m/ min, f_t =mm/ tooth] [min.– optimum – max.]

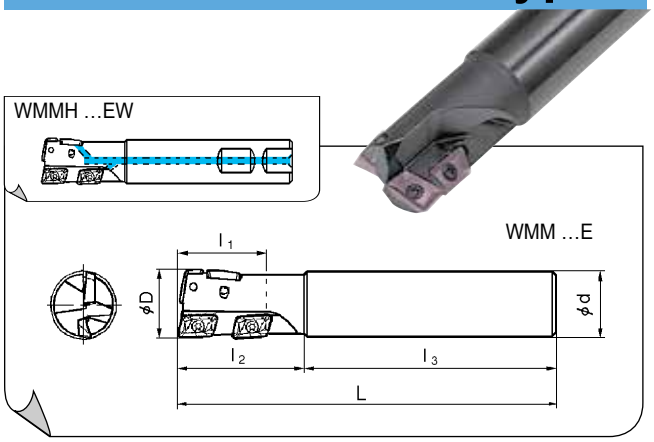
Recommended Cutting Conditions for WMM(H)3000

øD (mm) \ Material			Carbon steel (ex. C50)	Stainless steel (ex. 10CrNiS189)	Cast iron (ex. GG20)	Aluminium alloy
32 ~ 40	v_c	—	80-**120**-160	80-**100**-120	70-**150**-180	200-**300**-500
	f_t	Shoulder milling	0,05-0,25	0,05-0,20	0,05-0,25	0,1-0,15-0,2
		Slotting	0,05-0,15	0,05-0,12	0,05-0,15	0,05-0,10
		Drilling	0,05-0,20	0,05-0,18	0,05-0,20	0,05-0,10
Grade			ACZ330	ACZ350	ACZ310	DL1000 (H1)

[v_c =m/ min, f_t =mm/ tooth] [min.– optimum – max.]

● = Euro stock
○ = Japan stock

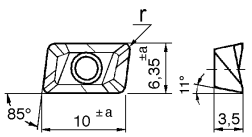
Wavemill Series
WMM (H) 2000 E/EL EW/ELW Type



Body

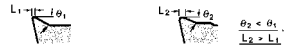
Shank	Cat. No.	Stock	Dimensions (mm) øD	ød	L	l_1	l_2	l_3	Total teeth	Efective teeth
	WMM 2020E	●	20	20	130	17	35	95	3	1
	WMM 2025E	●	25	25	140	26	40	100	4	1
(Long type)										
	WMM 2020EL	●	20	20	185	17	60	125	3	1
	WMM 2025EL	●	25	25	220	26	75	145	4	1
(Weldon shank type)										
	WMM 2020EW	●	20	20	130	17	35	95	3	1
	WMM 2025EW	●	25	25	140	26	40	100	4	1
(Long type with weldon shank)										
	WMM 2020ELW	●	20	20	185	17	60	125	3	1
	WMM 2025ELW	●	25	25	220	26	75	145	4	1
(**WMMH** Standard type with coolant holes and weldon shank)										
	WMMH 2020EW	●	20	20	130	17	35	95	3	1
	WMMH 2025EW	●	25	25	140	26	40	100	4	1
(**WMMH** Long type with coolant holes and weldon shank)										
	WMMH 2020ELW	●	20	20	185	17	60	125	3	1
	WMMH 2025ELW	●	25	25	220	26	75	145	4	1

Inserts for WMM 2000 Series



Cat. No.	Coated ACZ310	ACZ330	ACZ350	Diamond coated DL1000	Un-coated H1	Dimensions r	a
APMT 103504 PDER	●	●	●	–	–	0,4	0,08
APMT 103508 PDER	●	●	●	–	–	0,8	0,08
APMT 103512 PDER	❍	❍	❍	–	–	1,2	0,08
APMT 103504 PDER-H	●	●	●	–	–	0,4	0,08
APMT 103508 PDER-H	●	●	❍	–	–	0,8	0,08
APMT 103512 PDER-H	❍	●	❍	–	–	1,2	0,08
APET 103504 PDER-F	●	●	●	–	–	0,4	0,025
APET 103504 PDFR-S	–	–	–	●	●	0,4	0,025

APMT___ PDER　　APMT___ PDER-H

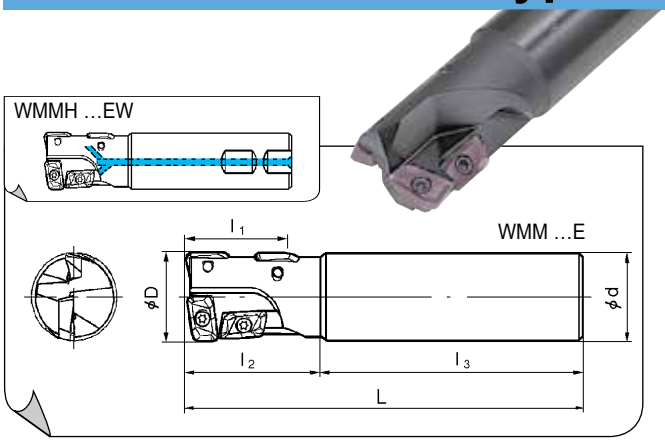


PDER-H : Stronger cutting edge
PDER-F : Ground insert for finishing
PDFR-S : Round honed sharp cutting edge for aluminium

Spare Parts

Screw	Wrench
	
BFTX02506N	TRD08

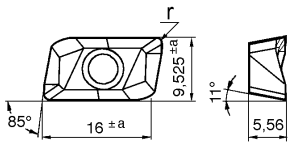
Wavemill Series
WMM (H) 3000 E/EL EW/ELW Type



Body

Shank	Cat. No.	Stock	Dimensions (mm) øD	ød	L	l_1	l_2	l_3	Total teeth	Efective teeth
	WMM 3032E	●	32	32	150	39	50	100	4	1
	WMM 3040E	●	40	32	160	39	55	105	4	1
(Long type)										
	WMM 3032EL	●	32	32	230	39	90	140	4	1
	WMM 3040EL	●	40	32	230	39	55	185	4	1
(Weldon shank type)										
	WMM 3032EW	●	32	32	150	39	50	100	4	1
	WMM 3040EW	●	40	32	160	39	55	105	4	1
(Long type with weldon shank)										
	WMM 3032ELW	●	32	32	230	39	90	140	4	1
	WMM 3040ELW	●	40	32	230	39	55	185	4	1
(**WMMH** Standard type with coolant holes and weldon shank)										
	WMMH 3032EW	●	32	32	150	39	50	100	4	1
	WMMH 3040EW	●	40	32	160	39	55	105	4	1
(**WMMH** Long type with coolant holes and weldon shank)										
	WMMH 3032ELW	●	32	32	230	39	90	140	4	1
	WMMH 3040ELW	●	40	32	230	39	55	185	4	1

Inserts for WMM 3000 Series



Cat. No.	Coated ACZ310	ACZ330	ACZ350	Diamond coated DL1000	Un-coated H1	Dimensions r	a
APMT 160508 PDER	●	●	●	–	–	0,8	0,08
APMT 160512 PDER	❍	❍	❍	–	–	1,2	0,08
APMT 160516 PDER	❍	❍	❍	–	–	1,6	0,08
APMT 160508 PDER-H	●	●	●	–	–	0,8	0,08
APMT 160512 PDER-H	●	●	●	–	–	1,2	0,08
APMT 160516 PDER-H	❍	●	●	–	–	1,6	0,08
APMT 160520 PDER-H	●	●	●	–	–	2,0	0,08
APMT 160530 PDER-H	●	●	●	–	–	3,0	0,08
APMT 160540 PDER-H	●	❍	●	–	–	4,0	0,08
APMT 160550 PDER-H	●	❍	●	–	–	5,0	0,08
APMT 160560 PDER-H	❍	❍	●	–	–	6,0	0,08
APET 160508 PDER-F	●	●	●	–	–	0,8	0,025
APET 160504 PDFR-S	–	–	–	●	●	0,4	0,025
APET 160508 PDFR-S	–	–	–	●	●	0,8	0,025

Spare Parts

Screw	Wrench
	
BFTX03584	TRD15



● APET--- S, uncoated grade “H1” for Aluminium

WRX Type



General Features

The WRX Wave repeater end mill system features AXMT style inserts vertically mounted and positioned to provide a long continuous cutting edge suitable for deep shoulder milling. Designed to run at elevated feed rates the soft cutting action reduces cutting resistance, vibration and noise to substantially improve tool life and surface finish.

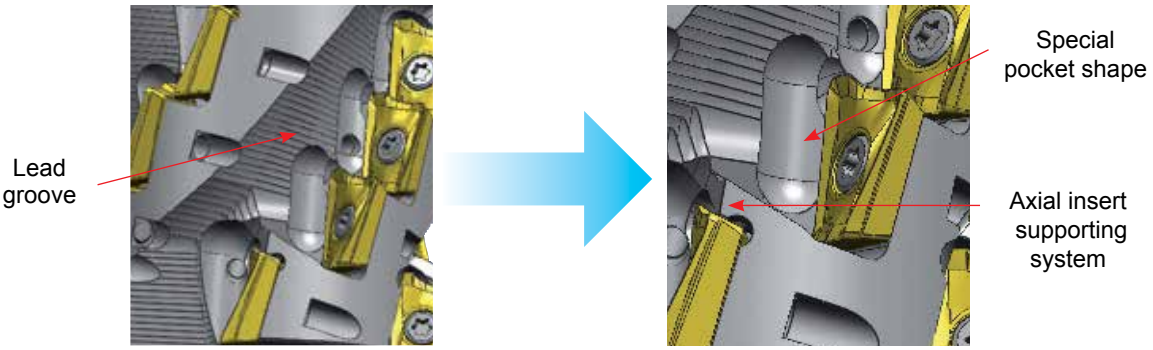
Available with our new generation Super FF and Super ZX coated inserts for unbeatable performance.

Product Range

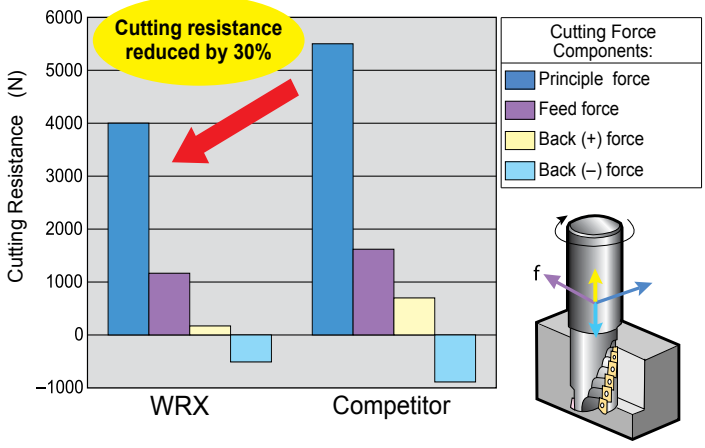
- WRX 2000 series with 12 mm inserts
- WRX 3000 series with 17mm inserts
- Cutter Diameters - 20mm (d_{oc} = 18mm) to 100mm (d_{oc} = 53mm)
- Special Order Options – WRX Cutter with integrated arbor
  Shell type with detachable head
- Wide ISO Application Range – P/M/K/N classification

Advantages

- Optimised insert positions reduce cutting resistance and vibration
- Integral coolant improves chip flow
- Primary chip slot for smooth and fast chip evacuation
- Optimised insert pocket maximises rigidity
- Bottom edge support improves tool life and cutting performance

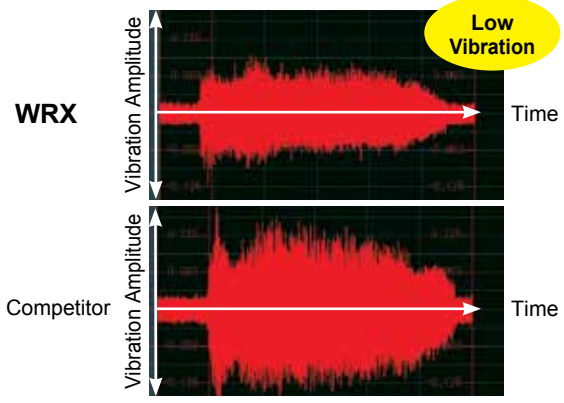


Cutting Resistance Comparison



Work Material:	C50
Tool:	WRX2025RH27E25
Cutting Conditions:	v_c = 100m/min, f_t = 0,15mm/tooth
	d_{oc} = 25mm, w_{oc} = 10mm, Dry

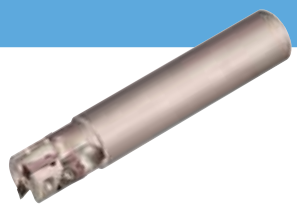
Vibration Comparison

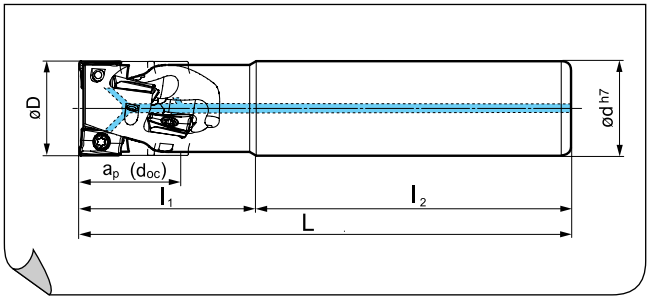


Work Material:	C50
Tool:	WRX3080RH53F32
Cutting Conditions:	v_c = 150m/min, f_t = 0,15mm/tooth
	d_{oc} = 25mm, w_{oc} = 10mm, Dry

● = Eurostock
❑ = Delivery on request

WRX 2000 Series with AXMT 12 mm inserts





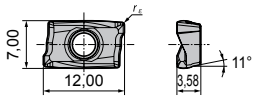
Body (Cylindrical Shank Type)

Shaft	Cat. No.	Stock	Depth of Cut (d_{oc})	Dimensions (mm) øD	ød	l	l_2	l_3	No. of teeth	No. of rows	Effective teeth
	WRX2020RH18E20	●	18	20	20	120	40	80	4	2	2
	WRX2020RH36E20	❑	36	20	20	130	45	85	4	4	1
	WRX2025RH18E25	●	18	25	25	130	45	85	6	2	3
	WRX2025RH27E25	●	27	25	25	130	45	85	6	3	2
	WRX2032RH18E32	●	18	32	32	140	50	90	8	2	4
	WRX2032RH27E32	●	27	32	32	130	45	85	9	3	3
	WRX2040RH18E40	❑	18	40	40	160	40	120	10	2	5
	WRX2040RH36E40	●	36	40	40	130	45	85	16	4	4

Body (Weldon Shank Type)

Shaft	Cat. No.	Stock	Depth of Cut (d_{oc})	Dimensions (mm) øD	ød	ℓ_1	ℓ_2	ℓ_3	No. of teeth	No. of rows	Effective teeth
	WRX2020RH18W20	●	18	20	20	120	40	80	4	2	2
	WRX2020RH36W20	❑	36	20	20	130	45	85	4	4	1
	WRX2025RH18W25	●	18	25	25	130	45	85	6	2	3
	WRX2025RH27W25	●	27	25	25	130	45	85	6	3	2
	WRX2032RH18W32	●	18	32	32	140	50	90	8	2	4
	WRX2032RH27W32	●	27	32	32	130	45	85	9	3	3
	WRX2040RH18W40	❑	18	40	40	160	40	120	10	2	5
	WRX2040RH36W40	●	36	40	40	130	45	85	16	4	4

Inserts (Same as for Wavemill WEX 2000 Type)



Application	Coated Carbide							Carbide	DLC	
High Speed / Light cut	P			K		MS		KN	N	
General Purpose		P		K		MS	MS		N	
Roughing		P	P		K		MS			
Cat. No.	ACP100	ACP200	ACP300	ACK200	ACK300	ACM200	ACM300	H1	DL1000	Radius r_ε
AXMT 123504 PEER-G	●	●	●	●	●			–	–	0,4
123508 PEER-G	●	●	●	●	●			–	–	0,8
123512 PEER-G	●	●	●	●	●			–	–	1,2
AXMT 123504 PEER-H	●	●	●	●	●			–	–	0,4
123508 PEER-H	●	●	●	●	●			–	–	0,8
123512 PEER-H	●	●	●	●	●			–	–	1,2
AXMT 123504 PEER-E						●	●	–	–	0,4
123508 PEER-E			●			●	●	–	–	0,8
123512 PEER-E						●	●	–	–	1,2
AXMT 123508 PEER-EH			●			●	●	–	–	0,8
AXET 123502 PEFR-S	–	–	–	–	–	–	–	●	●	0,2
123504 PEFR-S	–	–	–	–	–	–	–	●	●	0,4
123508 PEFR-S	–	–	–	–	–	–	–	●	●	0,8

– Unable to produce

G - General type
H - Strong cutting edge
E - For stainless steel / exotic alloy
EH - Strong edge for stainless steel / exotic alloy
S - For aluminium alloy

Spare Parts (WRX 2000)

Screw	Wrench
	
BFTX 0306 IP	TRDR 08 IP

Desciption Rule

WRX 20 25 R H 27 W 25

- 20 — Insert Size
- 25 — Tool øD
- R — Cutting Direction
- H — Inner coolant
- 27 — Cutting Edge Lengh
- W — Arbor Type
- 25 — Arbor Diameter

E - Straight Shank
W - Weldon Shank
F - Shell Type

Application Examples

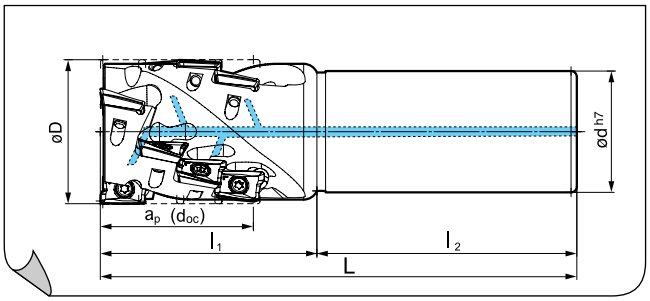
Example



Work Material	Construction Machine Parts (USt.42-2)		
Tool	Body	Sumitomo	Competitor
		WRX2000 Weldon shank	Ø 38,1
	Insert	AXMT	18 mm
	Insert grade	ACP200	PVD Type
	Tool dia. (mm)	38,1	38,1
	Total teeth	24	16
	Effective teeth	4	4
Cutting Data	Cutting speed (m/min)	180	137
	Feed (mm/t)	0,09	0,1
	Axial depth of cut (mm)	38,1	38,1
	Radial width of cut (mm)	3,2	3,2
	Coolant	Wet	Wet
Result	Tool life / Cutting edge	60	40
Benefits	**1,5 times longer tool life 30%increased productivity**		

WRX 3000 Series with AXMT 17 mm inserts





Body (Cylindrical Shank Type)

Shaft	Cat. No.	Stock	Depth of Cut (d_{oc})	Dimensions (mm)					No. of teeth	No. of rows	Effective teeth
				øD	ød	l	l_2	l_3			
	WRX3032RH40E32	●	40	32	32	150	65	85	6	3	2
	WRX3040RH27E40	❑	27	40	40	180	60	120	6	2	3
	WRX3040RH40E40	●	40	40	40	150	65	85	9	3	3
	WRX3050RH27E40	❑	27	50	40	180	60	120	8	2	4
	WRX3050RH53E40	●	53	50	40	165	75	90	12	4	3

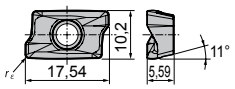
Body (Weldon Shank Type)

Shaft	Cat. No.	Stock	Depth of Cut (d_{oc})	Dimensions (mm)					No. of teeth	No. of rows	Effective teeth
				øD	ød	l	l_2	l_3			
	WRX3040RH27W40	❑	27	40	40	180	60	120	6	2	3
	WRX3040RH40W40	●	40	40	40	150	65	85	9	3	3
	WRX3050RH27W40	❑	27	50	40	180	60	120	8	2	4
	WRX3050RH53W40	●	53	50	40	165	75	90	12	4	3

Spare Parts (WRX 3000)

Screw	Wrench
	
BFTX 0409 IP	TRDR 15 IP

Inserts (Same as for Wavemill WEX 3000 Type)



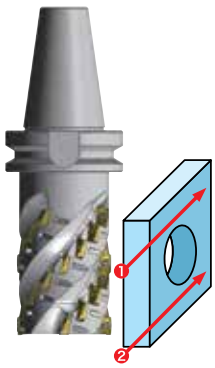
Application	Coated Carbide							Carbide	DLC	
High Speed / Light cut	P			K		M S		K N	N	
General Purpose		P		K		M S	M S		N	
Roughing		P	P		K		M S			
Cat. No.	ACP100	ACP200	ACP300	ACK200	ACK300	ACM200	ACM300	H1	DL1000	Radius r_ε
AXMT 170508 PEER-L	●	●	●	●	●			–	–	0,8
AXMT 170504 PEER-G	●	●	●	●	●			–	–	0,4
170508 PEER-G	●	●	●	●	●			–	–	0,8
170512 PEER-G	●	●	●	●	●			–	–	1,2
170516 PEER-G	●	●	●	●	●			–	–	1,6
170520 PEER-G*	●	●	●	●	●			–	–	2,0
170530 PEER-G*	●	●	●	●	●			–	–	3,0
AXMT 170508 PEER-H	●	●	●	●	●			–	–	0,8
170512 PEER-H	●	●	●	●	●			–	–	1,2
AXMT 170504 PEER-E						●	●	–	–	0,4
170508 PEER-E			●			●	●	–	–	0,8
170512 PEER-E						●	●	–	–	1,2
170516 PEER-E						●	●	–	–	1,6
170520 PEER-E*						●	●	–	–	2,0
170530 PEER-E*						●	●	–	–	3,0
AXMT 170508 PEER-EH			●			●	●	–	–	0,8
AXET 170502 PEFR-S	–	–	–	–	–	–	–	●	●	0,2
170504 PEFR-S	–	–	–	–	–	–	–	●	●	0,4
170508 PEFR-S	–	–	–	–	–	–	–	●	●	0,8

– Unable to produce

L – Low cutting force
G – General type
H – Strong cutting edge
E – For stainless steel
EH– Strong edge for stainless steel
S – For aluminium
* Cutter body modification is required.

Application Examples

Example 1



Work Material	Automotive Component / Cast Iron		
Tool	Body	Sumitomo	Competitor
		WRX3000 Type Integrated Arbor	Ø 50
	Insert	AXMT	18 mm
	Insert grade	ACK300	PVD Type
	Tool dia. (mm)	50	50
	Total teeth	15	12
	Effective teeth	3	3
Cutting Data	Cutting speed (m/min)	78	78
	Feed (mm/t)	0,13	0,13
	Axial depth of cut (mm)	45	45
	Radial width of cut (mm)	5	5
	Coolant	Dry	Dry
Result	Tool life / Cutting edge	500 min.	300 min.
Benefits	**1,7 times longer tool life**		

Example 2

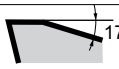
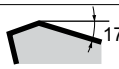


Work Material	Machine Parts / Stainless Steel		
Tool	Body	Sumitomo	Competitor
		WRX3040RH40E40	Ø 40
	Insert	AXMT	18 mm
	Insert grade	ACP 300	PVD Type
	Tool dia. (mm)	40	40
	Total teeth	9	6
	Effective teeth	3	2
Cutting Data	Cutting speed (m/min)	125	125
	Feed (mm/t)	0,2	0,2
	Axial depth of cut (mm)	40	40
	Radial width of cut (mm)	5	5
	Coolant	Wet	Wet
Result	Tool life / Cutting edge	20	5 ~ 10
Benefits	**Stable machining, double tool life with no breakage**		

● = Euro stock
❑ = Delivery on request

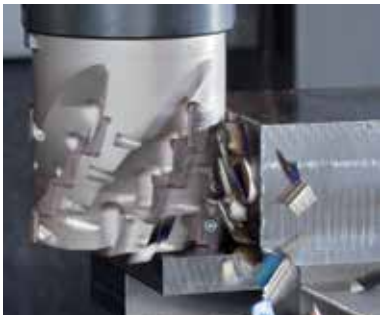
Wave Repeater Mill
WRX Type

Chipbreaker Selection

Work Material	Steel, Cast Iron			Stainless Steel		Aluminium
Chipbreaker Type	**L**	**G**	**H**	**E**	**EH**	**S**
						
Feature	Low cutting force	General purpose	Strong cutting edge	E type for smooth cutting	Strong cutting edge	Sharp cutting edge
2000 Type Figure	–					
3000 Type Figure						
Application	Light cut, low rigidity milling and less burrs	General to Interrupted milling	Roughing, heavy interrupted and hardened steel milling	Light cutting to general purpose	Heavy interrupted machining	Aluminium alloy and non-ferrous metal

Ramping (Slant Milling)

Tool Diameter	Max. Ramping Angle	
	WRX 2000 Typ	WRX 3000 Typ
Ø 20	4°	
Ø 25	2°	
Ø 32	1°30'	
Ø 40	1°	2°
Ø 50	0°30'	1°
Ø 63		0°30'
Ø 80		0°30'
Ø100		Not possible



Recommended Cutting Conditions

Tool: WRX 3050 RH53 F22, øD = 50mm, d_{oc} = 50mm

ISO	Work Material	Property, Condition	Hardness (HB)	Grades (optimum grade in bold letters)			Chip Breaker	Recommended cutting speed and feed / tooth according to width of cut (w_{oc} /øD) - must be adjusted to actual machine and workpiece conditions.					
								10%		25%		> 50%	
								v_c	f_t	v_c	f_t	v_c	f_t
								min. **Optimum** max.	min. **Optimum** max.	min. **Optimum** max.	min. **Optimum** max.	min. **Optimum** max.	min. **Optimum** max.
P	Steel, carbon steel	< 0,15% C, annealed	125	ACP 100	**ACP 200**	ACP 300	L - **G**	170 – **215** – 240	0,21 – **0,28** – 0,35	160 – **195** – 220	0,16 – **0,21** – 0,26	130 – **160** – 180	0,08 – **0,10** – 0,13
		< 0,45% C, annealed	190	ACP 100	**ACP 200**	ACP 300	L - **G**	160 – **195** – 220	0,21 – **0,28** – 0,35	140 – **175** – 190	0,16 – **0,21** – 0,26	110 – **140** – 160	0,08 – **0,10** – 0,13
		< 0,45% C, tempered	250	ACP 100	**ACP 200**	ACP 300	L - **G** - H	140 – **180** – 200	0,19 – **0,26** – 0,32	130 – **165** – 180	0,14 – **0,19** – 0,24	100 – **130** – 140	0,08 – **0,10** – 0,13
		< 0,75% C, annealed	270	ACP 100	**ACP 200**	ACP 300	L - **G** - H	140 – **170** – 190	0,19 – **0,26** – 0,32	120 – **155** – 170	0,14 – **0,19** – 0,24	100 – **130** – 140	0,07 – **0,10** – 0,12
		< 0,75% C, tempered	300	ACP 100	**ACP 200**	ACP 300	L - **G** - H	130 – **165** – 180	0,19 – **0,26** – 0,32	120 – **150** – 170	0,14 – **0,19** – 0,24	100 – **120** – 130	0,07 – **0,10** – 0,12
	Low alloyed steel	annealed	180	ACP 100	**ACP 200**	ACP 300	**G** - H	130 – **165** – 180	0,18 – **0,24** – 0,30	120 – **150** – 170	0,13 – **0,18** – 0,22	100 – **120** – 130	0,07 – **0,09** – 0,11
		tempered	275	ACP 100	**ACP 200**	ACP 300	**G** - H	130 – **160** – 180	0,17 – **0,23** – 0,28	120 – **145** – 160	0,12 – **0,16** – 0,20	100 – **120** – 130	0,07 – **0,09** – 0,11
		tempered	300	ACP 100	**ACP 200**	ACP 300	**G** - H	110 – **140** – 160	0,16 – **0,22** – 0,27	100 – **130** – 140	0,11 – **0,15** – 0,19	90 – **110** – 120	0,07 – **0,09** – 0,11
		tempered	350	ACP 100	**ACP 200**	ACP 300	**G** - H	100 – **130** – 140	0,16 – **0,21** – 0,26	100 – **120** – 130	0,11 – **0,15** – 0,19	80 – **100** – 110	0,06 – **0,08** – 0,10
	High alloyed and tool steel	annealed	200	**ACP 100**	ACP 200		G - **H**	70 – **85** – 90	0,15 – **0,21** – 0,26	60 – **80** – 90	0,11 – **0,14** – 0,18	60 – **70** – 80	0,06 – **0,08** – 0,10
		tempered	325	**ACP 100**	ACP 200		G - **H**	30 – **35** – 40	0,14 – **0,19** – 0,24	30 – **35** – 40	0,10 – **0,14** – 0,17	20 – **30** – 30	0,06 – **0,08** – 0,10
M	Stainless steel, ferritic/martensitic	annealed	200		ACP 200	**ACP 300**	L - **G** - H	120 – **150** – 170	0,15 – **0,20** – 0,25	110 – **135** – 150	0,11 – **0,14** – 0,18	90 – **110** – 120	0,07 – **0,09** – 0,11
	Stainless, martensitic	tempered	240		ACP 200	**ACP 300**	L - **G** - H	100 – **125** – 140	0,16 – **0,22** – 0,27	90 – **115** – 130	0,12 – **0,16** – 0,20	80 – **100** – 110	0,07 – **0,10** – 0,12
	Stainless, austenitic	plunged	180		**ACM 200**	**ACM 300**	L - **G**	80 – **95** – 110	0,15 – **0,20** – 0,25	70 – **85** – 90	0,11 – **0,14** – 0,18	60 – **70** – 80	0,06 – **0,08** – 0,10
K	Gray cast iron	GG	180	**ACK 200**	ACK 300		**G** - H	190 – **240** – 270	0,19 – **0,26** – 0,32	180 – **220** – 240	0,14 – **0,19** – 0,24	140 – **170** – 190	0,09 – **0,12** – 0,15
	Nodular cast iron	GGG	250	**ACK 200**	ACK 300		**G** - H	140 – **170** – 190	0,16 – **0,21** – 0,26	120 – **155** – 170	0,12 – **0,16** – 0,20	100 – **130** – 140	0,07 – **0,10** – 0,12
S	Exotic alloys (Resistant alloys, Ti + Ni alloys)	Fe based, annelaed	200	ACK 200	**ACK 300**		L - **G**	40 – **45** – 50	0,12 – **0,16** – 0,21	30 – **40** – 45	0,08 – **0,11** – 0,14	30 – **35** – 40	0,07 – **0,09** – 0,11
		hardened	280	ACK 200	**ACK 300**		L - **G**	15 – **20** – 25	0,10 – **0,14** – 0,17	10 – **15** – 20	0,07 – **0,10** – 0,12	10 – **15** – 20	0,05 – **0,07** – 0,09
N	Aluminum alloy	Si < 13%			**DL 1000**	H1	**S**	510 – **635** – 710	0,23 – **0,31** – 0,38	460 – **580** – 640	0,17 – **0,22** – 0,28	390 – **485** – 540	0,08 – **0,12** – 0,14
		Si ≥ 13%			**DL 1000**	H1	**S**	150 – **190** – 210	0,19 – **0,25** – 0,32	140 – **175** – 190	0,14 – **0,18** – 0,23	130 – **165** – 180	0,08 – **0,10** – 0,13
	Copper alloy				**DL 1000**	H1	**S**	320 – **405** – 450	0,15 – **0,21** – 0,26	300 – **370** – 410	0,13 – **0,16** – 0,22	240 – **300** – 330	0,07 – **0,10** – 0,12

- Dry machining is recommended (air cooling) - if lubricant is used, we recommend CVD coated grades (ACP100 / ACK200) or tough PVD grades (ACP300 / ACK300).
- Insert geometry: L type for low cutting forces, thinly coated components. G type for general application, H type offers high cutting edge stability for rough and heavy cutting conditions.

WBMR Type



Features

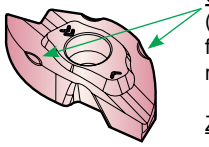
Particularly suitable for die mold machining the WBMR replaceable insert ball nose endmill efficiently roughs complex profiles.

Its high feed rate capability is a direct result of a sharp cutting edge which is maintained during the cutting cycle by the special cemented carbide substrate working in parallel with the ultra hard ZX coating.



Advantages

- Wave shaped cutting edge
- Economical M class insert
- Precise clamping
- High feed rate capability

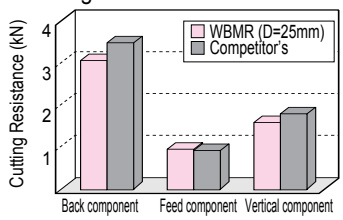


Chipbreaker
(Nick type)
for r = 25
radial insert

ZNMT 4310250-N

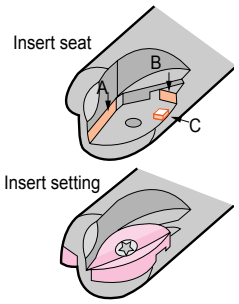
Performance

● Cutting Resistance



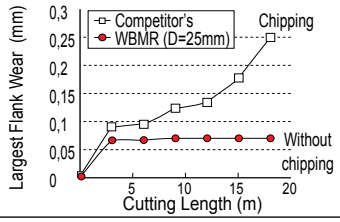
Cutting Conditions (Shoulder milling, downcut)
v_c =200m/min, f_t =0.15mm/tooth
Axial d_{oc} : 5mm, Radial w_{oc} : 5mm
Work Material : C50

● Anti-Rotational Mechanism



Circumferential movement of the insert caused by cutting forces is controlled by guide faces A, B & C, so as to allow stable cutting.

● Insert Life

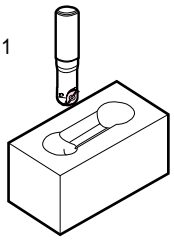


Cutting Conditions (Shoulder milling, downcut)
v_c =100m/min, f_t =0.15mm/tooth
Axial d_{oc} : 5mm, Radial w_{oc} : 5mm
Work Material : X 40 CrMoV 5-1(HRC45)

Application Example

● Cold Molding Die

Work Material :
X 155 CrVMo 12 1



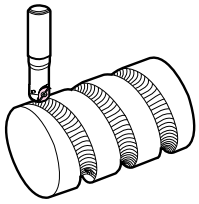
<Results>
Flank wear after continuous cutting for seven hours was less than other manufacturer's product.
Stable cutting was observed.

WBMR 2200S (ø20mm)
Insert Grade : ACZ350

Cutting Conditions :
n = 2200 rpm, v_f = 500 mm/min
Depth of Cut : 0,3~2 mm
Non-water soluble cutting oil

● Injection Molded Part

(Cr-Mo steel + Stellite-overlay)



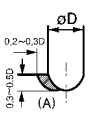
<Results>
Wave ball (ø30mm) could cut without chattering while other manufacturer's products could not cut at all due to chattering.

WBMR 2300M (ø30mm)
Insert Grade : ACZ350

Cutting Conditions :
n = 500 rpm, v_f = 35 mm/min
Depth of Cut : 5 mm
Dry cut

Recommended Cutting Conditions (2 teeth)

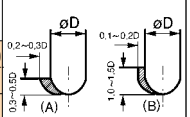
Condition		Material: Carbon steel (Below HRC25)	Alloy steel (Below HRC45)	Stainless, Die steel etc.	Cast iron
(A)	v_c	200-**250**-300	100-**150**-200	50-**80**-100	100-**120**-150
	f_t	0,1-**0,2**-0,3	0,1-**0,2**-0,3	0,1-**0,15**-0,2	0,2-**0,3**-0,4



[v_c =m/min, f_t =mm/tooth] [min.– optimum – max.]

Recommended Cutting Conditions (4 teeth)

Condition		Material: Carbon steel (Below HRC25)	Alloy steel (Below HRC45)	Stainless, Die steel etc.	Cast iron
(A)	v_c	200-**250**-300	100-**150**-200	50-**80**-100	100-**120**-150
	f_t	0,1-**0,2**-0,3	0,1-**0,2**-0,3	0,1-**0,15**-0,2	0,2-**0,3**-0,4
(B)	v_c	160-**200**-240	80-**120**-160	40-**60**-80	80-**100**-120
	f_t	0,1-**0,2**-0,3	0,1-**0,2**-0,3	0,1-**0,15**-0,2	0,2-**0,3**-0,4

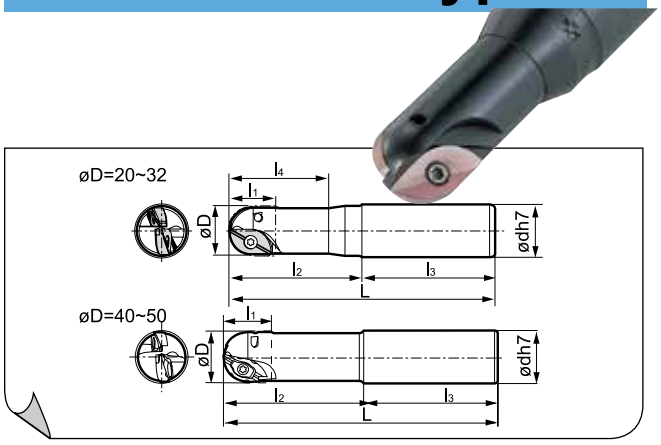


[v_c =m/min, f_t =mm/tooth] [min.– optimum – max.]

● = Euro stock
○ = Japan stock

❑ = Delivery on request

Wave Ball Mill" for Roughing
WBMR 2000 Type



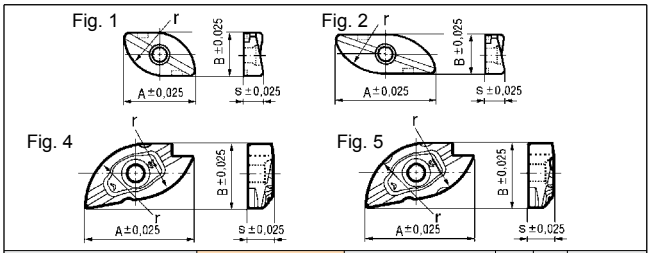
Body (Short and middle length type, 2 teeth)

Cat. No.	Stock	Dimensions (mm)						
		øD	ød	l_1	l_2	l_3	l_4	L
WBMR 2200 S	●	20	25	20	60	80	40	140
WBMR 2200 M	●				60	140		200
WBMR 2200 MW	●							
WBMR 2250 S	●	25	32	23	70	80	50	150
WBMR 2250 M	●				73	147		220
WBMR 2250 MW	●							
WBMR 2320 S	●	32	32	31	80	80	60	160
WBMR 2320 M	●				85	155		240
WBMR 2320 MW	●							
WBMR 2400 S	❑	40	42	35	100	100	-	200
WBMR 2400 M	❑				180	100		280
WBMR 2500 S	❑	50	42	47	100	100	-	200
WBMR 2500 M	❑				180	100		280

S: **S**hort type with cylindrical shank
M: **M**iddle length type with cylindrical shank

MW: **M**iddle length type with Weldon shank

Inserts

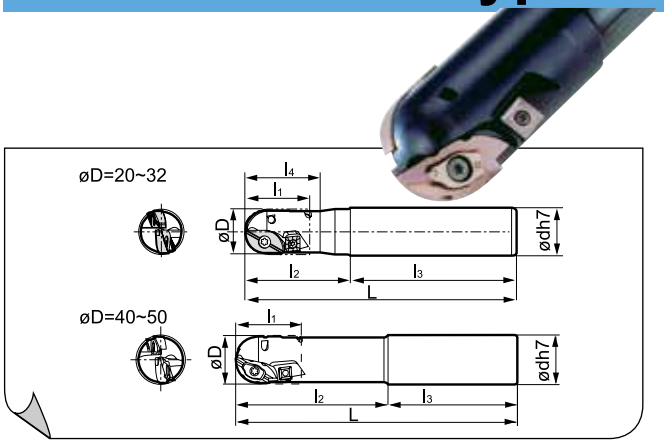


Cat. No.	Coated			Dimensions (mm)				Fig.	No. of teeth	Applicable Endmill
	ACP 200	ACP 300	ACK 300	A	B	s	r			
ZNMT 1804100-C	●	●	●	18,00	9,76	4,76	10	1	1	WBMR2200
ZNMT 2004100-S	●	●	●	20,00	7,50	4,37	10	2		
ZNMT 2205125-C	●	●	●	22,50	12,20	5,70	12,5	1	1	WBMR2250
ZNMT 2305125-S	●	●	●	23,00	9,38	5,56	12,5	2		
ZNMT 2907160-C	●	●	●	29,00	15,62	7,15	16	1	1	WBMR2320
ZNMT 3006160-S	●	●	●	30,00	12,00	6,70	16	2		
ZNMT 3608200	❍		❍	36,00	19,50	6,70	20	4	2	WBMR2400
ZNMT 4310250	❍		❍	43,00	25,70	10,15	25	4	2	WBMR2500
ZNMT 4310250-N	❍	❍	❍	43,00	25,70	10,15	25	5		

Spare Parts

Screw	Wrench	Wrench	Applicable Endmill
BFTX0307N	TRX10	–	WBMR 2200
BFTX0409N	–	TRD15	WBMR 2250
BFTX0511N	–	TRD20	WBMR 2320
BFTX0619N	–	TRD25	WBMR 2400 WBMR 2500

Wave Ball Mill" for Roughing
WBMR 2000L Type



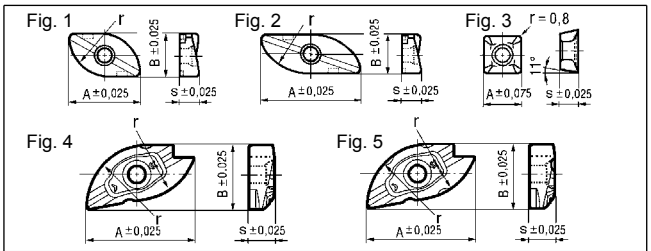
Body (Extra long type, 4 teeth)

Cat. No.	Stock	Dimensions (mm)						
		øD	ød	l_1	l_2	l_3	l_4	L
WBMR 2200 LL	●	20	25	30	80	170	40	250
WBMR 2200 LLW	●							
WBMR 2250 LL	●	25	32	38	100	200	50	300
WBMR 2250 LLW	●							
WBMR 2320 LL	●	32	32	44	120	230	60	350
WBMR 2320 LLW	●							
WBMR 2400 LL	❑	40	42	50	250	100	-	350
WBMR 2400 LLW								
WBMR 2500 LL	❑	50	42	69	250	100	-	350
WBMR 2500 LLW								

LL: Extra long type with cylindrical shank

LLW: Extra long type with Weldon shank

Inserts



Cat. No.	Coated			Dimensions (mm)				Fig.	No. of teeth	Applicable Endmill
	ACP 200	ACP 300	ACK 300	A	B	s	r			
ZNMT 1804100-C	●	●	●	18,00	9,76	4,76	10	1	1	WBMR2200
ZNMT 2004100-S	●	●	●	20,00	7,50	4,37	10	2		
SPMT 070308	❍	❍	❍	7,94	–	3,18	–	3	2	
ZNMT 2205125-C	●	●	●	22,50	12,20	5,70	12,5	1	1	WBMR2250
ZNMT 2305125-S	●	●	●	23,00	9,38	5,56	12,5	2		
SPMT 09T308	●	●	●	9,53	–	3,97	–	3	2	
ZNMT 2907160-C	●	●	●	29,00	15,62	7,15	16	1	1	WBMR2320
ZNMT 3006160-S	●	●	●	30,00	12,00	6,70	16	2		
SPMT 09T308	●	●	●	9,53	–	3,97	–	3	2	
ZNMT 3608200	❍		❍	36,00	19,50	6,70	20	4	2	WBMR2400
SPMT 09T308	●	●	●	9,53	–	3,97	–	3	2	
ZNMT 4310250	❍		❍	43,00	25,70	10,15	25	4	2	WBMR2500
ZNMT 4310250-N	❍	❍	❍	43,00	25,70	10,15	25	5		
SPMT 120408	❍	❍	❍	12,7	–	4,76	–	3	2	

Spare Parts

Screw	Wrench	Wrench	Applicable Endmill
BFTX0307N	TRX10	–	WBMR 2200 LL
BFTX0409N	–	TRD15	WBMR 2250 LL
BFTX0511N	–	TRD20	WBMR 2320 LL
BFTX0407N	–	TRD15	
BFTX0619N	–	TRD25	WBMR 2400 LL
BFTX0409N	–	TRD15	WBMR 2500 LL

Wave Ball Mill for Finishing
WBMF Type



Features

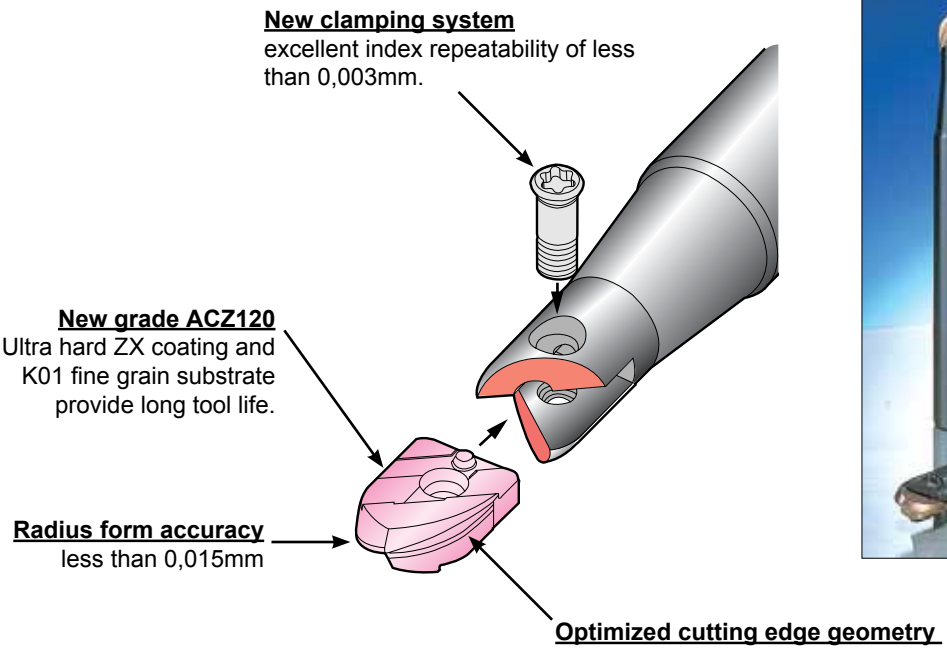
The outstanding results obtained from this finishing cutter are due to the combination of its large sigmoid blade and precise clamping system making it extremely rigid !

The WBMF achieves an excellent machined finish greatly reducing hand finishing and polishing operations.

Advantages

- Unique rigid clamping system
- Large sigmoid blade
- Smooth cutting action
- High quality machined surface
- Ultra hard ZX coated cutting edge

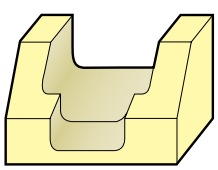




Application Example

● Bumper Moulding Die

Work Material :
C55

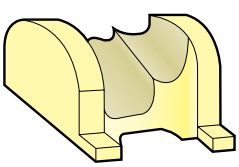


<Results>
Surface roughness after continuous cutting for twelve hours was better than other manufacturer's product.
Less width of flank wear was observed.

WBMF1200M (ø20mm) Insert : ZPGU2471100 Grade : ACZ120	Cutting Conditions v_c = 88 m/min v_f = 700 mm/min (f_t = 0,25 mm/tooth) Width of Cut : 0,5 mm Depth of Cut : 0,5 mm Dry

● Bumper Moulding Die

Work Material :
C50

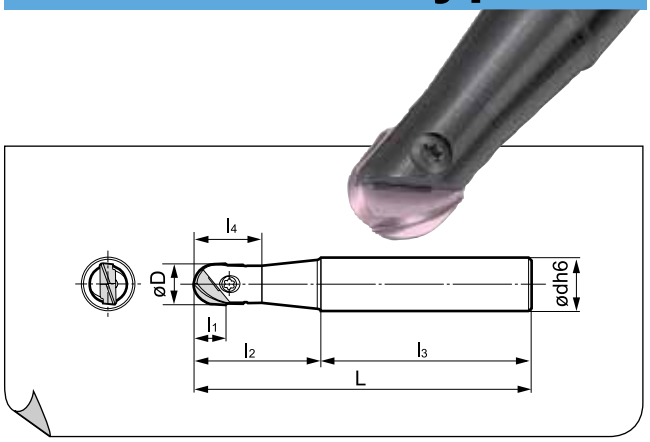


<Results>
Smooth cutting and good surface finish after continuous cutting for eight hours

WBMF1200M (ø20mm) Insert : ZPGU2471100 Grade : ACZ120	Cutting Conditions v_c = 190 m/min v_f = 1200 mm/min (f_t = 0,21 mm/tooth) Width of Cut : 0,2 mm Depth of Cut : 0,2 mm Dry

● = Euro stock
❑ = Delivery on request

Wave Ball Mill for Finishing
WBMF 1000 Type

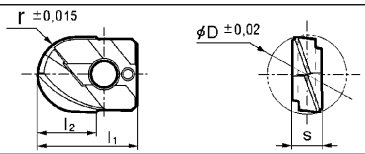


Body

Cat. No.	Stock	Dimensions (mm)						
		øD	ød	l_1	l_2	l_3	l_4	L
WBMF 1100 S	❑	10	16	9	30	70	17	100
WBMF 1100 M	●				35	95		130
WBMF 1100 L	❑				50	130		180
WBMF 1120 S	❑	12	16	10,5	40	70	19,5	110
WBMF 1120 M	●				40	110		150
WBMF 1120 MM12N			12		40	110		150
WBMF 1120 L	❑		16		60	140		200
WBMF 1160 S	❑	16	20	12	50	80	25,5	130
WBMF 1160 M	●				50	130		180
WBMF 1160 MM16N			16		50	130		180
WBMF 1160 L	❑		20		70	150		220
WBMF 1200 S	❑	20	25	15	60	80	32	140
WBMF 1200 M	●				60	140		200
WBMF 1200 MM20N			20		60	140		200
WBMF 1200 L	❑		25		80	170		250
WBMF 1250 S		25	32	18,5	70	80	36	150
WBMF 1250 M	●				73	147		220
WBMF 1250 L	❑				100	200		300
WBMF 1300 S		30	32	22,5	80	80	43	160
WBMF 1300 M	●				85	155		240
WBMF 1300 L	❑				120	230		350

S : **S**hort type
M : **M**iddle length type
L : **L**ong type

Inserts

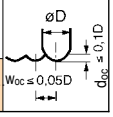


Cat. No.	Coated	Dimensions (mm)					Applicable
	ACZ120	øD	l_1	l_2	s	r	Endmill
ZPGU 1551050	●	10	15,6	9	5,1	5,0	WBMF1100
ZPGU 1856060	●	12	18	10,5	5,6	6,0	WBMF1120
ZPGU 2061080	●	16	20,5	12	6,1	8,0	WBMF1160
ZPGU 2471100	●	20	24,5	15	7,1	10,0	WBMF1200
ZPGU 2876125	●	25	28,5	18,5	7,6	12,5	WBMF1250
ZPGU 3486150	●	30	34,4	22,5	8,6	15,0	WBMF1300

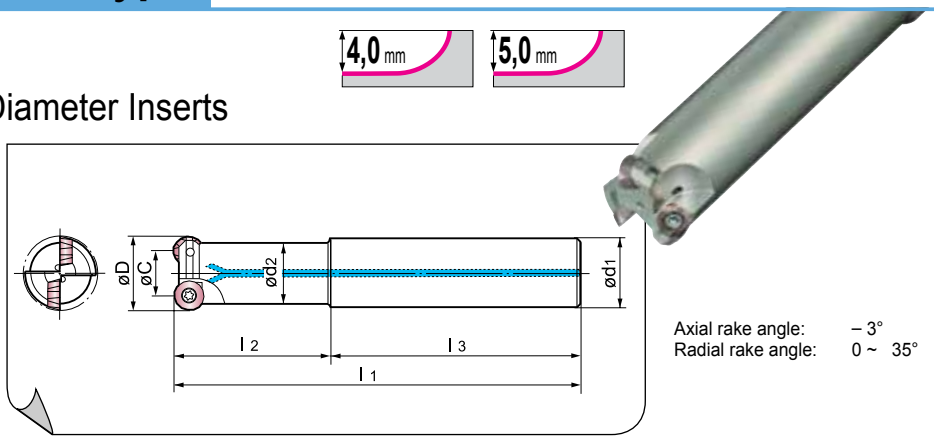
Spare Parts

Screw	Wrench	Applicable Endmill
		
BFTG0408F	TRD15	WBMF1100
BFTG0409F	TRD15	WBMF1120
BFTG0513F	TRD20	WBMF1160
BFTG0617F	TRD25	WBMF1200
BFTG0621F	TRD25	WBMF1250
BFTG0825F	TRD25	WBMF1300

Recommended Cutting Conditions

Material / Condition		Carbon steel (Below HRC25)	Alloy steel (Below HRC45)	Stainless, Die steel etc.	Cast iron	
øD 10~30	v_c	200-**250**-300	100-**150**-200	50-**80**-100	100-**120**-150	
	f_t	0,1-**0,2**-0,3	0,1-**0,2**-0,3	0,1-**0,15**-0,2	0,2-**0,3**-0,4	

Shank Type with Small Diameter Inserts



E_ : Cylindrical straight shank type

ES : **S**hort type with straight shank
EM : **M**iddle length type with straight shank
EL : **L**ong type with straight shank

Axial rake angle: – 3°
Radial rake angle: 0 ~ 35°

■ Body

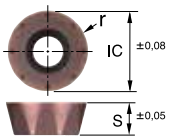
■ Spare Parts

Insert IC (mm)	Cat. No.	Stock	Dimensions (mm) øD	øC	ød1	ød2	l1	l2	l3	No. of teeth	Axial Rake	Radial Rake	Helical Boring øB Standard	Plunging α max.		
8	**WRCX 08012 ES**	●	12	-	12	9,4	110	40	70	1	-3°	-35°	–	0°30′	BFTX 02505 IP	TRDR 08 IP
	WRCX 08012 EM	●	12	-	12	9,4	150	70	80	1						
	WRCX 08016 ES	●	16	-	16	14	120	50	70	1	-3°	-10°	24^{+7}_{-4}	5°30′	BFTX 02506 IP	TRDR 08 IP
	WRCX 08016 EM	●	16	-	16	14	150	70	80	1						
	WRCX 08020 ES	●	20	12	20	18	130	50	80	2	-3°	-3°	32 ± 7	13°		
	WRCX 08020 EM	●	20	12	20	18	180	100	80	2						
	WRCX 08020 EL	●	20	12	20	18	250	130	120	2						
	WRCX 08025 ES	●	25	17	25	21	130	50	80	3	-3°	0°	42 ± 7	8°20′		
	WRCX 08025 EM	●	25	17	25	21	180	100	80	3						
	WRCX 08025 EL	●	25	17	25	21	250	130	120	3						
10	**WRCX 10025 ES**	●	25	15	25	21	130	50	80	2	-3°	0°	40 ± 8	13°10′	BFTX 03584 IP	TRDR 15 IP
	WRCX 10025 EM	●	25	15	25	21	180	100	80	2						
	WRCX 10025 EL	●	25	15	25	21	250	130	120	2						
	WRCX 10032 ES	●	32	22	32	28	130	50	80	3	-3°	0°	54 ± 8	8°		
	WRCX 10032 EM	●	32	22	32	28	200	120	80	3						
	WRCX 10032 EL	●	32	22	32	28	300	180	120	3						

■ Insert

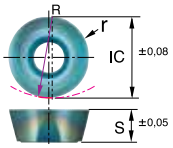
● QPMT... : Standard 16 cornered polygon type
QPMT...-H : Stronger cutting edge type

Fig. 1



● QPET...-S : Polished round insert for non-ferrous material

Fig. 2



Rake angle: 25°
4 corners use
R : wiper radius

Cat. No.	Coated Carbide ACP100	ACP200	ACP300	ACK200	ACK300	Diamond Coated DL1000	Uncoated carbide H1	IC (mm)	r (mm)	s (mm)	Max. d_{oc} 4 corners application	8 corners application	Fig.	Applicable Endmill
QPMT 080330 PPEN	●	●	●	●	●			8	3,0	3,18	3,8	1,0	❶	WRCX 08000 E
QPMT 080330 PPEN-H	●	●	●	●	●									
QPMT 10T335 PPEN	●	●	●	●	●			10	3,5	3,97	4,7	1,2	❶	WRCX 10000 E
QPMT 10T335 PPEN-H	●	●	●	●	●									
QPET 10T350 PPFR-S						●	●		5,0			–	❷	

■ Recommended Cutting Conditions

[v_c = m/min, f_t = mm/tooth] [min.– optimum – max.]

Material / Grade		Carbon steel (ex. C40 ~ C50)	Alloy steel (Below HRC40)	Stainless steel (ex. X10CrNiS18-9)	Cast iron (ex. GG20)	Non-ferrous material
øD (mm)		ACP100, ACP200	ACP100, ACP200	ACP200, ACP300	ACK200, ACK300	DL1000, H1
12 ~ 32	v_c	80-**120**-160	60-**100**-140	60-**100**-120	60-**80**-120	200-**500**-1000
	f_t	0,1-**0,3**-0,4	0,1-**0,2**-0,3	0,1-**0,15**-0,2	0,1-**0,2**-0,3	0,1-**0,2**-0,3

● = Euro stock
❑ = Delivery on request

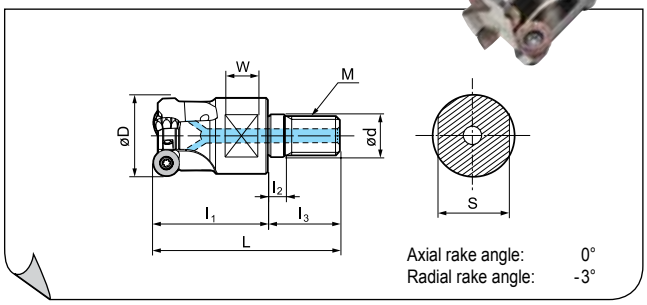
Exchangeable Head Endmills
WRCX 08000 M Type

Modular Tools

4,0 mm

High efficiency multi purpose endmills





Heads

For insert type : QPMT 0803

Cat. No.	Stock	Dimensions (mm)									No. of teeth
		øD	ød	M	L	l_1	l_2	l_3	W	S	
WRCX08020M10Z2	●	20	10,5	M10	49	30	5	19	8	15	2
WRCX08025M12Z3	●	25	12,5	M12	56	35	5	21	10	19	3

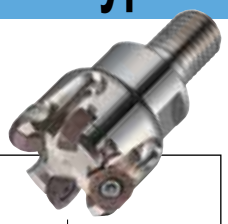
Inserts are not included.

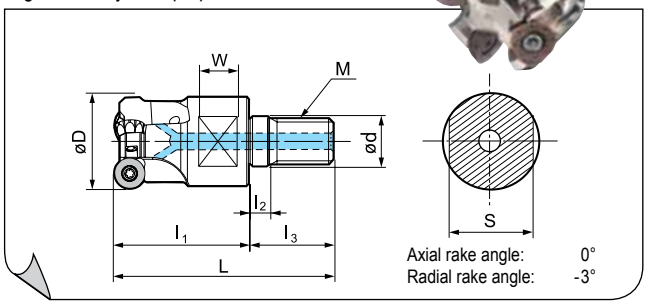
Exchangeable Head Endmills
WRCX 10000/12000 M Type

5,0 mm (WRCX 10000M)

6,0 mm (WRCX 12000M)

High efficiency multi purpose endmills





Heads

For insert type : QPOT 10T3

Cat. No.	Stock	Dimensions (mm)									No. of teeth
		øD	ød	M	L	l_1	l_2	l_3	W	S	
WRCX10025M12Z2	●	25	12,5	M12	56	35	5	21	10	19	2
WRCX10028M12Z2	❑	28	12,5	M12	56	35	5	21	10	19	2
WRCX10030M16Z3	❑	30	17,0	M16	63	40	5	23	10	24	3
WRCX10032M16Z3	●	32	17,0	M16	63	40	5	23	10	24	3

Inserts are not included.

Heads

For insert type : QPOT 1204

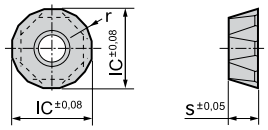
Cat. No.	Stock	Dimensions (mm)									No. of teeth
		øD	ød	M	L	l_1	l_2	l_3	W	S	
WRCX12040M16Z4	❑	40	17,0	M16	63	40	5	23	10	24	4

Inserts are not included.

Inserts

● QPMT – 16 corner insert for General Purpose Application
QPMT ... H 16 corner insert with Strong cutting edge

Fig. 1

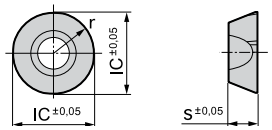


● QPET ... S Round insert with Sharp cutting edge for Aluminium

Rake angle: 25°

4 corners use

Fig. 2



Cat. No.	Coated Carbide					DLC Coated	Uncoated Carbide	IC (mm)	r (mm)	s (mm)	Max. d_{oc} 4 corners application	Max. d_{oc} 8 corners application	Fig.	Applicable Endmill
	ACP 100	ACP 200	ACP 300	ACK 200	ACK 300	DL1000	H1							
QPMT 080330 PPEN	●	●	●	●	●			8	3,0	3,18	3,8	1,0	❶	WRCX 08000M
QPMT 080330 PPEN-H	●	●	●	●	●									
QPMT 10T335 PPEN	●	●	●	●	●			10	3,5	3,97	4,7	1,2	❶	WRCX 10000M
QPMT 10T335 PPEN-H	●	●	●	●	●									
QPET 10T350 PPFR-S						●	●		5,0			–	❷	
QPMT 120440 PPEN	●	●	●	●	●			12	4,0	4,76	5,6	1,5	❶	WRCX 12000M
QPMT 120440 PPEN-H	●	●	●	●	●									
QPET 120460 PPFR-S						●	●		6,0			–	❷	

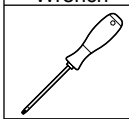
● Identification of Catalogue No.

WRCX 08 020 M10 Z2

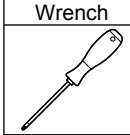
- WRCX: Cutter Type
- 08: Insert Size
- 020: Diameter
- M10: Mounting Screw
- Z2: No. of Teeth



Spare Parts

Wrench	Screw	Required Torque (N·m)	Applicable Endmill
			
TRDR 08 IP	BFTX 02506 IP	1,5	WRCX 08020M ~ WRCX 08025M

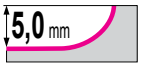
Spare Parts

Wrench	Screw	Required Torque (N·m)	Applicable Endmill
			
TRDR 15 IP	BFTX 03584 IP	3,0	WRCX 10025M ~ WRCX 10032M
	BFTX 0409 IP	3,0	WRCX 12040M

Wave Radius Mill
RSX(F)10000/12000 ES Type

Milling of exotic alloys and stainless steel

Rake Angle		
	Radial	-5°~ -8°
	Axial	10°

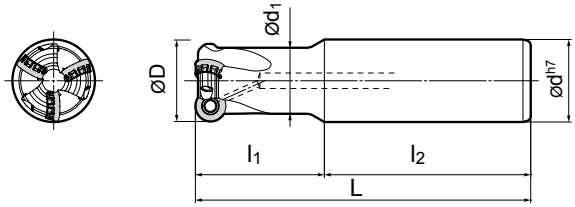


(10000ES)



(12000ES)

Body – Dimensions





Body (RSX10000ES, Standard)

Cat. No.	Stock	Dimensions (mm)						No. of teeth	Weight (kg)
		ØD	Ød	Ød1	l1	l2	L		
RSX 10025ES	●	25	25	20,3	50	80	130	2	0,4
10032ES	●	32	32	27,1	50	80	130	3	0,7

Body (RSX12000ES, Standard)

Cat. No.	Stock	Dimensions (mm)						No. of teeth	Weight (kg)
		ØD	Ød	Ød1	l1	l2	L		
RSX 12032ES	●	32	32	25,6	50	80	130	2	0,7

Body (RSXF10000ES, Fine Pitch)

Cat. No.	Stock	Dimensions (mm)						No. of teeth	Weight (kg)
		ØD	Ød	Ød1	l1	l2	L		
RSXF 10025ES	●	25	25	20,3	50	80	130	3	0,4
10032ES	●	32	32	27,1	50	80	130	4	0,7

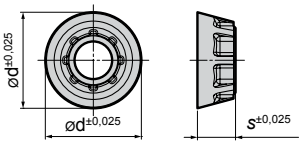
Body (RSXF12000ES, Fine Pitch)

Cat. No.	Stock	Dimensions (mm)						No. of teeth	Weight (kg)
		ØD	Ød	Ød1	l1	l2	L		
RSXF 12032ES	●	32	32	25,6	50	80	130	3	0,7

Inserts

Application	Grade		
High Speed/Light Cut	MS	MS	
General Purpose	MS	MS	MS
Roughing			MS

Cat. No.	ACM100	ACM200	ACM300	Dimens. ød (IC)	Dimens. S	Applicable Cutters
RDET 10T3M0EN G	●	●	●	10	3,97	RSX(F) 10000ES
10T3M0EN H	●	●	●	10	3,97	
RDET 1204M0EN G	●	●	●	12	4,76	RSX(F) 12000ES
1204M0EN H	●	●	●	12	4,76	



Cutting Edge Cross Section



G - Type **H** - Type

M0: IC is metric

Spare Parts

Applicable Cutters		Wrench	Screw	Recommended Tightening Torque (N·m)
RSX(F)	10000ES	TRDR15IP	BFTX03584IP	**3,0**
RSX(F)	12000ES		BFTX0409IP	**3,0**

Cutter Identification

RSX	F	10	025	ES
Cutter Series	Fine Pitch Type	Insert Size	Cutter Diameter	Endmill Type

Recommended Cutting Conditions

Min.-**Optimum**-Max.

ISO	Work Material			Hardness	Cutting Speed v_c (m/min)	Feed Rate f_t (mm/t)	Grade
M	Stain-less Steel	Cr Based	Ferritic	200HB	150-**180**-200	0,15-**0,25**-0,35	ACM300
			Martensitic	200-330HB	80-**120**-180	0,15-**0,25**-0,35	ACM300
		Cr-Ni Based	Austenitic	200HB	150-**180**-200	0,15-**0,25**-0,35	ACM300
			Austenitic, ferritic	230-270HB	80-**120**-180	0,15-**0,25**-0,35	ACM200
			Precipitation hardening	330HB	60-**100**-160	0,15-**0,25**-0,35	ACM200
S	Heat resistant alloy		Ni based material	250-350HB	20- **30**- 40	0,10-**0,20**-0,30	ACM100 ACM200
	Titanium		Pure Titanium	(Rm400)	60- **80**-100	0,10-**0,20**-0,30	
			α + β alloy system	(Rm1050)	40- **50**- 60	0,10-**0,20**-0,30	

● = Euro stock

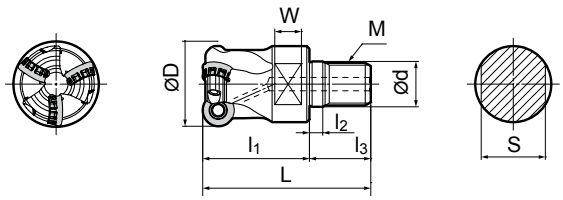
☞ G20/G21

Modular Tools

Rake Angle		
	Radial	-5°~ -8°
	Axial	10°

5,0 mm (10000M)

6,0 mm (12000M)





Body (RSX10000M, Standard)

Cat. No.	Stock	Dimensions (mm)									No. of Teeth	Weight (kg)
		ØD	Ød	M	L	l_1	l_2	l_3	W	S		
RSX 10025M12Z2	●	25	12,5	M12	56	35	5	21	10	19	2	0,1
10032M16Z3	●	32	17,0	M16	63	40	5	23	10	24	3	0,2

Body (RSX12000M, Standard)

Cat. No.	Stock	Dimensions (mm)									No. of Teeth	Weight (kg)
		ØD	Ød	M	L	l_1	l_2	l_3	W	S		
RSX 12032M16Z2	●	32	17,0	M16	63	40	5	23	10	24	2	0,2
12040M16Z3	●	40	17,0	M16	63	40	5	23	10	24	3	0,3

Body (RSXF10000M, Fine Pitch)

Cat. No.	Stock	Dimensions (mm)									No. of Teeth	Weight (kg)
		ØD	Ød	M	L	l_1	l_2	l_3	W	S		
RSXF 10025M12Z3	●	25	12,5	M12	56	35	5	21	10	19	3	0,1
10032M16Z4	●	32	17,0	M16	63	40	5	23	10	24	4	0,2

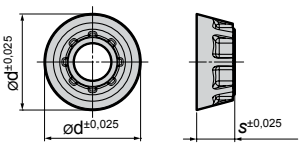
Body (RSXF12000M, Fine Pitch)

Cat. No.	Stock	Dimensions (mm)									No. of Teeth	Weight (kg)
		ØD	Ød	M	L	l_1	l_2	l_3	W	S		
RSXF 12032M16Z3	●	32	17,0	M16	63	40	5	23	10	24	3	0,2
12040M16Z4	●	40	17,0	M16	63	40	5	23	10	24	4	0,3

Inserts

Application	Grade		
High Speed/Light Cut	MS	MS	
General Purpose	MS	MS	MS
Roughing			MS

Cat. No.	ACM100	ACM200	ACM300	Dimens. ød (IC)	Dimens. S	Applicable Cutters
RDET 10T3M0EN G	●	●	●	10	3,97	RSX(F)10000M
10T3M0EN H	●	●	●	10	3,97	
RDET 1204M0EN G	●	●	●	12	4,76	RSX(F)12000M
1204M0EN H	●	●	●	12	4,76	



Cutting Edge Cross Section



G - Type **H** - Type

M0: IC is metric

Spare Parts

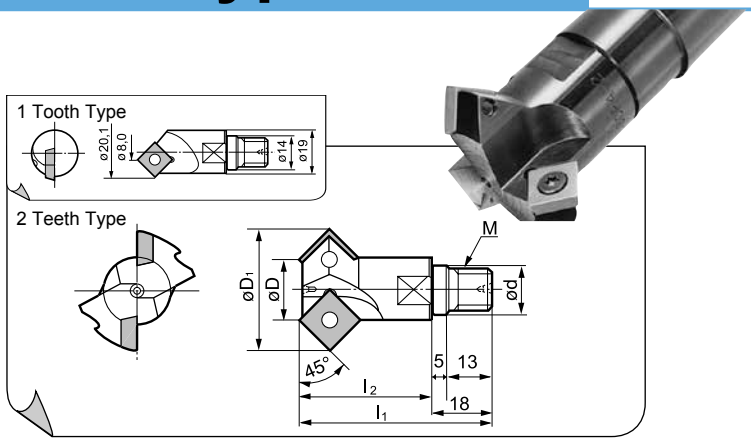
Applicable Cutters	Wrench	Screw	Recommended Tightening Torque (N·m)
RSX(F) 10000M	TRDR15IP	BFTX03584IP	**3,0**
RSX(F) 12000M		BFTX0409IP	**3,0**

Cutter Identification

RSX	F	10	025	M12	Z3
Cutter Series	Fine Pitch Type	Insert Size	Cutter Diameter	Mounting Screw Size	No. of Teeth



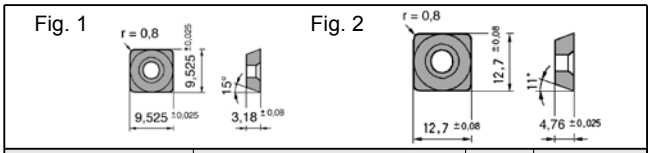
SCP Type



Body

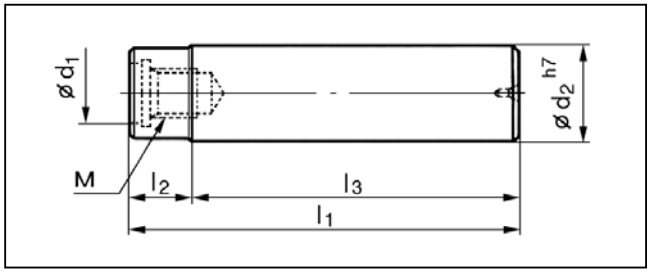
Cat. No.	Stock	Dimensions (mm)						No. of teeth
		ø D	ø D1	ød	l1	l2	M	
SCP 308	●	8	20,1	14	50	32	M12	1
SCP 419	●	19	35,6	14	56	38	M12	2
SCP 432	●	32	48,6	20	60	42	M16	3

Inserts



Cat. No.	Carbide				Fig.	Applicable Endmill
	A30N	G10E				
SDMA 090308		●			1.	SCP 308
SDMA 090308 T	●					
SPMA 120408		●			2.	SCP 419 SCP 432
SPMA 120408 T	●					

Holder for SCP

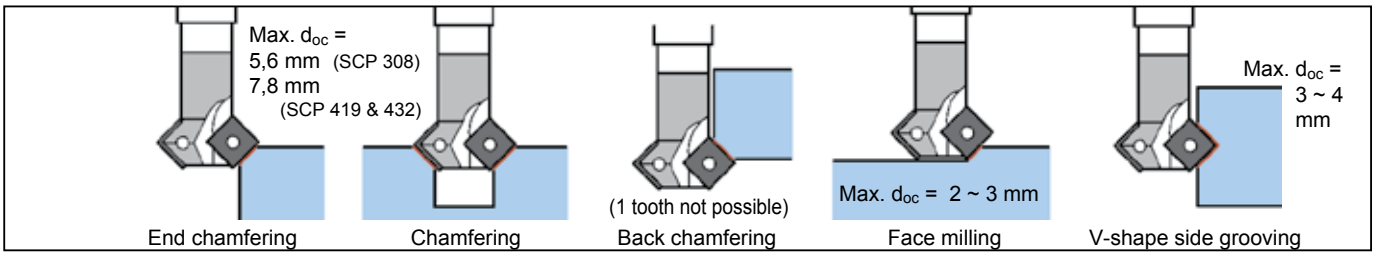


Cat. No.	Stock	Dimensions (mm)						Applicable Endmill
		ød1	ød2	M	l1	l2	l3	
SCA 20	●	14	20	M12	105	20	85	SCP 308 SCP 419
SCA 32	●	20	32	M16	130	20	110	SCP 432

Spare Parts

SCP	Screw	Wrench
		
308	BFTX 0407 N	TRX 10
419, 432	BFTX 0511 N	TRX 20

Application Examples



Recommended Cutting Conditions for SCP

(min. - **optimal** - max.)

Multi-Mills	ø D (mm)	Tooling	Cutting Conditions	General steel			Cast iron
				Less than HRC25	HRC25 ~ 35	HRC35 ~ 45	(GG20)
SCP 308	8,5 ~ 19,5	Chamfering	v_c (m/min)	80 - **100** - 140	50 - **60** - 80	20 - **40** - 60	90 - **110** - 130
			f_t (mm/tooth)	0,15 - 0,4	0,1 - 0,25	0,05 - 0,15	0,2 - 0,5
SCP 419	19,5 ~ 35,1	Face milling	v_c (m/min)	80 - **100** - 140	50 - **60** - 80	20 - **40** - 60	90 - **110** - 130
SCP 432	32,5 ~ 48,1		f_t (mm/tooth)	0,1 - 0,2	0,05 - 0,1	0,04 - 0,08	0,1 - 0,3

● = Euro stock

Coated & Solid Endmills

J1 ~ J50





Selection Guide	According to Work Materials	J 2 - 3
	New Global Standard Endmills	J 4 - 6

Coated Endmills

GSX MILL Series	**GSX** 20000	J 7 -11
	GSX 30000	J12-13
Slotted Type	**GSXSLT** 30000	J14
	GSX 40000	J15-19
Anti-Vibration Type	**GSXVL** 40000	J20-21
SSEH MILL Series for Exotic Alloys	**SSEHVL** 4000W-R / **SSEH** 4000W-R	J22-24
GS MILL Series	**GLM** 4000SF/SF-R	J25
Hard Type	**GSH** 4000/6000/8000SF	J26
Roughing Type	**GSRE** 4000SF	J27
UP MILL Series	**SSUP** 4000ZX/ZX-R	J28-29
AURORA COAT MILL Series	**ASM** 2000/4000DL / DL-R	J30-31
Standard Type	**SSM** 2000/4000ZX	J32
Long Type	**LSM** 2000/4000ZX	J33
Hard Type	**LHHM** 4000/6000/8000ZX	J34
	EHHM 4000/6000/8000ZX	J34
Fast Helix Type	**HSM** 2000/3000/4000ZX	J35
GSX Mills Ball Type	**GSXB** 20000	J36
GS Mills Ball Type	**GLB** 2000SF	J37
Ball Mills "Neo"	**SNB** 2000ZX	J38-39
AURORA COAT Ball Type	**SNB** 2000DL	J40

Uncoated Endmills

SSEH MILL Series for Exotic Alloys	**SSEHVL** 4000-R / **SSEH** 4000-R	J41
Standard Type	**SSM** 2000/4000	J42-43
Long Type	**LSM** 2000/4000	J44
Extra LongType	**ELSM** 2000/4000	J45
Fast Helix Type	**HSM** 2000/3000/4000	J46
For Aluminium Cutting	**ASM** 4000	J47
Straight Flute Ball Type	**BSM** 2000	J47
SUMIBORON "Helical Master" for Hardened Steel	**BNES** 1000	J48
SUMIBORON "Mould Finish Master" for Hardened Steel	**BNBP** 2R…4/6	J49

● According to Work Materials

Square Type

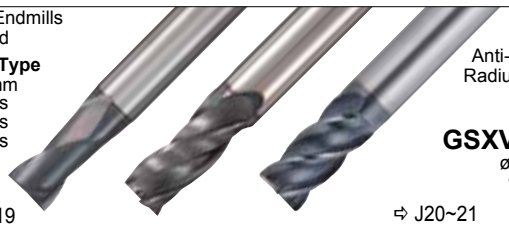
Legend: Grade | Edge Type | Usage

General Steel (Common Use)

Coated | Sharp | General

Global Endmills
Standard
GSX Type
ø1~25mm
•2 Flutes
•3 Flutes
•4 Flutes

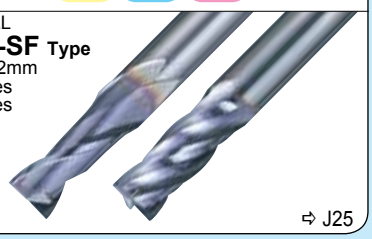
Anti-Vibration
Radius Corner
Endmills
GSXVL Type
ø2~25mm
•4 Flutes



⇨ J7~19 ⇨ J20~21

Coated | Sharp | General

GS MILL
GLM-SF Type
ø0,5~12mm
•2 Flutes
•4 Flutes



⇨ J25

Coated | Sharp | General

ZX-COATED
SSM-ZX Type
ø0,3~32mm
•2 Flutes
•4 Flutes



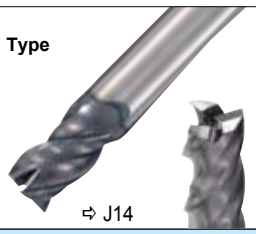
⇨ J32

General Steel (Special Use)

Plunge Cut
Multi-Purpose

Coated | Sharp | General

GSX MILL
GSXSLT Type
ø1~16mm
•3 Flutes



⇨ J14

High Efficiency

Coated | Strong | High Efficiency

UPMILL
SSUP-ZX Type
ø2~20mm
•4 Flutes



⇨ J28~29

High Efficiency

Coated | Strong | High Efficiency

ROUGHING ENDMILL
GSRE-SFType
ø6~20mm
•4 Flutes



⇨ J27

Hardened Steel

High performance Type

Coated | Strong | High Efficiency

GS-MILL-HARD
GSH-SF Type
ø1~20mm
•4 Flutes
•6 Flutes
•8 Flutes



⇨ J26

High Rigidity Type

Coated | Strong | High Efficiency

HARD ENDMILL
LHHM...ZX
EHHM...ZX
ø3~32mm
•4 Flutes
•6 Flutes
•8 Flutes



⇨ J34

SumiBoron Endmill

CBN

"Helical Master"
BNES Type
ø6~16mm
•1 Flute



⇨ J48, M34

Non-ferrous Metal

SumiDia Endmill

PCD

SUMIDIA brazed
DFE Type
ø4~13mm
•1 Flute
•2 Flutes
•4 Flutes



⇨ Stock in Japan

DLC-Coated Endmill

Coated | Sharp | General

AURORA COATED
ASM-DL Type
ø2~16mm
•2 Flutes
•4 Flutes



⇨ J30~31

Exotic Metals

For Heat Resistive Steel

Coated | Sharp | General

Radius Endmills
Standard
SSEH Type
ø4,5~25mm
•4 Flutes

Anti-Vibration
Radius Endmills
SSEHVL Type
ø4,5~25mm
•4 Flut



⇨ J22, J24, J41 ⇨ J22~23, J41

For Heat Resistive Steel

Coated | Strong | High Efficiency

ZX-COATED HI-HELIX
HSM-ZX Type
ø2~25mm
•2 Flutes
•3 Flutes
•4 Flutes



⇨ J35

● According to Work Materials

Ballnose Type

General Steel (Common Use)

Coated | General
GSX MILL BALL
GSXB Type
R0,2~12,5mm
•2 Flutes

⇨ J36

Coated | General
GS MILL BALL
GLB-SF Type
R0,5~6mm
•2 Flutes

⇨ J37

Coated | General
NEOBALL
SNB-ZX Type
R0,5~15mm
•2 Flutes

⇨ J38~39

General Steel (Short Series)

Coated | Short | General
NEOBALL SHORT FLUTE
S-SNB-ZX Type
R1,5~15mm
•2 Flutes

⇨ Stock in Japan

Coated | Short | General
ZX-COATED SHORT FLUTE
S-SSB-ZX Type
R1,5~4mm
•2 Flutes

⇨ Stock in Japan

General Steel (Long Series)

Coated | Long | General
NEOBALL (LONG TYPE)
LSNB-ZX Type
R0,5~15mm
•2 Flutes

⇨ Stock in Japan

Coated | Long | General
NEOBALL (EXTRA-LONG TYPE)
ESNB-ZX Type
R3~15mm
•2 Flutes

⇨ Stock in Japan

Hardened Steel

High Rigidity Type

Coated | Strong | High Efficiency
HARDBALL
SHB-ZX Type
R0,5~10mm
•2 Flutes

⇨ Stock in Japan

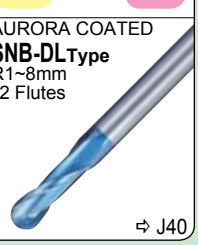
Hardened Steel

CBN | MOULD FINISH MASTER
SUMIBORON brazed
BNBP Type
R0,2~1,0mm
•2 Flutes

⇨ J49, M35

Non-ferrous Metal

DLC-Coated Endmill

Coated | General
AURORA COATED
SNB-DL Type
R1~8mm
•2 Flutes

⇨ J40

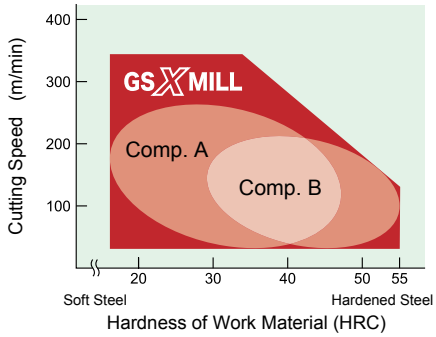
GSX MILL Series



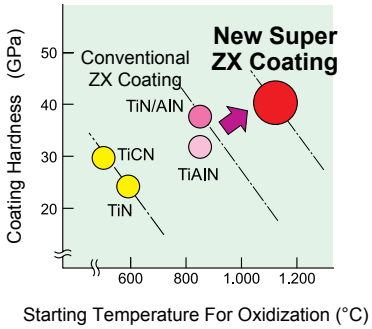
■ Characteristics and Applications

- Wide variation of three flute types and four flute lengths enable use in a wide variety of applications.
- Fine carbide substrate provides high transverse rupture strength and excellent thermal shock resistance improving reliability in wet cutting applications.
- GSX Coating provides improved reliability and longer tool life.
- Large rake angle and unique flute design improve sharpness and chip evacuation.
- Cutting teeth with gash land improves corner flute strength.
- Sharper edge S type and fracture resistant C type added to the 2D size series.

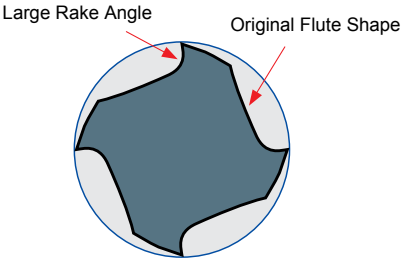
● Wear Resistance



● Thermal Resistance



● Improved Chip Evacuation

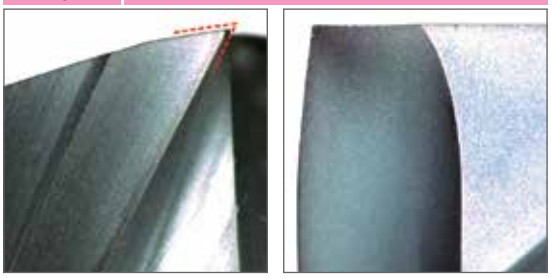


Large rake angle combined with our unique flute design improves sharpness and chip evacuation.

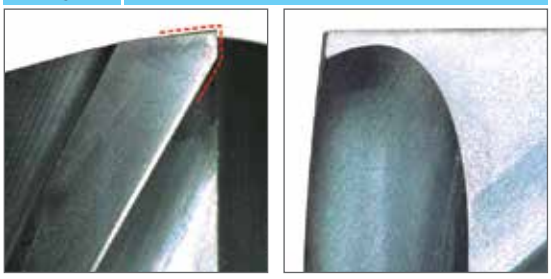
■ 2 cutting edge designs expand machining applications

Sharper edge S type and fracture resistant C type added to the 2D size series.

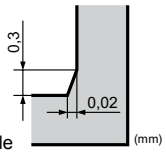
S Type Sharp Corner: Sharper Edge Design



C Type Gash Land: Fracture Resistant Design



Note: In gash land drilling, some material remains as shown on the right. If you need sharp corners, use the S Type.



Ex.: Corner on a ø10mm hole

■ Application Range

P					H			M	S		K	N		
General Structure Rolled Steel	Carbon Steel	Alloy Steel	Pre-hardened Steel	Tempered Die Steel	Hardened Steel 45 ~ 55 HRC	Hardened Steel 55 ~ 60 HRC	Hardened Steel 60 ~ 65 HRC	Stainless Steel	Ti Alloy	Heat Resistant Alloy	Cast Iron	Al Alloy	Cu Alloy	Graphite
○	◎	◎	◎	◎	◎ *1			◎	○	○	○			

◎ : Best
○ : Good

Blank : Not recommended
*1: GSXSLT30000C is recommended for 50 HRC or less

■ Recommended Milling Examples

Application	Surface Milling		Grooving		Groove Finishing	
Form						
	Rough	Finishing	Rough	Finishing	Rough	Finishing
S Type		◎		○ *2		◎
C Type	◎	○	◎	◎	◎	○

S Type is best for removing inside corners.

*2: Use with small depth of cut.

GSX MILL Series



Large rake angle and unique flute design improve sharpness and excellent chip evacuation.

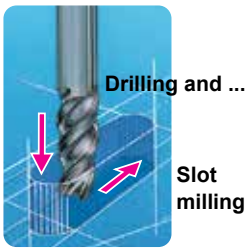
■ Product Range

Application	No. of Teeth	Flute Length				
		1,5 D	2 D		3 D	4 D
		C Type	S Type	C Type	C Type	C Type
General Purpose	2 Flutes	GSX20000C-1.5D  ⇨ J 7	GSX20000S-2D  ⇨ J 8	GSX20000C-2D  ⇨ J 9	GSX20000C-3D  ⇨ J 10	GSX20000C-4D  ⇨ J 11
	3 Flutes	GSX30000C-1.5D  ⇨ J 12		GSX30000C-2D  ⇨ J 13		
	4 Flutes	GSX40000C-1.5D  ⇨ J 15	GSX40000S-2D  ⇨ J 16	GSX40000C-2D  ⇨ J 17	GSX40000C-3D  ⇨ J 18	GSX40000C-4D  ⇨ J 19
Compound Endmilling	3 Flutes	GSXSLT30000C-1.5D  ⇨ J 14				

■ Multi-Purpose "GSX-SLT" Slot Type

● Optimized flute design of slotted 3 flute (1.5D) short type reduces cutting resistance.

① Allows drilling and slot milling and other continuous (compound) applications.
② Perfect for use with thin sheets and small machining centres





■ Application Examples

● Carbon Steel Grooving with GSX20000C

GSX 20000C | Competitor



Gash land for stronger cutting edge.

Tool dimension	ø6 (2 Flutes)
Work material	C50
Cutting speed	v_c = 87 m/min
	n = 4615 rpm
Feed rate	f_t = 0,06 mm/teeth
	v_f = 553 mm/min
Depth of cut	d_{oc} = 3 mm
Wide of cut	w_{oc} = 6 mm
Cooland	Dry
Vertical machining centre (BT50)	

● Cast Iron Grooving with GSX20000C

GSX 20000C | Competitor

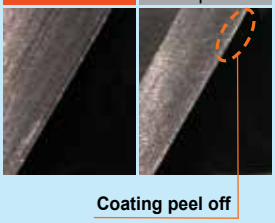


GSX coating for improved wear resistance.

Tool dimension	ø10 (2 Flutes)
Work material	GGG60
Cutting speed	v_c = 66 m/min
	n = 2100 rpm
Feed rate	f_t = 0,072 mm/teeth
	v_f = 302 mm/min
Depth of cut	d_{oc} = 5 mm, 5 passes
Wide of cut	w_{oc} = 10 mm
Cooland	Dry
Vertical machining centre (BT40)	

● Stainless Steel Machining with GSX20000C

GSX 20000C | Competitor

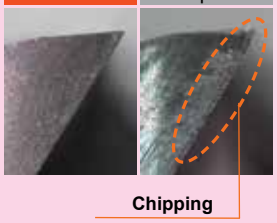


Improved reliability even under wet machining.

Tool dimension	ø10 (2 Flutes)
Work material	X5 CrNi 1812
Cutting speed	v_c = 50 m/min
	n = 1591 rpm
Feed rate	f_t = 0,04 mm/teeth
	v_f = 27 mm/min
Depth of cut	d_{oc} = 10 mm
Wide of cut	w_{oc} = 0,5 mm
Cooland	Wet
Vertical machining centre (BT50)	

● Surface Milling C50 with GSX20000S

GSX 20000S | Competitor



S type delivers optimum cutting performance.

Tool dimension	ø6 (2 Flutes)
Work material	C50
Cutting speed	v_c = 87 m/min
	n = 4615 rpm
Feed rate	f_t = 0,06 mm/teeth
	v_f = 553 mm/min
Depth of cut	d_{oc} = 10 mm
Wide of cut	w_{oc} = 0,3 mm
Cooland	Dry
Vertical machining centre (BT50)	

GSX MILL Series



☞ J 20, J 21

GSX MILL Anti-vibration Type (Square/Radius)

■ Characteristics and Applications

- Optimized irregular pitch and lead affords:
  - Drastically improved chattering and fracture resistance !
  - Less cutting force Allows high-speed, high-feed cutting.
- Rounded lands greatly improve machined surface quality (from ø4 and up).
- New fine-grained carbide substrate and special coating for better rigidity and thermal and wear resistance.

■ Product Range

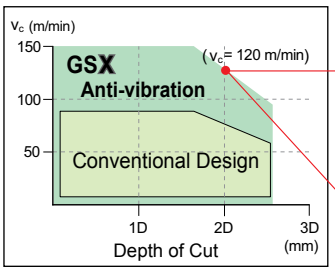
GSX MILL Anti-vibration Square Type

Series	No. of Teeth	Serie	øD (mm)
GSXVL4000-2.5D	4 Flutes	 ⇨ J 20	ø2 ~ ø20

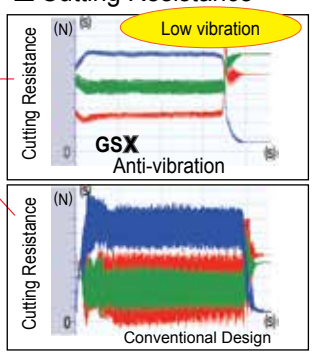
GSX MILL Anti-vibration Corner Radius Type

Series	No. of Teeth	Serie	øD (mm)
GSXVL4000-R-2.5D	4 Flutes	 ⇨ J 21	ø3 ~ ø20

■ Cutting Range



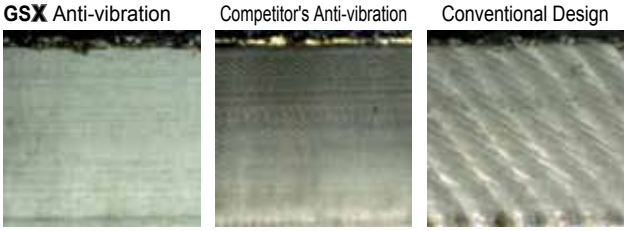
■ Cutting Resistance



■ Application Range

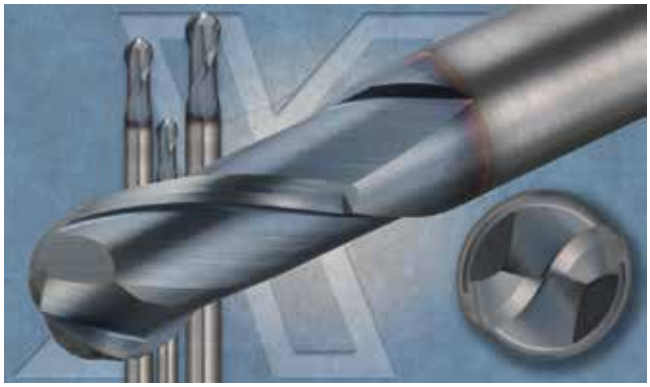
● Surface Finish Quality

GSX Anti-vibration | Competitor's Anti-vibration | Conventional Design



No Chattering Clean Surface | Minute Chattering Poor Surface | Heavy Chattering Poor Surface

Work material:	C50	Cutting Conditions:	n = 4.800 rpm v_f = 800 mm/min
Grooving:		Depth of cut	d_{oc} = 10 mm
Tool dimension:	ø10	Equipment:	BT50



☞ J 36

GSX MILL Ball

■ Characteristics and Applications

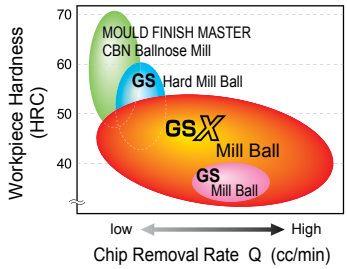
- New coating combined with a fine-grained carbide substrate affords better thermal and wear resistance.
- Large helix angle on cutting edge reduces cutting resistance.
- Unique pocket design and expanded pocket area promotes better chip evacuation.

☞ Expands the range of machineable material from soft to hardened steels, and offers reliability and longer tool life.

■ Product Range

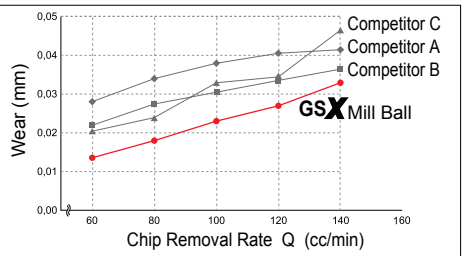
Series	No. of Teeth	Serie	øD (mm)
GSX-B 20000	2 Flutes	 ⇨ J 36	Rø0,2 ~ ø15 (øD=0,2 ~ 30)

■ Application Range



■ Application Examples

● Flank Wear



GSX Ball (Cutting Length 140 m)



Able to continue



Conventional Tool (Cutting Length 80 m)



Unable to continue



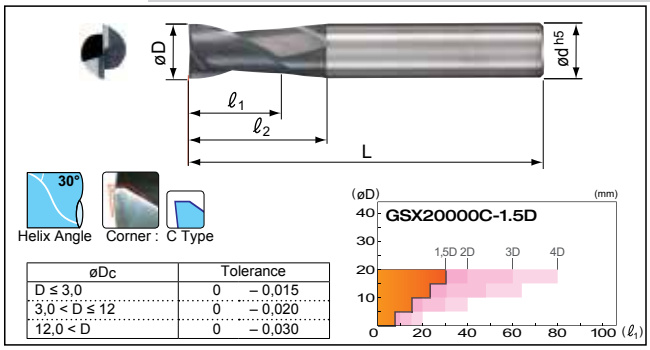
Work Material : X40CrVMo5-1 (50HRC)
Tool Dimensions : R3 (2 Flutes)
Cutting Conditions : v_c= 179 m/min (n = 9.500 rpm)
v_f= 2.250 mm/min (f_t = 0,12 mm/t)
d_{oc} = 0,2 ~ 1,0 mm, w_{oc} =0,3 mm, Wet
Equipment Vertical Machining Centre BT40

Chipping in centre
Heavy wear on flank face

● = Euro stock

GSX MILL Endmills
GSX 20000C-1.5D Type

Coated Carbide Grades	GSX Coating	Structural Steel	Carbon Steel	Alloy Steel	Pre-hardened Steel	Tempered Die Steel	Hardened Steel 45~55 HRC	Hardened Steel 55~60 HRC	Hardened Steel 60~65 HRC	Stainless Steel	Ti Alloy / Heat Resistant Alloy	Cast Iron	Al Alloy	Cu Alloy	Graphite
		○	◎	◎	◎	◎	◎	○		◎	○	○			



øDc	Tolerance
D ≤ 3,0	0 – 0,015
3,0 < D ≤ 12	0 – 0,020
12,0 < D	0 – 0,030

Grade: ACF20

■ Endmills

(mm)

Cat. No.	Stock	øD	ℓ_1	ℓ_2	L	ød
GSX 20100C-1.5D	●	1,0	1,5	2,5	40	4
GSX 20150C-1.5D	●	1,5	2,3	3,3	40	4
GSX 20200C-1.5D	●	2,0	3,0	4,0	40	4
GSX 20250C-1.5D	●	2,5	3,8	4,8	40	4
GSX 20300C-1.5D	●	3,0	4,5	6,0	45	6
GSX 20350C-1.5D	●	3,5	5,3	6,8	45	6
GSX 20400C-1.5D	●	4,0	6,0	7,5	45	6
GSX 20450C-1.5D	●	4,5	6,8	8,3	50	6
GSX 20500C-1.5D	●	5,0	7,5	9,5	50	6
GSX 20550C-1.5D	●	5,5	8,3	10,3	50	6
GSX 20600C-1.5D	●	6,0	9,0	–	50	6
GSX 20700C-1.5D	●	7,0	11,0	13,0	60	8
GSX 20800C-1.5D	●	8,0	12,0	–	60	8
GSX 20900C-1.5D	●	9,0	14,0	16,0	70	10
GSX 21000C-1.5D	●	10,0	15,0	–	70	10
GSX 21200C-1.5D	●	12,0	18,0	–	75	12
GSX 21400C-1.5D		14,0	21,0	24,5	90	16
GSX 21500C-1.5D		15,0	23,0	26,5	90	16
GSX 21600C-1.5D		16,0	24,0	–	90	16
GSX 22000C-1.5D		20,0	30,0	–	100	20

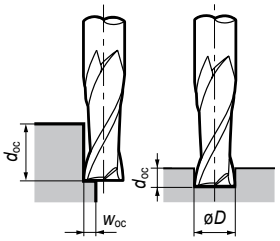
■ Endmill Identification (GSX MILL Series)

GSX 2 0100 C - 1.5D

① Series Code	② No. of Teeth	③ Diameter	④ Cutting Edge	⑤ Cutting Edge Length
			(S: Sharp Edge C: Gash Land Drilling)	

■ Recommended cutting conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blowing when dry machining.
3. Use wet machining for stainless steel, heat resistant alloy, and titanium alloy applications.
4. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.



● Shoulder Milling

Work Material / Cond. / øD (mm)	Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0	19.600	250	19.600	250	19.600	250	18.300	180	12.700	100	9.000	60	11.000	70	9.000	50
2,0	11.200	340	11.200	340	11.200	340	10.500	240	7.300	130	5.300	80	6.400	90	5.300	70
4,0	6.400	460	6.400	460	6.400	460	6.000	320	4.200	180	3.000	110	3.600	120	3.000	90
6,0	4.600	560	4.600	560	4.600	560	4.300	400	3.000	210	2.200	130	2.700	140	2.200	100
8,0	3.400	560	3.400	560	3.400	560	3.200	400	2.200	210	1.600	130	2.000	140	1.600	100
10,0	2.800	560	2.800	560	2.800	560	2.600	400	1.800	210	1.300	130	1.600	140	1.300	100
12,0	2.300	560	2.300	560	2.300	560	2.200	400	1.500	210	1.100	130	1.300	140	1.100	100
16,0	1.700	450	1.700	450	1.700	450	1.600	320	1.100	180	800	100	1.000	110	800	85
20,0	1.350	380	1.350	380	1.350	380	1.300	280	900	160	650	90	800	100	650	75
Shoulder cutting d_{oc}	1,5 *D*										1,0 *D*					
Shoulder cutting w_{oc}	0,05 *D*										0,02 *D*					

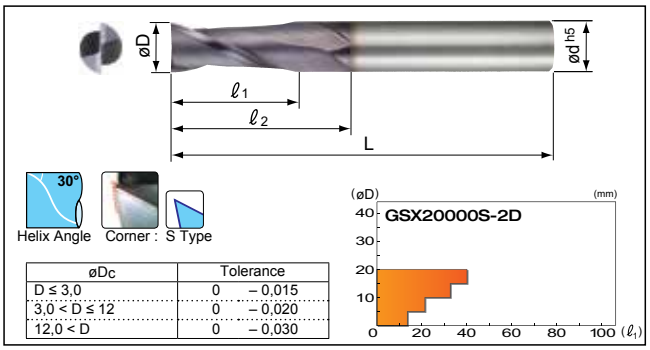
● Grooving

Work Material / Cond. / øD (mm)	Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0	19.600	200	19.600	250	19.600	250	18.300	180	12.700	100	9.000	60	11.000	50	4.500	20
2,0	11.200	270	11.200	340	11.200	340	10.500	240	7.300	130	5.300	80	6.400	65	2.650	25
4,0	6.400	370	6.400	460	6.400	460	6.000	320	4.200	180	3.000	110	3.600	80	1.500	35
6,0	4.600	450	4.600	560	4.600	560	4.300	400	3.000	210	2.200	130	2.700	100	1.100	40
8,0	3.400	450	3.400	560	3.400	560	3.200	400	2.200	210	1.600	130	2.000	100	800	40
10,0	2.800	450	2.800	560	2.800	560	2.600	400	1.800	210	1.300	130	1.600	100	650	40
12,0	2.300	450	2.300	560	2.300	560	2.200	400	1.500	210	1.100	130	1.300	100	500	40
16,0	1.700	360	1.700	450	1.700	450	1.600	320	1.100	180	800	100	1.000	80	400	35
20,0	1.350	300	1.350	380	1.350	380	1.300	280	900	160	650	90	800	70	320	30
Grooving d_{oc}	0,2 *D*		0,5 *D*						0,2 *D*		0,05 *D*		0,2 *D*			

GSX 20000S-2D Type

Coated Carbide Grades | GSX Coating

Structural Steel	Carbon Steel	Alloy Steel	Pre-hardened Steel	Tempered Die Steel	Hardened Steel 45~55 HRC	Hardened Steel 55~60 HRC	Hardened Steel 60~65 HRC	Stainless Steel	Ti Alloy / Heat Resistant Alloy	Cast iron	Al Alloy	Cu Alloy	Graphite
○	◎	◎	◎	◎	◎	○		◎	○	○			



øDc	Tolerance
D ≤ 3,0	0 – 0,015
3,0 < D ≤ 12	0 – 0,020
12,0 < D	0 – 0,030

Grade: ACF20

■ Endmills

(mm)

Cat. No.	Stock	øD	ℓ_1	ℓ_2	L	ød
GSX 20050S-2D	●	0,5	1,3	1,7	40	4
GSX 20100S-2D	●	1,0	2,5	3,5	40	4
GSX 20150S-2D	●	1,5	3,8	4,8	40	4
GSX 20200S-2D	●	2,0	5,0	6,0	40	4
GSX 20250S-2D	●	2,5	6,3	7,3	40	4
GSX 20300S-2D	●	3,0	7,5	9,0	45	6
GSX 20350S-2D	●	3,5	8,8	10,3	45	6
GSX 20400S-2D	●	4,0	11,0	14,0	45	6
GSX 20450S-2D	●	4,5	11,3	12,8	50	6
GSX 20500S-2D	●	5,0	13,0	19,6	50	6
GSX 20550S-2D	●	5,5	13,0	19,6	50	6
GSX 20600S-2D	●	6,0	13,0	–	50	6
GSX 20700S-2D	●	7,0	16,0	21,1	60	8
GSX 20800S-2D	●	8,0	19,0	–	60	8
GSX 20900S-2D	●	9,0	19,0	24,1	70	10
GSX 21000S-2D	●	10,0	22,0	–	70	10
GSX 21200S-2D	●	12,0	26,0	–	75	12
GSX 21600S-2D	●	16,0	32,0	–	90	16
GSX 22000S-2D	●	20,0	40,0	–	100	20

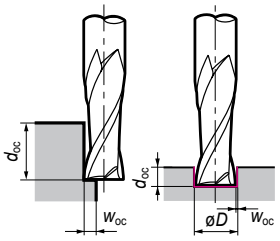
■ Endmill Identification (GSX MILL Series)

GSX 2 0050 S - 2D

① Series Code	② No. of Teeth	③ Diameter	④ Cutting Edge	⑤ Cutting Edge Length
			(S: Sharp Edge C: Gash Land Drilling)	

■ Recommended cutting conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blowing when dry machining.
3. Use wet machining for stainless steel, heat resistant alloy, and titanium alloy applications.
4. If chattering is a problem, reduce the spindle speed and feed rate indicated in the table below by the same ratio, or reduce the depth of cut.
5. This series is not recommended for grooving.
6. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.



● Shoulder Milling

Work Material / Cond.	Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
øD (mm)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0	16.600	180	16.600	180	16.600	180	15.500	130	10.500	70	7.500	45	9.400	50	7.500	35
2,0	9.500	250	9.500	250	9.500	250	9.000	200	6.200	100	4.500	60	5.400	70	4.500	50
4,0	5.400	330	5.400	330	5.400	330	5.000	250	3.400	120	2.500	75	3.000	90	2.500	65
6,0	4.000	400	4.000	400	4.000	400	3.700	300	2.550	150	1.900	100	2.300	110	1.900	80
8,0	3.000	400	3.000	400	3.000	400	2.800	300	1.900	150	1.400	100	1.700	110	1.400	80
10,0	2.400	400	2.400	400	2.400	400	2.200	300	1.500	150	1.100	100	1.300	110	1.100	80
12,0	2.000	400	2.000	400	2.000	400	1.850	300	1.300	150	950	100	1.100	110	950	80
16,0	1.500	330	1.500	330	1.500	330	1.400	250	950	120	700	75	850	85	700	60
20,0	1.200	280	1.200	280	1.200	280	1.100	220	750	110	550	65	650	75	550	55
Shoulder cutting d_{oc}	1,5 *D*										1,0 *D*					
Shoulder cutting W_{oc}	0,05 *D*										0,02 *D*					

● Groove Finishing

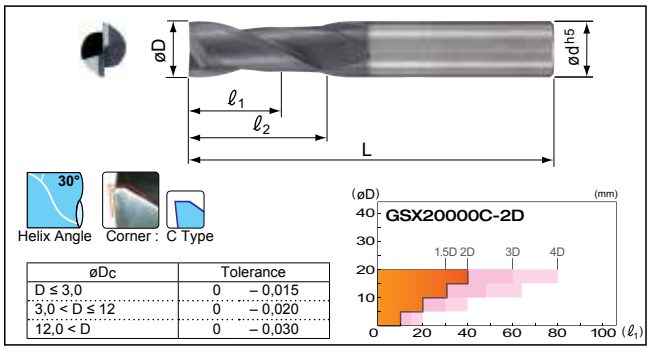
Work Material / Cond.	Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
øD (mm)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0	16.600	180	16.600	180	16.600	180	15.500	130	10.500	70	7.500	45	9.400	50	7.500	35
2,0	9.500	250	9.500	250	9.500	250	9.000	200	6.200	100	4.500	60	5.400	70	4.500	50
4,0	5.400	330	5.400	330	5.400	330	5.000	250	3.400	120	2.500	75	3.000	90	2.500	65
6,0	4.000	400	4.000	400	4.000	400	3.700	300	2.550	150	1.900	100	2.300	110	1.900	80
8,0	3.000	400	3.000	400	3.000	400	2.800	300	1.900	150	1.400	100	1.700	110	1.400	80
10,0	2.400	400	2.400	400	2.400	400	2.200	300	1.500	150	1.100	100	1.300	110	1.100	80
12,0	2.000	400	2.000	400	2.000	400	1.850	300	1.300	150	950	100	1.100	110	950	80
16,0	1.500	330	1.500	330	1.500	330	1.400	250	950	120	700	75	850	85	700	60
20,0	1.200	280	1.200	280	1.200	280	1.100	220	750	110	550	65	650	75	550	55
Groove finishing d_{oc}	1,5 *D*															
Groove finishing W_{oc}	~ 0,02 *D*															

● = Euro stock

GSX MILL Endmills
GSX 20000C-2D Type

Coated Carbide Grades | GSX Coating

Structural Steel	Carbon Steel	Alloy Steel	Pre-hardened Steel	Tempered Die Steel	Hardened Steel 45~55 HRC	Hardened Steel 55~60 HRC	Hardened Steel 60~65 HRC	Stainless Steel	Ti Alloy / Heat Resistant Alloy	Cast iron	Al Alloy	Cu Alloy	Graphite
○	◎	◎	◎	◎	◎	○		◎	○	○			



øDc	Tolerance
D ≤ 3,0	0 – 0,015
3,0 < D ≤ 12	0 – 0,020
12,0 < D	0 – 0,030

Grade: ACF20

■ Endmills

(mm)

Cat. No.	Stock	øD	ℓ1	ℓ2	L	ød
GSX 20050C-2D	●	0,5	1,0	1,4	40	4
GSX 20100C-2D	●	1,0	2,0	3,0	40	4
GSX 20150C-2D	●	1,5	3,0	4,0	40	4
GSX 20200C-2D	●	2,0	4,0	5,0	40	4
GSX 20250C-2D	●	2,5	5,0	6,0	40	4
GSX 20300C-2D	●	3,0	6,0	7,5	45	6
GSX 20350C-2D	●	3,5	7,0	8,5	45	6
GSX 20400C-2D	●	4,0	8,0	9,5	45	6
GSX 20450C-2D	●	4,5	9,0	10,5	50	6
GSX 20500C-2D	●	5,0	10,0	12,0	50	6
GSX 20550C-2D	●	5,5	11,0	13,0	50	6
GSX 20600C-2D	●	6,0	12,0	—	50	6
GSX 20700C-2D	●	7,0	14,0	16,0	60	8
GSX 20800C-2D	●	8,0	16,0	—	60	8
GSX 20900C-2D	●	9,0	18,0	20,0	70	10
GSX 21000C-2D	●	10,0	20,0	—	70	10
GSX 21200C-2D	●	12,0	24,0	—	75	12
GSX 21400C-2D		14,0	28,0	31,5	90	16
GSX 21500C-2D		15,0	30,0	33,5	90	16
GSX 21600C-2D	●	16,0	32,0	—	90	16
GSX 22000C-2D	●	20,0	40,0	—	100	20

■ Endmill Identification (GSX MILL Series)

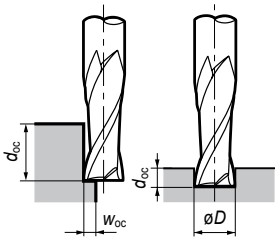
GSX 2 0050 C - 2D

①	②	③	④	⑤
Series Code	No. of Teeth	Diameter	Cutting Edge	Cutting Edge Length

④ (S: Sharp Edge, C: Gash Land Drilling)

■ Recommended cutting conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blowing when dry machining.
3. Use wet machining for stainless steel, heat resistant alloy, and titanium alloy applications.
4. If chattering is a problem, reduce the spindle speed and feed rate indicated in the table below by the same ratio, or reduce the depth of cut.
5. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.



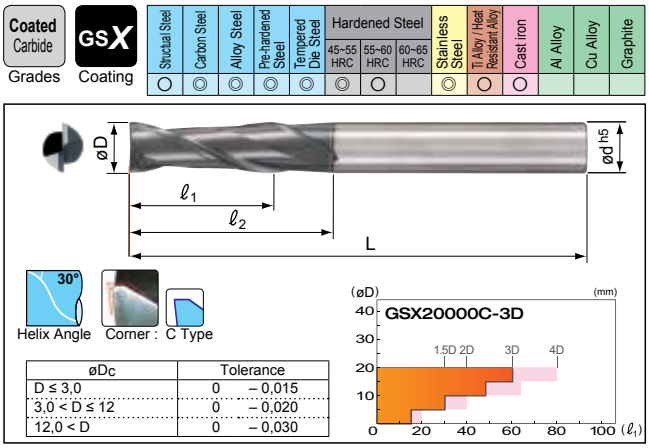
●Shoulder Milling

Work Material / Cond.	Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
øD (mm)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0	19.600	250	19.600	250	19.600	250	18.300	180	12.700	100	9.000	60	11.000	70	9.000	50
2,0	11.200	340	11.200	340	11.200	340	10.500	240	7.300	130	5.300	80	6.400	90	5.300	70
4,0	6.400	460	6.400	460	6.400	460	6.000	320	4.200	180	3.000	110	3.600	120	3.000	90
6,0	4.600	560	4.600	560	4.600	560	4.300	400	3.000	210	2.200	130	2.700	140	2.200	100
8,0	3.400	560	3.400	560	3.400	560	3.200	400	2.200	210	1.600	130	2.000	140	1.600	100
10,0	2.800	560	2.800	560	2.800	560	2.600	400	1.800	210	1.300	130	1.600	140	1.300	100
12,0	2.300	560	2.300	560	2.300	560	2.200	400	1.500	210	1.100	130	1.300	140	1.100	100
16,0	1.700	450	1.700	450	1.700	450	1.600	320	1.100	180	800	100	1.000	110	800	85
20,0	1.350	380	1.350	380	1.350	380	1.300	280	900	160	650	90	800	100	650	75
Shoulder cutting d_{oc}	1,5 *D*										1,0 *D*					
Shoulder cutting w_{oc}	0,05 *D*										0,02 *D*					

●Grooving

Work Material / Cond.	Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
øD (mm)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0	19.600	200	19.600	250	19.600	250	18.300	180	12.700	100	9.000	60	11.000	50	4.500	20
2,0	11.200	270	11.200	340	11.200	340	10.500	240	7.300	130	5.300	80	6.400	65	2.650	25
4,0	6.400	370	6.400	460	6.400	460	6.000	320	4.200	180	3.000	110	3.600	80	1.500	35
6,0	4.600	450	4.600	560	4.600	560	4.300	400	3.000	210	2.200	130	2.700	100	1.100	40
8,0	3.400	450	3.400	560	3.400	560	3.200	400	2.200	210	1.600	130	2.000	100	800	40
10,0	2.800	450	2.800	560	2.800	560	2.600	400	1.800	210	1.300	130	1.600	100	650	40
12,0	2.300	450	2.300	560	2.300	560	2.200	400	1.500	210	1.100	130	1.300	100	500	40
16,0	1.700	360	1.700	450	1.700	450	1.600	320	1.100	180	800	100	1.000	80	400	35
20,0	1.350	300	1.350	380	1.350	380	1.300	280	900	160	650	90	800	70	320	30
Grooving d_{oc}	0,2 *D*		0,5 *D*						0,2 *D*		0,05 *D*		0,2 *D*			

GSX 20000C-3D Type



Grade: ACF20

■ Endmills

(mm)

Cat. No.	Stock	øD	ℓ_1	ℓ_2	L	ød
GSX 20100C-3D	●	1,0	3,0	4,0	40	4
GSX 20150C-3D	●	1,5	4,5	5,5	40	4
GSX 20200C-3D	●	2,0	6,0	7,0	40	4
GSX 20250C-3D	●	2,5	7,5	8,5	40	4
GSX 20300C-3D	●	3,0	9,0	10,5	50	6
GSX 20400C-3D	●	4,0	12,0	13,5	50	6
GSX 20500C-3D	●	5,0	15,0	17,0	50	6
GSX 20600C-3D	●	6,0	18,0	—	50	6
GSX 20800C-3D	●	8,0	24,0	—	70	8
GSX 21000C-3D	●	10,0	30,0	—	90	10
GSX 21200C-3D	●	12,0	36,0	—	90	12
GSX 21600C-3D	●	16,0	48,0	—	110	16
GSX 22000C-3D		20,0	60,0	—	120	20

■ Endmill Identification (GSX MILL Series)

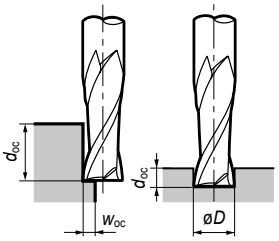
GSX 2 0100 C - 3D

①	②	③	④	⑤
Series Code	No. of Teeth	Diameter	Cutting Edge	Cutting Edge Length

(S: Sharp Edge
C: Gash Land Drilling)

■ Recommended cutting conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blowing when dry machining.
3. Use wet machining for stainless steel, heat resistant alloy, and titanium alloy applications.
4. In rare cases, chattering may occur in early milling stages, dissipating after 2m of cutting.
5. If chattering is a problem, reduce the spindle speed and feed rate indicated in the table below by the same ratio, or reduce the depth of cut.
6. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.



●Shoulder Milling

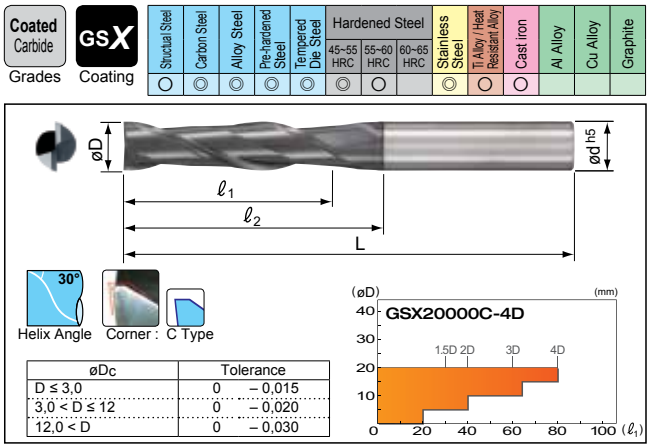
Work Material / Cond. / øD (mm)	Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0	16.600	190	16.600	190	16.600	190	15.500	140	10.500	70	7.500	45	9.400	50	7.500	35
2,0	9.500	250	9.500	250	9.500	250	9.000	200	6.200	120	4.500	60	5.200	70	4.500	50
4,0	5.200	330	5.200	330	5.200	330	4.800	200	3.400	150	2.250	75	2.600	90	2.250	65
6,0	3.500	360	3.500	360	3.500	360	3.200	250	2.550	170	1.500	90	1.700	100	1.500	80
8,0	2.600	320	2.600	320	2.600	320	2.400	240	1.900	170	1.100	90	1.300	105	1.100	80
10,0	2.100	300	2.100	300	2.100	300	1.900	230	1.500	170	900	90	1.000	100	900	80
12,0	1.750	280	1.750	280	1.750	280	1.600	230	1.250	170	750	90	850	100	750	80
16,0	1.300	240	1.300	240	1.300	240	1.200	200	950	150	550	75	650	85	550	65
20,0	1.050	220	1.050	220	1.050	220	950	180	750	140	450	70	500	75	450	60
Shoulder cutting d_{oc}	2,5 *D*								2,0 *D*							
Shoulder cutting w_{oc}	øD< 3: 0,05 *D* , 3 ≤ øD: 0,1 *D*								0,02 *D*							

●Grooving

Work Material / Cond. / øD (mm)	Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0	16.600	70	16.600	80	16.600	80	15.500	50	10.500	50	7.500	35	9.400	30	3.750	10
2,0	9.500	80	9.500	100	9.500	100	9.000	90	6.200	60	4.500	45	5.200	40	2.250	15
4,0	5.200	120	5.200	150	5.200	150	4.800	120	3.400	80	2.200	50	2.600	50	1.250	20
6,0	3.500	140	3.500	170	3.500	170	3.200	130	2.550	100	1.500	50	1.700	60	950	25
8,0	2.600	140	2.600	160	2.600	160	2.400	130	1.900	100	1.100	50	1.300	60	700	25
10,0	2.100	130	2.100	150	2.100	150	1.900	120	1.500	90	900	50	1.000	60	550	25
12,0	1.750	130	1.750	150	1.750	150	1.600	120	1.250	90	750	50	850	60	450	25
16,0	1.300	110	1.300	130	1.300	130	1.200	110	950	80	550	45	650	50	350	20
20,0	1.050	100	1.050	120	1.050	120	950	100	750	70	450	40	500	40	280	15
Grooving d_{oc} / w_{oc}	0,1 *D*		0,2 *D*								0,05 *D*		0,1 *D*			

● = Euro stock

GSX MILL Endmills
GSX 20000C-4D Type



Grade: ACF20

Endmills

(mm)

Cat. No.	Stock	øD	ℓ_1	ℓ_2	L	ød
GSX 20100C-4D	●	1,0	4,0	5,0	40	4
GSX 20150C-4D	●	1,5	6,0	7,0	40	4
GSX 20200C-4D	●	2,0	8,0	9,0	40	4
GSX 20250C-4D	●	2,5	10,0	11,0	50	4
GSX 20300C-4D	●	3,0	12,0	13,5	50	6
GSX 20400C-4D	●	4,0	16,0	17,5	50	6
GSX 20500C-4D	●	5,0	20,0	22,0	60	6
GSX 20600C-4D	●	6,0	24,0	–	60	6
GSX 20800C-4D	●	8,0	32,0	–	80	8
GSX 21000C-4D	●	10,0	40,0	–	90	10
GSX 21200C-4D	●	12,0	48,0	–	100	12
GSX 21600C-4D		16,0	64,0	–	120	16
GSX 22000C-4D		20,0	80,0	–	140	20

Endmill Identification (GSX MILL Series)

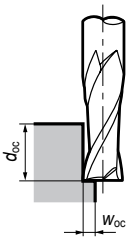
GSX 2 0100 C - 4D

①	②	③	④	⑤
Series Code	No. of Teeth	Diameter	Cutting Edge	Cutting Edge Length

(S: Sharp Edge
C: Gash Land Drilling)

Recommended cutting conditions

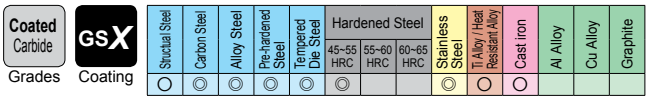
1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blowing when dry machining.
3. Use wet machining for stainless steel, heat resistant alloy, and titanium alloy applications.
4. In rear cases, chattering may occur in early milling stages, dissipating after 2m of cutting.
5. If chattering is a problem, reduce the spindle speed and feed rate indicated in the table below by the same ratio, or reduce the depth of cut.
6. This series is not recommended for grooving.
7. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

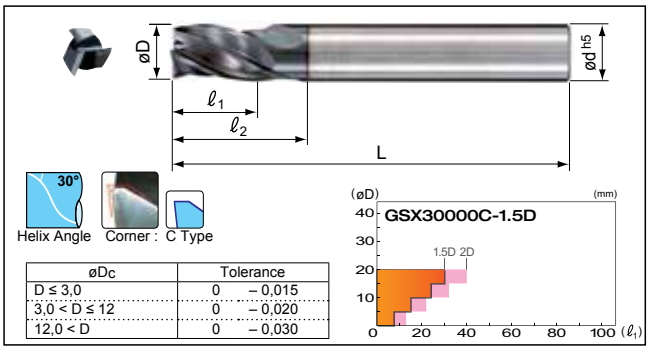


Shoulder Milling

Work Material / Cond.		Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
øD (mm)		Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0		9.000	130	9.000	130	9.000	130	7.000	95	6.500	50	4.500	30	5.400	40	4.500	25
2,0		4.500	180	4.500	180	4.500	180	3.500	120	3.200	70	2.300	40	2.700	50	2.300	35
4,0		2.250	240	2.250	240	2.250	240	1.750	160	1.600	95	1.200	60	1.350	65	1.200	40
6,0		1.500	300	1.500	300	1.500	300	1.150	170	1.050	110	800	70	900	70	800	50
8,0		1.100	260	1.100	260	1.100	260	850	170	800	110	600	70	660	70	600	50
10,0		900	250	900	250	900	250	700	160	650	110	460	70	540	70	460	50
12,0		750	240	750	240	750	240	580	160	520	110	400	70	450	70	400	50
16,0		550	200	550	200	550	200	440	140	400	95	300	55	330	60	300	45
20,0		450	180	450	180	450	180	350	120	320	85	240	45	270	50	240	40
Shoulder cutting	d_{oc}	3,5 *D*										3,0 *D*					
	w_{oc}	0,08 *D*						0,04 *D*									

GSX 30000C-1.5D Type





øDc	Tolerance
D ≤ 3,0	0 – 0,015
3,0 < D ≤ 12	0 – 0,020
12,0 < D	0 – 0,030

Grade: ACF20

■ Endmills

(mm)

Cat. No.	Stock	øD	ℓ_1	ℓ_2	L	ød
GSX 30100C-1.5D	●	1,0	1,5	2,5	40	4
GSX 30150C-1.5D	●	1,5	2,3	3,3	40	4
GSX 30200C-1.5D	●	2,0	3,0	4,0	40	4
GSX 30250C-1.5D	●	2,5	3,8	4,8	40	4
GSX 30300C-1.5D	●	3,0	4,5	6,0	45	6
GSX 30400C-1.5D	●	4,0	6,0	7,5	45	6
GSX 30500C-1.5D	●	5,0	7,5	9,5	50	6
GSX 30600C-1.5D	●	6,0	9,0	–	50	6
GSX 30700C-1.5D	●	7,0	11,0	13,0	60	8
GSX 30800C-1.5D	●	8,0	12,0	–	60	8
GSX 30900C-1.5D	●	9,0	14,0	16,0	70	10
GSX 31000C-1.5D	●	10,0	15,0	–	70	10
GSX 31200C-1.5D	●	12,0	18,0	–	75	12
GSX 31600C-1.5D		16,0	24,0	–	90	16
GSX 32000C-1.5D		20,0	30,0	–	100	20

■ Endmill Identification (GSX MILL Series)

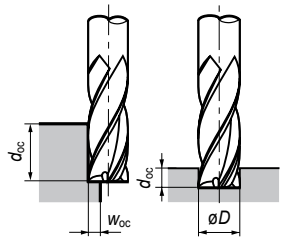
GSX 3 0100 C - 1.5D

①	②	③	④	⑤
Series Code	No. of Teeth	Diameter	Cutting Edge	Cutting Edge Length

(S: Sharp Edge
C: Gash Land Drilling)

■ Recommended cutting conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blowing when dry machining.
3. Use wet machining for stainless steel, heat resistant alloy, and titanium alloy applications.
4. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.



● Shoulder Milling

Work Material / Cond. / øD (mm)	Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0	19.600	300	19.600	300	19.600	300	18.300	210	12.700	130	9.000	80	11.000	90	9.000	65
2,0	11.200	410	11.200	410	11.200	410	10.500	280	7.300	170	5.300	100	6.400	120	5.300	90
4,0	6.400	550	6.400	550	6.400	550	6.000	370	4.200	230	3.000	140	3.600	150	3.000	120
6,0	4.600	670	4.600	670	4.600	670	4.300	460	3.000	270	2.200	170	2.700	180	2.200	130
8,0	3.400	670	3.400	670	3.400	670	3.200	460	2.200	270	1.600	170	2.000	180	1.600	130
10,0	2.800	670	2.800	670	2.800	670	2.600	460	1.800	270	1.300	170	1.600	180	1.300	130
12,0	2.300	670	2.300	670	2.300	670	2.200	460	1.500	270	1.100	170	1.300	180	1.100	130
16,0	1.700	550	1.700	550	1.700	550	1.600	370	1.100	230	800	140	1.000	150	800	100
20,0	1.350	490	1.350	490	1.350	490	1.300	330	900	210	650	120	800	130	650	90
Shoulder cutting d_{oc}	1,5 *D*								1,0 *D*							
Shoulder cutting w_{oc}	0,05 *D*								0,02 *D*							

● Grooving

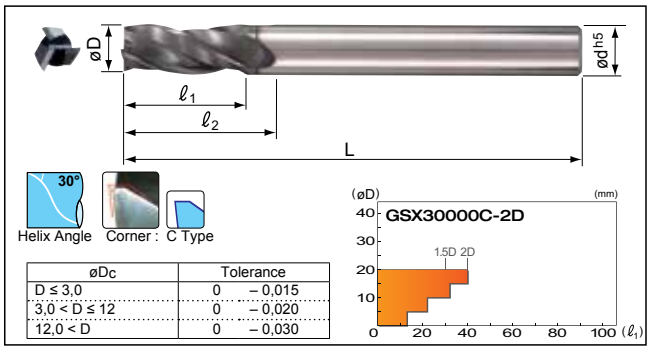
Work Material / Cond. / øD (mm)	Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0	19.600	240	19.600	300	19.600	300	18.300	210	12.700	130	9.000	80	11.000	65	4.500	25
2,0	11.200	320	11.200	410	11.200	410	10.500	280	7.300	170	5.300	100	6.400	85	2.650	35
4,0	6.400	450	6.400	550	6.400	550	6.000	370	4.200	230	3.000	140	3.600	100	1.500	50
6,0	4.600	540	4.600	670	4.600	670	4.300	460	3.000	270	2.200	170	2.650	130	1.150	55
8,0	3.400	540	3.400	670	3.400	670	3.200	460	2.200	270	1.600	170	2.000	130	800	55
10,0	2.800	540	2.800	670	2.800	670	2.600	460	1.800	270	1.300	170	1.600	130	650	55
12,0	2.300	540	2.300	670	2.300	670	2.200	460	1.500	270	1.100	170	1.300	130	500	55
16,0	1.700	440	1.700	550	1.700	550	1.600	370	1.100	230	800	140	1.000	110	400	45
20,0	1.350	390	1.350	490	1.350	490	1.300	330	900	210	650	120	800	90	320	40
Grooving d_{oc} / w_{oc}	0,2 *D*		0,5 *D*								0,05 *D*		0,2 *D*			

● = Euro stock

GSX MILL Endmills
GSX 30000C-2D Type

Coated Carbide Grades / GSX Coating

Structural Steel	Carbon Steel	Alloy Steel	Pre-hardened Steel	Tempered Die Steel	Hardened Steel 45~55 HRC	Hardened Steel 55~60 HRC	Hardened Steel 60~65 HRC	Stainless Steel	Ti Alloy / Heat Resistant Alloy	Cast Iron	Al Alloy	Cu Alloy	Graphite
○	◎	◎	◎	◎	◎			◎	○	○			



øDc	Tolerance
D ≤ 3,0	0 – 0,015
3,0 < D ≤ 12	0 – 0,020
12,0 < D	0 – 0,030

Grade: ACF20

■ Endmills

(mm)

Cat. No.	Stock	øD	ℓ_1	ℓ_2	L	ød
GSX 30100C-2D	●	1,0	2,5	3,5	40	4
GSX 30150C-2D	●	1,5	3,8	4,8	40	4
GSX 30200C-2D	●	2,0	5,0	6,0	40	4
GSX 30250C-2D	●	2,5	6,3	7,3	40	4
GSX 30300C-2D	●	3,0	7,5	9,0	45	6
GSX 30400C-2D	●	4,0	11,0	12,5	45	6
GSX 30500C-2D	●	5,0	13,0	15,0	50	6
GSX 30600C-2D	●	6,0	13,0	–	50	6
GSX 30700C-2D	●	7,0	16,0	18,0	60	8
GSX 30800C-2D	●	8,0	19,0	–	60	8
GSX 30900C-2D	●	9,0	19,0	21,0	70	10
GSX 31000C-2D	●	10,0	22,0	–	70	10
GSX 31200C-2D	●	12,0	26,0	–	75	12
GSX 31600C-2D		16,0	32,0	–	90	16
GSX 32000C-2D		20,0	40,0	–	100	20

■ Endmill Identification (GSX MILL Series)

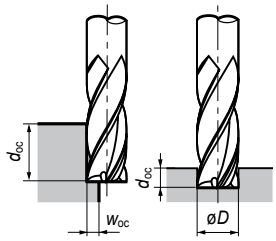
GSX 3 0100 C - 2D

①	②	③	④	⑤
Series Code	No. of Teeth	Diameter	Cutting Edge	Cutting Edge Length

(S: Sharp Edge
C: Gash Land Drilling)

■ Recommended cutting conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blowing when dry machining.
3. Use wet machining for stainless steel, heat resistant alloy, and titanium alloy applications.
4. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.



● Shoulder Milling

Work Material / Cond. / øD (mm)	Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0	19.600	300	19.600	300	19.600	300	18.300	210	12.700	130	9.000	80	11.000	90	9.000	65
2,0	11.200	410	11.200	410	11.200	410	10.500	280	7.300	170	5.300	100	6.400	120	5.300	90
4,0	6.400	550	6.400	550	6.400	550	6.000	370	4.200	230	3.000	140	3.600	150	3.000	120
6,0	4.600	670	4.600	670	4.600	670	4.300	460	3.000	270	2.200	170	2.700	180	2.200	130
8,0	3.400	670	3.400	670	3.400	670	3.200	460	2.200	270	1.600	170	2.000	180	1.600	130
10,0	2.800	670	2.800	670	2.800	670	2.600	460	1.800	270	1.300	170	1.600	180	1.300	130
12,0	2.300	670	2.300	670	2.300	670	2.200	460	1.500	270	1.100	170	1.300	180	1.100	130
16,0	1.700	550	1.700	550	1.700	550	1.600	370	1.100	230	800	140	1.000	150	800	100
20,0	1.350	490	1.350	490	1.350	490	1.300	330	900	210	650	120	800	130	650	90
Shoulder cutting d_{oc}	1,5 *D*										1,0 *D*					
Shoulder cutting w_{oc}	0,05 *D*										0,02 *D*					

● Grooving

Work Material / Cond. / øD (mm)	Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0	19.600	240	19.600	300	19.600	300	18.300	210	12.700	130	9.000	80	11.000	65	4.500	25
2,0	11.200	320	11.200	410	11.200	410	10.500	280	7.300	170	5.300	100	6.400	85	2.650	35
4,0	6.400	450	6.400	550	6.400	550	6.000	370	4.200	230	3.000	140	3.600	100	1.500	50
6,0	4.600	540	4.600	670	4.600	670	4.300	460	3.000	270	2.200	170	2.650	130	1.150	55
8,0	3.400	540	3.400	670	3.400	670	3.200	460	2.200	270	1.600	170	2.000	130	800	55
10,0	2.800	540	2.800	670	2.800	670	2.600	460	1.800	270	1.300	170	1.600	130	650	55
12,0	2.300	540	2.300	670	2.300	670	2.200	460	1.500	270	1.100	170	1.300	130	500	55
16,0	1.700	440	1.700	550	1.700	550	1.600	370	1.100	230	800	140	1.000	110	400	45
20,0	1.350	390	1.350	490	1.350	490	1.300	330	900	210	650	120	800	90	320	40
Grooving d_{oc}	0,2 *D*		0,5 *D*						0,2 *D*		0,05 *D*		0,2 *D*			

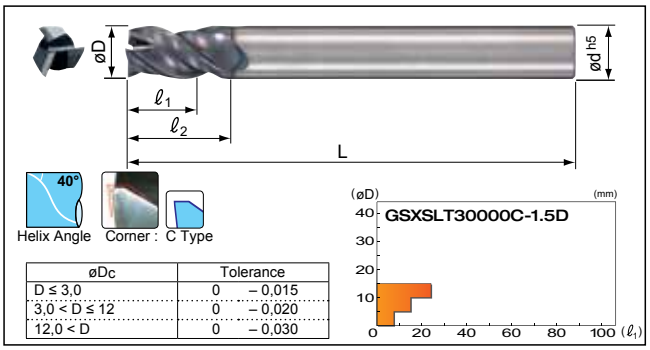
GSXSLT 30000C-1.5D Type

3 Slotted Short Endmills (3 Flutes)

For Compound Endmilling

Coated Carbide Grades | GSX Coating

Structural Steel	Carbon Steel	Alloy Steel	Pre-hardened Steel	Tempered Die Steel	Hardened Steel 45~55 HRC	Hardened Steel 55~60 HRC	Hardened Steel 60~65 HRC	Stainless Steel	Ti Alloy / Heat Resistant Alloy	Cast iron	Al Alloy	Cu Alloy	Graphite
○	◎	◎	◎	◎	◎			◎	○	○			



øDc	Tolerance
D ≤ 3,0	0 – 0,015
3,0 < D ≤ 12	0 – 0,020
12,0 < D	0 – 0,030

Grade: ACF20

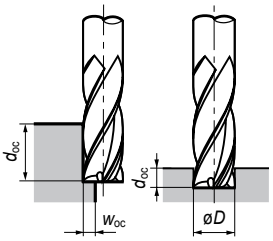
■ Endmills

(mm)

Cat. No.	Stock	øD	ℓ_1	ℓ_2	L	ød
GSXSLT 30100C-1.5D	●	1,0	1,5	2,5	40	4
GSXSLT 30150C-1.5D	●	1,5	2,3	3,3	40	4
GSXSLT 30200C-1.5D	●	2,0	3,0	4,0	40	4
GSXSLT 30250C-1.5D	●	2,5	3,8	4,8	40	4
GSXSLT 30300C-1.5D	●	3,0	4,5	6,0	45	6
GSXSLT 30400C-1.5D	●	4,0	6,0	7,5	45	6
GSXSLT 30500C-1.5D	●	5,0	7,5	9,5	50	6
GSXSLT 30600C-1.5D	●	6,0	9,0	–	50	6
GSXSLT 30700C-1.5D	●	7,0	11,0	13,0	60	8
GSXSLT 30800C-1.5D	●	8,0	12,0	–	60	8
GSXSLT 30900C-1.5D	●	9,0	14,0	16,0	70	10
GSXSLT 31000C-1.5D	●	10,0	15,0	–	70	10
GSXSLT 31200C-1.5D	●	12,0	18,0	–	75	12
GSXSLT 31600C-1.5D		16,0	24,0	–	90	16

■ Recommended cutting conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blowing when dry machining.
3. Use wet machining for stainless steel, heat resistant alloy, and titanium alloy applications.
4. Use step machining of 0.1Dc when drilling stainless steel, heat resistant alloy, and titanium alloy.
5. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.



● Shoulder Milling

Work Material / Cond.		Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
øD (mm)		Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0		19.600	300	19.600	300	19.600	300	18.300	210	12.700	130	9.000	80	11.000	90	9.000	65
2,0		11.200	410	11.200	410	11.200	410	10.500	280	7.300	170	5.300	100	6.400	120	5.300	90
4,0		6.400	550	6.400	550	6.400	550	6.000	370	4.200	230	3.000	140	3.600	150	3.000	120
6,0		4.600	670	4.600	670	4.600	670	4.300	460	3.000	270	2.200	170	2.700	180	2.200	130
8,0		3.400	670	3.400	670	3.400	670	3.200	460	2.200	270	1.600	170	2.000	180	1.600	130
10,0		2.800	670	2.800	670	2.800	670	2.600	460	1.800	270	1.300	170	1.600	180	1.300	130
12,0		2.300	670	2.300	670	2.300	670	2.200	460	1.500	270	1.100	170	1.300	180	1.100	130
16,0		1.700	550	1.700	550	1.700	550	1.600	370	1.100	230	800	140	1.000	150	800	100
Shoulder cutting	d_{oc}	1.5 *D*										1.0 *D*					
	w_{oc}	0.05 *D*										0.02 *D*					

● Grooving

Work Material / Cond.		Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
øD (mm)		Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0		19.600	240	19.600	300	19.600	300	18.300	210	12.700	130	9.000	80	11.000	65	4.500	25
2,0		11.200	320	11.200	410	11.200	410	10.500	280	7.300	170	5.300	100	6.400	85	2.650	35
4,0		6.400	450	6.400	550	6.400	550	6.000	370	4.200	230	3.000	140	3.600	100	1.500	50
6,0		4.600	540	4.600	670	4.600	670	4.300	460	3.000	270	2.200	170	2.650	130	1.150	55
8,0		3.400	540	3.400	670	3.400	670	3.200	460	2.200	270	1.600	170	2.000	130	800	55
10,0		2.800	540	2.800	670	2.800	670	2.600	460	1.800	270	1.300	170	1.600	130	650	55
12,0		2.300	540	2.300	670	2.300	670	2.200	460	1.500	270	1.100	170	1.300	130	500	55
16,0		1.700	440	1.700	550	1.700	550	1.600	370	1.100	230	800	140	1.000	110	400	45
Grooving	d_{oc}	0,2 *D*		0,5 *D*						0,2 *D*		0,05 *D*		0,2 *D*			

● Drilling

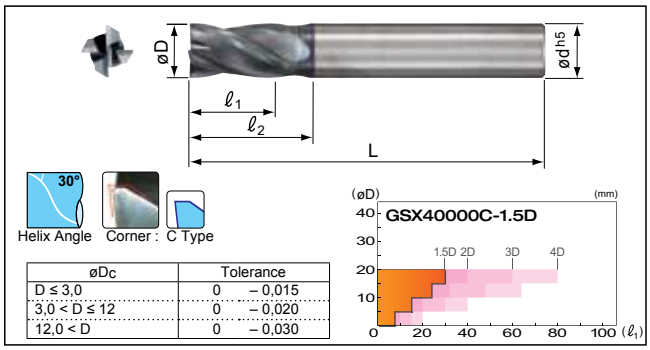
Work Material / Cond.		Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
øD (mm)		Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0		19.600	70	19.600	90	19.600	90	18.300	60	12.700	40	9.000	25	11.000	20	4.500	10
2,0		11.200	90	11.200	120	11.200	120	10.500	80	7.300	50	5.300	30	6.400	25	2.650	15
4,0		6.400	130	6.400	160	6.400	160	6.000	110	4.200	70	3.000	40	3.600	30	1.500	20
6,0		4.600	160	4.600	200	4.600	200	4.300	130	3.000	80	2.200	50	2.650	40	1.150	20
8,0		3.400	160	3.400	200	3.400	200	3.200	130	2.200	80	1.600	50	2.000	40	800	20
10,0		2.800	160	2.800	200	2.800	200	2.600	130	1.800	80	1.300	50	1.600	40	650	20
12,0		2.300	160	2.300	200	2.300	200	2.200	130	1.500	80	1.100	50	1.300	40	500	20
16,0		1.700	130	1.700	160	1.700	160	1.600	110	1.100	70	800	40	1.000	35	400	15

● = Euro stock

GSX MILL Endmills
GSX 40000C-1.5D Type

Coated Carbide Grades | GSX Coating

Structural Steel	Carbon Steel	Alloy Steel	Pre-hardened Steel	Tempered Die Steel	Hardened Steel 45~55 HRC	Hardened Steel 55~60 HRC	Hardened Steel 60~65 HRC	Stainless Steel	Ti Alloy / Heat Resistant Alloy	Cast Iron	Al Alloy	Cu Alloy	Graphite
○	◎	◎	◎	◎	◎	○		◎	○	○			



øDc	Tolerance
D ≤ 3,0	0 – 0,015
3,0 < D ≤ 12	0 – 0,020
12,0 < D	0 – 0,030

Grade: ACF20

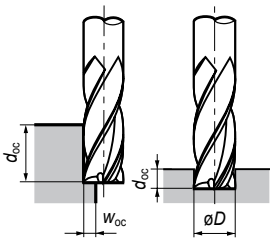
■ Endmills

(mm)

Cat. No.	Stock	øD	ℓ1	ℓ2	L	ød
GSX 40100C-1.5D	●	1,0	1,5	2,5	40	4
GSX 40150C-1.5D	●	1,5	2,3	3,3	40	4
GSX 40200C-1.5D	●	2,0	3,0	4,0	40	4
GSX 40250C-1.5D	●	2,5	3,8	4,8	40	4
GSX 40300C-1.5D	●	3,0	4,5	6,0	45	6
GSX 40350C-1.5D	●	3,5	5,3	6,8	45	6
GSX 40400C-1.5D	●	4,0	6,0	7,5	45	6
GSX 40450C-1.5D	●	4,5	6,8	8,3	50	6
GSX 40500C-1.5D	●	5,0	7,5	9,5	50	6
GSX 40550C-1.5D	●	5,5	8,3	10,3	50	6
GSX 40600C-1.5D	●	6,0	9,0	–	50	6
GSX 40700C-1.5D	●	7,0	11,0	13,0	60	8
GSX 40800C-1.5D	●	8,0	12,0	–	60	8
GSX 40900C-1.5D	●	9,0	14,0	16,0	70	10
GSX 41000C-1.5D	●	10,0	15,0	–	70	10
GSX 41200C-1.5D	●	12,0	18,0	–	75	12
GSX 41400C-1.5D		14,0	21,0	24,5	90	16
GSX 41500C-1.5D		15,0	23,0	26,5	90	16
GSX 41600C-1.5D		16,0	24,0	–	90	16
GSX 42000C-1.5D		20,0	30,0	–	100	20

■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blowing when dry machining.
3. Use wet machining for stainless steel, heat resistant alloy, and titanium alloy applications.
4. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.



● Shoulder Milling

Work Material / Cond.	Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
øD (mm)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0	24.000	470	24.000	470	24.000	470	21.000	290	14.500	180	10.500	120	12.600	120	10.500	85
2,0	12.800	570	12.800	570	12.800	570	12.000	380	8.300	230	6.000	150	7.200	160	6.000	110
4,0	6.800	730	6.800	730	6.800	730	6.400	490	4.400	300	3.200	200	3.800	210	3.200	130
6,0	4.600	780	4.600	780	4.600	780	4.300	520	3.000	320	2.200	210	2.650	220	2.200	150
8,0	3.400	780	3.400	780	3.400	780	3.200	520	2.200	320	1.600	210	2.000	220	1.600	150
10,0	2.800	780	2.800	780	2.800	780	2.600	520	1.800	320	1.300	210	1.500	220	1.300	150
12,0	2.300	780	2.300	780	2.300	780	2.200	520	1.500	320	1.100	210	1.300	220	1.100	150
16,0	1.700	650	1.700	650	1.700	650	1.600	420	1.100	280	800	170	1.000	180	800	120
20,0	1.350	600	1.350	600	1.350	600	1.300	380	900	260	650	150	800	160	650	100
Shoulder cutting doc	1,5 D										1,0 D					
Shoulder cutting woc	0,05 D										0,02 D					

● Shoulder Milling (High Speed Machining Centre)

Work Material / Cond.	Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
øD (mm)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0	60.000	1.200	60.000	1.200	60.000	1.200	60.000	850	60.000	720	48.000	500	32.000	300	–	–
2,0	47.800	2.200	47.800	2.200	47.800	2.200	47.800	1.600	39.800	1.200	31.800	900	15.900	400	–	–
4,0	23.900	2.600	23.900	2.600	23.900	2.600	23.900	1.900	19.900	1.400	15.900	1.100	8.000	490	–	–
6,0	16.000	2.700	16.000	2.700	16.000	2.700	16.000	2.000	13.300	1.500	10.600	1.200	5.300	520	–	–
8,0	12.000	2.700	12.000	2.700	12.000	2.700	12.000	2.000	10.000	1.500	8.000	1.200	4.000	520	–	–
10,0	9.600	2.700	9.600	2.700	9.600	2.700	9.600	2.000	8.000	1.500	6.400	1.200	3.200	520	–	–
12,0	8.000	2.700	8.000	2.700	8.000	2.700	8.000	2.000	6.700	1.500	5.300	1.200	2.700	520	–	–
16,0	6.000	2.200	6.000	2.200	6.000	2.200	6.000	1.600	5.000	1.200	4.000	900	2.000	450	–	–
20,0	4.800	2.000	4.800	2.000	4.800	2.000	4.800	1.400	4.000	1.100	3.200	750	1.600	380	–	–
Shoulder cutting doc	1,5 D										1,0 D					
Shoulder cutting woc	0,05 D										0,02 D					

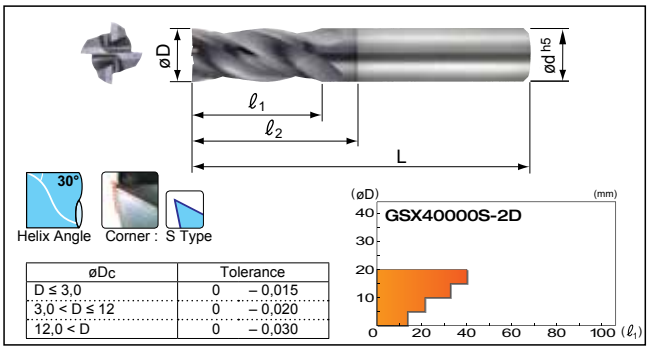
● Grooving

Work Material / Cond.	Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
øD (mm)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0	24.000	380	24.000	470	24.000	470	21.000	290	14.500	180	10.500	120	12.600	85	5.200	30
2,0	12.800	460	12.800	570	12.800	570	12.000	380	8.300	230	6.000	150	7.200	110	3.000	40
4,0	6.800	580	6.800	730	6.800	730	5.400	490	4.400	300	3.200	200	3.800	130	1.600	55
6,0	4.600	620	4.600	780	4.600	780	4.300	520	3.000	320	2.200	210	2.650	160	1.100	65
8,0	3.400	620	3.400	780	3.400	780	3.200	520	2.200	320	1.600	210	2.000	160	800	65
10,0	2.800	620	2.800	780	2.800	780	2.600	520	1.800	320	1.300	210	1.600	160	650	65
12,0	2.300	620	2.300	780	2.300	780	2.200	520	1.500	320	1.100	210	1.300	160	550	65
16,0	1.700	520	1.700	560	1.700	560	1.600	420	1.100	280	800	170	1.000	130	400	55
20,0	1.350	480	1.350	600	1.350	600	1.300	380	900	260	650	150	800	110	320	50
Grooving doc	0,2 D		0,5 D						0,2 D		0,05 D		0,2 D			

GSX 40000S-2D Type

Coated Carbide Grades | GSX Coating

Structural Steel	Carbon Steel	Alloy Steel	Pre-hardened Steel	Tempered Die Steel	Hardened Steel 45~55 HRC	Hardened Steel 55~60 HRC	Hardened Steel 60~65 HRC	Stainless Steel	Ti Alloy / Heat Resistant Alloy	Cast iron	Al Alloy	Cu Alloy	Graphite
○	◎	◎	◎	◎	◎	○		◎	○	○			



øDc	Tolerance
D ≤ 3,0	0 – 0,015
3,0 < D ≤ 12	0 – 0,020
12,0 < D	0 – 0,030

Grade: ACF20

■ Endmills

(mm)

Cat. No.	Stock	øD	ℓ_1	ℓ_2	L	ød
GSX 40100S-2D	●	1,0	2,5	3,5	40	4
GSX 40150S-2D	●	1,5	3,8	4,8	40	4
GSX 40200S-2D	●	2,0	5,0	6,0	40	4
GSX 40250S-2D	●	2,5	6,3	7,3	40	4
GSX 40300S-2D	●	3,0	7,5	9,0	45	6
GSX 40350S-2D	●	3,5	8,8	10,0	45	6
GSX 40400S-2D	●	4,0	11,0	14,0	45	6
GSX 40450S-2D	●	4,5	11,3	12,8	50	6
GSX 40500S-2D	●	5,0	13,0	19,6	50	6
GSX 40550S-2D	●	5,5	13,0	19,6	50	6
GSX 40600S-2D	●	6,0	13,0	–	50	6
GSX 40700S-2D	●	7,0	16,0	21,1	60	8
GSX 40800S-2D	●	8,0	19,0	–	60	8
GSX 40900S-2D	●	9,0	19,0	24,1	70	10
GSX 41000S-2D	●	10,0	22,0	–	70	10
GSX 41200S-2D	●	12,0	26,0	–	75	12
GSX 41600S-2D	●	16,0	32,0	–	90	16
GSX 42000S-2D	●	20,0	40,0	–	100	20

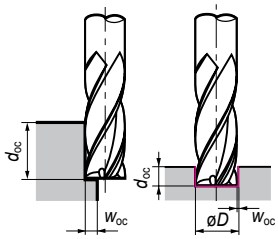
■ Endmill Identification (GSX MILL Series)

GSX 4 1000 S - 2D

① Series Code	② No. of Teeth	③ Diameter	④ Cutting Edge	⑤ Cutting Edge Length
			(S: Sharp Edge C: Gash Land Drilling)	

■ Recommended cutting conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blowing when dry machining.
3. Use wet machining for stainless steel, heat resistant alloy, and titanium alloy applications.
4. If chattering is a problem, reduce the spindle speed and feed rate indicated in the table below by the same ratio, or reduce the depth of cut.
5. This series is not recommended for grooving.
6. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.



● Shoulder Milling

Work Material / Cond.	Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
øD (mm)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0	22.000	360	22.000	360	22.000	360	19.000	220	13.000	140	9.500	90	11.300	90	9.500	65
2,0	11.500	440	11.500	440	11.500	440	11.000	290	7.500	180	5.400	110	6.500	120	5.400	85
4,0	6.000	560	6.000	560	6.000	560	5.800	370	4.000	230	2.900	150	3.400	160	2.900	100
6,0	4.200	600	4.200	600	4.200	600	4.000	400	2.700	240	2.000	160	2.400	170	2.000	120
8,0	3.000	600	3.000	600	3.000	600	2.800	400	2.000	240	1.450	160	1.800	170	1.450	120
10,0	2.500	600	2.500	600	2.500	600	2.350	400	1.600	240	1.200	160	1.450	170	1.200	120
12,0	2.100	600	2.100	600	2.100	600	2.000	400	1.350	240	1.000	160	1.200	170	1.000	120
16,0	1.500	500	1.500	500	1.500	500	1.450	320	1.000	210	750	130	900	140	750	90
20,0	1.200	460	1.200	460	1.200	460	1.150	290	800	200	600	110	700	120	600	75
Shoulder cutting d_{oc}	2,0 *D*															
Shoulder cutting w_{oc}	0,03 *D*										0,01 *D*					

● Groove Finishing

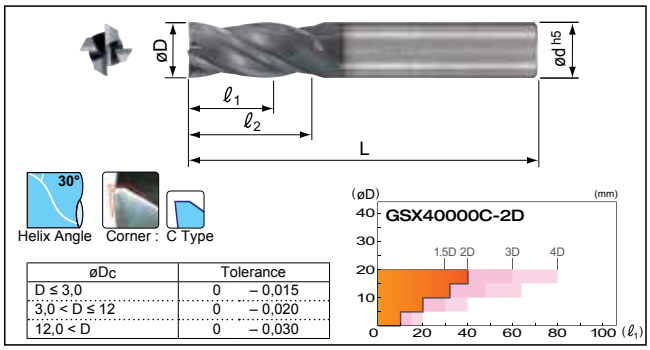
Work Material / Cond.	Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
øD (mm)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0	22.000	360	22.000	360	22.000	360	19.000	220	13.000	140	9.500	90	11.300	90	9.500	65
2,0	11.500	440	11.500	440	11.500	440	11.000	290	7.500	180	5.400	110	6.500	120	5.400	85
4,0	6.000	560	6.000	560	6.000	560	5.800	370	4.000	230	2.900	150	3.400	160	2.900	100
6,0	4.200	600	4.200	600	4.200	600	4.000	400	2.700	240	2.000	160	2.400	170	2.000	120
8,0	3.000	600	3.000	600	3.000	600	2.800	400	2.000	240	1.450	160	1.800	170	1.450	120
10,0	2.500	600	2.500	600	2.500	600	2.350	400	1.600	240	1.200	160	1.450	170	1.200	120
12,0	2.100	600	2.100	600	2.100	600	2.000	400	1.350	240	1.000	160	1.200	170	1.000	120
16,0	1.500	500	1.500	500	1.500	500	1.450	320	1.000	210	750	130	900	140	750	90
20,0	1.200	460	1.200	460	1.200	460	1.150	290	800	200	600	110	700	120	600	75
Groove finishing d_{oc}	1,5 *D*															
Groove finishing w_{oc}	~ 0,02 *D*															

● = Euro stock

GSX MILL Endmills
GSX 40000C-2D Type

Coated Carbide Grades | GSX Coating

Structural Steel	Carbon Steel	Alloy Steel	Pre-hardened Steel	Tempered Die Steel	Hardened Steel 45~55 HRC	Hardened Steel 55~60 HRC	Hardened Steel 60~65 HRC	Stainless Steel	Ti Alloy / Heat Resistant Alloy	Cast Iron	Al Alloy	Cu Alloy	Graphite
○	◎	◎	◎	◎	◎	○		◎	○	○			



øDc	Tolerance
D ≤ 3,0	0 – 0,015
3,0 < D ≤ 12	0 – 0,020
12,0 < D	0 – 0,030

Grade: ACF20

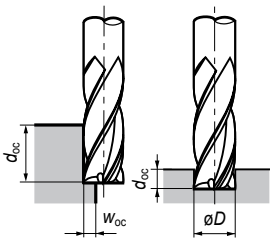
■ Endmills

(mm)

Cat. No.	Stock	øD	ℓ_1	ℓ_2	L	ød
GSX 40100C-2D	●	1,0	2,0	3,0	40	4
GSX 40150C-2D	●	1,5	3,0	4,0	40	4
GSX 40200C-2D	●	2,0	4,0	5,0	40	4
GSX 40250C-2D	●	2,5	5,0	6,0	40	4
GSX 40300C-2D	●	3,0	6,0	7,5	45	6
GSX 40350C-2D	●	3,5	7,0	8,5	45	6
GSX 40400C-2D	●	4,0	8,0	9,5	45	6
GSX 40450C-2D	●	4,5	9,0	10,5	50	6
GSX 40500C-2D	●	5,0	10,0	12,0	50	6
GSX 40550C-2D	●	5,5	11,0	13,0	50	6
GSX 40600C-2D	●	6,0	12,0	–	50	6
GSX 40700C-2D	●	7,0	14,0	16,0	60	8
GSX 40800C-2D	●	8,0	16,0	–	60	8
GSX 40900C-2D	●	9,0	18,0	20,0	70	10
GSX 41000C-2D	●	10,0	20,0	–	70	10
GSX 41200C-2D	●	12,0	24,0	–	75	12
GSX 41400C-2D		14,0	28,0	31,5	90	16
GSX 41500C-2D		15,0	30,0	33,5	90	16
GSX 41600C-2D	●	16,0	32,0	–	90	16
GSX 42000C-2D	●	20,0	40,0	–	100	20

■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blowing when dry machining.
3. Use wet machining for stainless steel, heat resistant alloy, and titanium alloy applications.
4. If chattering is a problem, reduce the spindle speed and feed rate indicated in the table below by the same ratio, or reduce the depth of cut.
5. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.



● Shoulder Milling

Work Material / Cond. / øD (mm)	Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0	24.000	470	24.000	470	24.000	470	21.000	290	14.500	180	10.500	120	12.600	120	10.500	85
2,0	12.800	570	12.800	570	12.800	570	12.000	380	8.300	230	6.000	150	7.200	160	6.000	110
4,0	6.800	730	6.800	730	6.800	730	6.400	490	4.400	300	3.200	200	3.800	210	3.200	130
6,0	4.600	780	4.600	780	4.600	780	4.300	520	3.000	320	2.200	210	2.650	220	2.200	150
8,0	3.400	780	3.400	780	3.400	780	3.200	520	2.200	320	1.600	210	2.000	220	1.600	150
10,0	2.800	780	2.800	780	2.800	780	2.600	520	1.800	320	1.300	210	1.500	220	1.300	150
12,0	2.300	780	2.300	780	2.300	780	2.200	520	1.500	320	1.100	210	1.300	220	1.100	150
16,0	1.700	650	1.700	650	1.700	650	1.600	420	1.100	280	800	170	1.000	180	800	120
20,0	1.350	600	1.350	600	1.350	600	1.300	380	900	260	650	150	800	160	650	100
Shoulder cutting d_{oc}	1,5 *D*										1,0 *D*					
Shoulder cutting w_{oc}	0,05 *D*										0,02 *D*					

● Shoulder Milling (High Speed Machining Centre)

Work Material / Cond. / øD (mm)	Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0	60.000	1.200	60.000	1.200	60.000	1.200	60.000	850	60.000	720	48.000	500	32.000	300	–	–
2,0	47.800	2.200	47.800	2.200	47.800	2.200	47.800	1.600	39.800	1.200	31.800	900	15.900	400	–	–
4,0	23.900	2.600	23.900	2.600	23.900	2.600	23.900	1.900	19.900	1.400	15.900	1.100	8.000	490	–	–
6,0	16.000	2.700	16.000	2.700	16.000	2.700	16.000	2.000	13.300	1.500	10.600	1.200	5.300	520	–	–
8,0	12.000	2.700	12.000	2.700	12.000	2.700	12.000	2.000	10.000	1.500	8.000	1.200	4.000	520	–	–
10,0	9.600	2.700	9.600	2.700	9.600	2.700	9.600	2.000	8.000	1.500	6.400	1.200	3.200	520	–	–
12,0	8.000	2.700	8.000	2.700	8.000	2.700	8.000	2.000	6.700	1.500	5.300	1.200	2.700	520	–	–
16,0	6.000	2.200	6.000	2.200	6.000	2.200	6.000	1.600	5.000	1.200	4.000	900	2.000	450	–	–
20,0	4.800	2.000	4.800	2.000	4.800	2.000	4.800	1.400	4.000	1.100	3.200	750	1.600	380	–	–
Shoulder cutting d_{oc}	1,5 *D*										1,0 *D*					
Shoulder cutting w_{oc}	0,05 *D*										0,02 *D*					

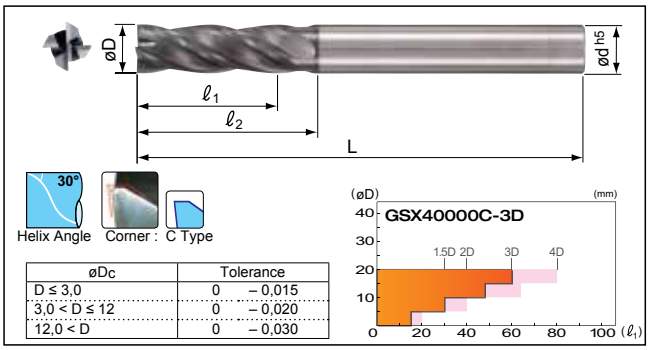
● Grooving

Work Material / Cond. / øD (mm)	Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0	24.000	380	24.000	470	24.000	470	21.000	290	14.500	180	10.500	120	12.600	85	5.200	30
2,0	12.800	460	12.800	570	12.800	570	12.000	380	8.300	230	6.000	150	7.200	110	3.000	40
4,0	6.800	580	6.800	730	6.800	730	5.400	490	4.400	300	3.200	200	3.800	130	1.600	55
6,0	4.600	620	4.600	780	4.600	780	4.300	520	3.000	320	2.200	210	2.650	160	1.100	65
8,0	3.400	620	3.400	780	3.400	780	3.200	520	2.200	320	1.600	210	2.000	160	800	65
10,0	2.800	620	2.800	780	2.800	780	2.600	520	1.800	320	1.300	210	1.600	160	650	65
12,0	2.300	620	2.300	780	2.300	780	2.200	520	1.500	320	1.100	210	1.300	160	550	65
16,0	1.700	520	1.700	560	1.700	560	1.600	420	1.100	280	800	170	1.000	130	400	55
20,0	1.350	480	1.350	600	1.350	600	1.300	380	900	260	650	150	800	110	320	50
Grooving d_{oc}	0,2 *D*		0,5 *D*						0,2 *D*		0,05 *D*		0,2 *D*			

GSX 40000C-3D Type

Coated Carbide Grades | GSX Coating

Structural Steel	Carbon Steel	Alloy Steel	Pre-hardened Steel	Tempered Die Steel	Hardened Steel 45~55 HRC	Hardened Steel 55~60 HRC	Hardened Steel 60~65 HRC	Stainless Steel	Ti Alloy / Heat Resistant Alloy	Cast iron	Al Alloy	Cu Alloy	Graphite
○	◎	◎	◎	◎	◎	○		◎	○	○			



øDc	Tolerance
D ≤ 3,0	0 – 0,015
3,0 < D ≤ 12	0 – 0,020
12,0 < D	0 – 0,030

Grade: ACF20

■ Endmills

(mm)

Cat. No.	Stock	øD	ℓ_1	ℓ_2	L	ød
GSX 40100C-3D	●	1,0	3,0	4,0	40	4
GSX 40150C-3D	●	1,5	4,5	5,5	40	4
GSX 40200C-3D	●	2,0	6,0	7,0	40	4
GSX 40250C-3D	●	2,5	7,5	8,5	40	4
GSX 40300C-3D	●	3,0	9,0	10,5	50	6
GSX 40400C-3D	●	4,0	12,0	13,5	50	6
GSX 40500C-3D	●	5,0	15,0	17,0	50	6
GSX 40600C-3D	●	6,0	18,0	–	50	6
GSX 40800C-3D	●	8,0	24,0	–	70	8
GSX 41000C-3D	●	10,0	30,0	–	90	10
GSX 41200C-3D	●	12,0	36,0	–	90	12
GSX 41600C-3D	●	16,0	48,0	–	110	16
GSX 42000C-3D		20,0	60,0	–	120	20

■ Endmill Identification (GSX MILL Series)

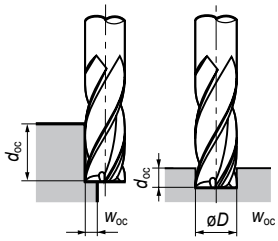
GSX 4 0100 C - 2D/3D

① Series Code | ② No. of Teeth | ③ Diameter | ④ Cutting Edge | ⑤ Cutting Edge Length

(S: Sharp Edge
C: Gash Land Drilling)

■ Recommended cutting conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blowing when dry machining.
3. Use wet machining for stainless steel, heat resistant alloy, and titanium alloy applications.
4. In rear cases, chattering may occur in early milling stages, dissipating after 2m of cutting.
5. If chattering is a problem, reduce the spindle speed and feed rate indicated in the table below by the same ratio, or reduce the depth of cut.
6. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.



●Shoulder Milling

Work Material / Cond. / øD (mm)	Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0	21.000	360	21.000	360	21.000	360	19.000	220	13.000	140	9.000	90	10.500	90	9.000	65
2,0	10.500	360	10.500	360	10.500	360	9.600	290	7.500	180	4.500	110	5.200	120	4.500	85
4,0	5.200	500	5.200	500	5.200	500	4.800	370	4.000	280	2.250	150	2.600	160	2.250	100
6,0	3.500	560	3.500	560	3.500	560	3.200	400	2.700	300	1.500	160	1.700	170	1.500	120
8,0	2.600	520	2.600	520	2.600	520	2.400	400	2.000	300	1.100	160	1.300	170	1.100	120
10,0	2.100	500	2.100	500	2.100	500	1.900	400	1.600	300	900	160	1.000	160	900	120
12,0	1.750	500	1.750	500	1.750	500	1.600	400	1.350	300	750	150	850	160	750	120
16,0	1.300	420	1.300	420	1.300	420	1.200	330	1.000	260	550	120	650	140	550	100
20,0	1.050	380	1.050	380	1.050	380	950	290	800	230	450	110	500	120	450	90
Shoulder cutting d_{oc}	2,5 *D*										2,0 *D*					
Shoulder cutting w_{oc}	øD< 3: 0,05 *D* , 3 ≤ øD< 8: 0,1 *D* , 8 ≤ øD: 0,15 *D*										0,02 *D*					

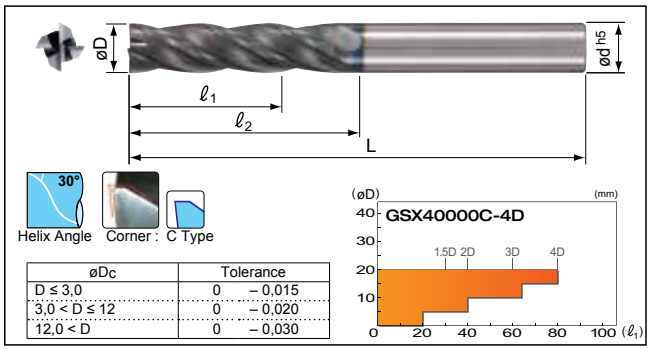
●Grooving

Work Material / Cond. / øD (mm)	Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0	16.600	140	16.600	140	16.600	140	15.500	100	10.500	100	7.500	70	9.400	60	3.750	20
2,0	9.500	160	9.500	160	9.500	160	9.000	180	6.200	120	4.500	90	5.200	80	2.250	30
4,0	5.200	160	5.200	180	5.200	180	4.800	160	3.400	110	2.200	65	2.600	70	1.250	25
6,0	3.500	160	3.500	200	3.500	200	3.200	160	2.550	120	1.500	65	1.700	70	950	25
8,0	2.600	160	2.600	200	2.600	200	2.400	160	1.900	120	1.100	65	1.300	70	700	25
10,0	2.100	160	2.100	200	2.100	200	1.900	160	1.500	120	900	65	1.000	70	550	25
12,0	1.750	160	1.750	200	1.750	200	1.600	160	1.250	120	750	65	850	70	450	25
16,0	1.300	160	1.300	200	1.300	200	1.200	160	950	120	550	65	650	70	350	25
20,0	1.050	160	1.050	200	1.050	200	950	160	750	120	450	65	500	70	280	25
Grooving d_{oc}	0,1 *D*		0,2 *D*								0,05 *D*		0,1 *D*			

● = Euro stock

GSX MILL Endmills
GSX 40000C-4D Type

Coated Carbide Grades	GSX Coating	Structural Steel	Carbon Steel	Alloy Steel	Pre-hardened Steel	Tempered Die Steel	Hardened Steel 45~55 HRC	Hardened Steel 55~60 HRC	Hardened Steel 60~65 HRC	Stainless Steel	Ti Alloy / Heat Resistant Alloy	Cast iron	Al Alloy	Cu Alloy	Graphite
		○	◎	◎	◎	◎	◎	○		◎	○	○			



øDc	Tolerance
D ≤ 3,0	0 – 0,015
3,0 < D ≤ 12	0 – 0,020
12,0 < D	0 – 0,030

Grade: ACF20

■ Endmills

(mm)

Cat. No.	Stock	øD	ℓ_1	ℓ_2	L	ød
GSX 40100C-4D	●	1,0	4,0	5,0	40	4
GSX 40150C-4D	●	1,5	6,0	7,0	40	4
GSX 40200C-4D	●	2,0	8,0	9,0	40	4
GSX 40250C-4D	●	2,5	10,0	11,0	50	4
GSX 40300C-4D	●	3,0	12,0	13,5	50	6
GSX 40400C-4D	●	4,0	16,0	17,5	50	6
GSX 40500C-4D	●	5,0	20,0	22,0	60	6
GSX 40600C-4D	●	6,0	24,0	–	60	6
GSX 40800C-4D	●	8,0	32,0	–	80	8
GSX 41000C-4D	●	10,0	40,0	–	90	10
GSX 41200C-4D	●	12,0	48,0	–	100	12
GSX 41600C-4D	●	16,0	64,0	–	120	16
GSX 42000C-4D		20,0	80,0	–	140	20

■ Endmill Identification (GSX MILL Series)

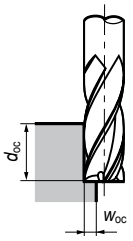
GSX 4 0100 C - 4D

①	②	③	④	⑤
Series Code	No. of Teeth	Diameter	Cutting Edge	Cutting Edge Length

(S: Sharp Edge
C: Gash Land Drilling)

■ Recommended Cutting Conditions

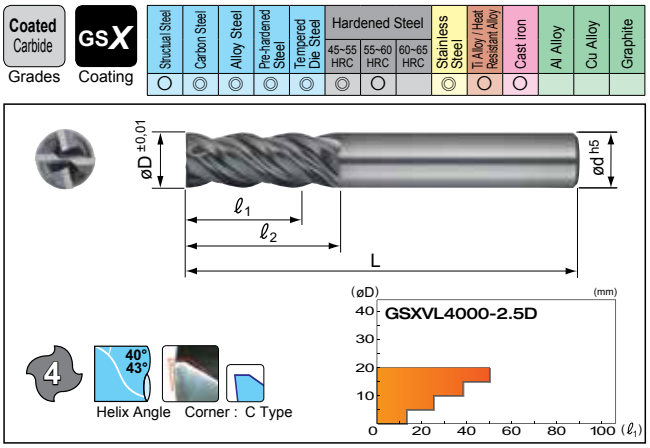
1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blowing when dry machining.
3. Use wet machining for stainless steel, heat resistant alloy, and titanium alloy applications.
4. In rear cases, chattering may occur in early milling stages, dissipating after 2m of cutting.
5. If chattering is a problem, reduce the spindle speed and feed rate indicated in the table below by the same ratio, or reduce the depth of cut.
6. This series is not recommended for grooving.
7. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.



● Shoulder Milling

Work Material / Cond.		Structural Steel		Carbon Steel (150 to 250HB)		Cast Iron		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy	
øD (mm)		Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
1,0		9.000	140	9.000	140	9.000	140	7.000	80	6.500	60	4.500	40	5.400	40	4.500	40
2,0		4.500	140	4.500	140	4.500	140	3.500	100	3.200	80	2.300	55	2.700	55	2.300	40
4,0		2.250	200	2.250	200	2.250	200	1.750	120	1.600	100	1.200	60	1.350	50	1.200	35
6,0		1.500	250	1.500	250	1.500	250	1.150	160	1.050	140	800	65	900	45	800	35
8,0		1.100	220	1.100	220	1.100	220	850	160	800	130	600	65	660	45	600	35
10,0		900	210	900	210	900	210	700	140	650	120	460	65	540	45	460	35
12,0		750	200	750	200	750	200	580	140	520	110	400	65	450	45	400	35
16,0		550	170	550	170	550	170	440	120	400	95	300	55	330	45	300	35
20,0		450	150	450	150	450	150	350	100	320	80	240	50	270	45	240	35
Shoulder cutting	d_{oc}	3,5 *D*										3,0 *D*					
	w_{oc}	øD< 3: 0,04 *D* , 3 ≤ øD< 8: 0,08 *D* , 8 ≤ øD: 0,1 *D*										0,02 *D*					

GSXVL 4000-2.5D Type



Grade: ACF20

■ Endmills

(mm)

Cat. No.	Stock	øD	ℓ1	ℓ2	L	ød
GSXVL 4020-2.5D	●	2,0	5	6,5	50	4
GSXVL 4030-2.5D	●	3,0	8	9,5	50	6
GSXVL 4040-2.5D	●	4,0	10	11,5	50	6
GSXVL 4050-2.5D	●	5,0	13	14,5	60	6
GSXVL 4060-2.5D	●	6,0	15	–	60	6
GSXVL 4070-2.5D	●	7,0	18	20,0	70	8
GSXVL 4080-2.5D	●	8,0	20	–	80	8
GSXVL 4090-2.5D	●	9,0	23	25,0	90	10
GSXVL 4100-2.5D	●	10,0	25	–	90	10
GSXVL 4110-2.5D	●	11,0	28	30,5	90	12
GSXVL 4120-2.5D	●	12,0	30	–	90	12
GSXVL 4140-2.5D	●	14,0	35	37,5	110	16
GSXVL 4150-2.5D	●	15,0	38	41,0	110	16
GSXVL 4160-2.5D	●	16,0	40	–	115	16
GSXVL 4180-2.5D	●	18,0	45	48,0	120	20
GSXVL 4200-2.5D	●	20,0	50	–	125	20
GSXVL 4250-2.5D	❑	25,0	63	–	140	25

SAFE-LOCK™ Applicable Endmills





■ Endmills

(mm)

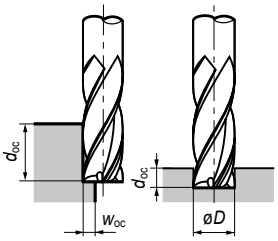
Cat. No.	Stock	øD	ℓ1	ℓ2	L	ød
GSXVL 4120S-2.5D	❑	12,0	30	–	90	12
GSXVL 4140S-2.5D	❑	14,0	35	37,5	110	16
GSXVL 4150S-2.5D	❑	15,0	38	41,0	110	16
GSXVL 4160S-2.5D	❑	16,0	40	–	115	16
GSXVL 4180S-2.5D	❑	18,0	45	48,0	120	20
GSXVL 4200S-2.5D	❑	20,0	50	–	125	20
GSXVL 4250S-2.5D	❑	25,0	63	–	140	25

■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blowing when dry machining.
3. Use wet machining for stainless steel, heat resistant alloy, and titanium alloy applications.
4. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

● Shoulder Milling

Work Material / Cond. / øD (mm)	Carbon Steel, Cast Iron (150 to 250HB)		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (40 to 50HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy (20 to 45HRC)	
	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
2,0	13.000	1.000	10.000	800	8.000	700	10.000	580	5.000	200
4,0	9.600	1.200	8.000	1.000	6.000	800	5.500	650	3.000	230
6,0	6.800	1.500	5.600	1.200	4.200	900	3.800	680	2.100	240
8,0	5.200	1.600	4.400	1.300	3.200	950	2.800	650	1.600	250
10,0	4.200	1.500	3.500	1.200	2.600	800	2.300	600	1.300	210
12,0	3.500	1.400	3.000	1.200	2.200	700	1.900	550	1.100	180
14,0	3.000	1.200	2.600	1.100	1.800	600	1.600	500	900	150
16,0	2.700	1.100	2.200	1.000	1.600	600	1.400	480	760	130
18,0	2.400	1.000	2.000	900	1.400	570	1.300	450	680	120
20,0	2.200	900	1.700	800	1.200	550	1.100	400	600	100
25,0	1.700	680	1.400	630	1.000	450	890	310	480	82
Shoulder cutting d_{oc}	1,5 *D*									
Shoulder cutting w_{oc}	0,1 *D*				0,05 *D*		0,1 *D*		0,05 *D*	



● Shoulder Milling

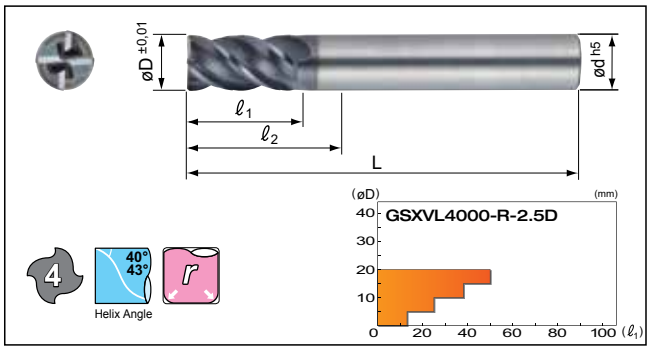
Work Material / Cond. / øD (mm)	Carbon Steel, Cast Iron (150 to 250HB)		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (40 to 50HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy (20 to 45HRC)	
	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
2,0	13.000	750	10.000	550	8.400	500	6.500	300	4.000	140
4,0	8.200	800	6.000	600	5.200	500	4.000	330	2.000	130
6,0	6.100	1.100	4.000	600	3.500	580	2.700	350	1.350	150
8,0	4.600	1.000	3.000	580	2.600	570	2.000	330	1.000	140
10,0	3.600	1.000	2.400	550	2.100	510	1.600	200	800	130
12,0	3.100	920	2.000	500	1.700	450	1.300	280	660	110
14,0	2.600	750	1.700	450	1.500	400	1.100	250	570	100
16,0	2.300	670	1.500	420	1.300	350	1.000	230	500	90
18,0	2.000	620	1.300	380	1.100	330	900	200	430	80
20,0	1.900	600	1.200	360	1.000	320	800	180	380	70
25,0	1.500	470	1.000	300	790	250	640	140	300	55
Grooving d_{oc}	1,0 *D*				0,2 *D*		0,3 *D*		0,2 *D*	

● = Euro stock
❑ = Delivery on request

Anti-Vibration MILL with R. Corner
GSXVL 4000-R-2.5D Type

Coated Carbide Grades | GSX Coating

Structal Steel	Carbon Steel	Alloy Steel	Pre-hardened Steel	Tempered Die Steel	Hardened Steel 45~55 HRC	Hardened Steel 55~60 HRC	Hardened Steel 60~65 HRC	Stainless Steel	Ti Alloy / Heat Resistant Alloy	Cast iron	Al Alloy	Cu Alloy	Graphite
○	◎	◎	◎	◎	◎	○		◎	○	○			



Endmills

(mm)

Cat. No.	Stock	øD	r	ℓ_1	ℓ_2	L	ød
GSXVL 4030-R02-2.5D	❑	3,0	0,2	8	9,5	50	6
GSXVL 4030-R05-2.5D	❑	3,0	0,5	8	9,5	50	6
GSXVL 4040-R02-2.5D	❑	4,0	0,2	10	11,5	50	6
GSXVL 4040-R05-2.5D	❑	4,0	0,5	10	11,5	50	6
GSXVL 4040-R10-2.5D	❑	4,0	1,0	10	11,5	50	6
GSXVL 4050-R02-2.5D	❑	5,0	0,2	13	14,5	60	6
GSXVL 4050-R05-2.5D	❑	5,0	0,5	13	14,5	60	6
GSXVL 4050-R10-2.5D	❑	5,0	1,0	13	14,5	60	6
GSXVL 4060-R03-2.5D	❑	6,0	0,3	15	–	60	6
GSXVL 4060-R05-2.5D	❑	6,0	0,5	15	–	60	6
GSXVL 4060-R10-2.5D	❑	6,0	1,0	15	–	60	6
GSXVL 4060-R15-2.5D	❑	6,0	1,5	15	–	60	6
GSXVL 4080-R03-2.5D	❑	8,0	0,3	20	–	80	8
GSXVL 4080-R05-2.5D	❑	8,0	0,5	20	–	80	8
GSXVL 4080-R10-2.5D	❑	8,0	1,0	20	–	80	8
GSXVL 4080-R15-2.5D	❑	8,0	1,5	20	–	80	8
GSXVL 4080-R20-2.5D	❑	8,0	2,0	20	–	80	8
GSXVL 4100-R03-2.5D	❑	10,0	0,3	25	–	90	10
GSXVL 4100-R05-2.5D	❑	10,0	0,5	25	–	90	10
GSXVL 4100-R10-2.5D	❑	10,0	1,0	25	–	90	10
GSXVL 4100-R15-2.5D	❑	10,0	1,5	25	–	90	10
GSXVL 4100-R20-2.5D	❑	10,0	2,0	25	–	90	10
GSXVL 4120-R05-2.5D	❑	12,0	0,5	30	–	90	12
GSXVL 4120-R10-2.5D	❑	12,0	1,0	30	–	90	12
GSXVL 4120-R15-2.5D	❑	12,0	1,5	30	–	90	12
GSXVL 4120-R20-2.5D	❑	12,0	2,0	30	–	90	12
GSXVL 4120-R30-2.5D	❑	12,0	3,0	30	–	90	12
GSXVL 4160-R10-2.5D	❑	16,0	1,0	40	–	115	16
GSXVL 4160-R15-2.5D	❑	16,0	1,5	40	–	115	16
GSXVL 4160-R20-2.5D	❑	16,0	2,0	40	–	115	16
GSXVL 4160-R30-2.5D	❑	16,0	3,0	40	–	115	16
GSXVL 4200-R10-2.5D	❑	20,0	1,0	50	–	125	20
GSXVL 4200-R15-2.5D	❑	20,0	1,5	50	–	125	20
GSXVL 4200-R20-2.5D	❑	20,0	2,0	50	–	125	20
GSXVL 4200-R30-2.5D	❑	20,0	3,0	50	–	125	20
GSXVL 4250-R10-2.5D	❑	25,0	1,0	63	–	140	25
GSXVL 4250-R15-2.5D	❑	25,0	1,5	63	–	140	25
GSXVL 4250-R20-2.5D	❑	25,0	2,0	63	–	140	25
GSXVL 4250-R30-2.5D	❑	25,0	3,0	63	–	140	25

Grade: ACF20

Endmills

SAFE-λOCK™

Applicable Endmills





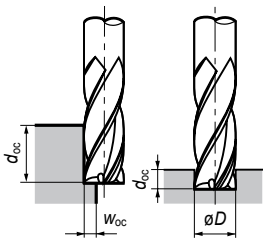
(mm)

Cat. No.	Stock	øD	r	ℓ_1	ℓ_2	L	ød
GSXVL 4120S-R05-2.5D	❑	12,0	0,5	30	–	90	12
GSXVL 4120S-R10-2.5D	❑	12,0	1,0	30	–	90	12
GSXVL 4120S-R15-2.5D	❑	12,0	1,5	30	–	90	12
GSXVL 4120S-R20-2.5D	❑	12,0	2,0	30	–	90	12
GSXVL 4120S-R30-2.5D	❑	12,0	3,0	30	–	90	12
GSXVL 4160S-R10-2.5D	❑	16,0	1,0	40	–	115	16
GSXVL 4160S-R15-2.5D	❑	16,0	1,5	40	–	115	16
GSXVL 4160S-R20-2.5D	❑	16,0	2,0	40	–	115	16
GSXVL 4160S-R30-2.5D	❑	16,0	3,0	40	–	115	16
GSXVL 4200S-R10-2.5D	❑	20,0	1,0	50	–	125	20
GSXVL 4200S-R15-2.5D	❑	20,0	1,5	50	–	125	20
GSXVL 4200S-R20-2.5D	❑	20,0	2,0	50	–	125	20
GSXVL 4200S-R30-2.5D	❑	20,0	3,0	50	–	125	20
GSXVL 4250S-R10-2.5D	❑	25,0	1,0	63	–	140	25
GSXVL 4250S-R15-2.5D	❑	25,0	1,5	63	–	140	25
GSXVL 4250S-R20-2.5D	❑	25,0	2,0	63	–	140	25
GSXVL 4250S-R30-2.5D	❑	25,0	3,0	63	–	140	25

Grade: ACF20

Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blowing when dry machining.
3. Use wet machining for stainless steel, heat resistant alloy, and titanium alloy applications.
4. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.



Shoulder Milling and Grooving

Work Material / Cond. / øD (mm)	Carbon Steel, Cast Iron (150 to 250HB)		Alloy Steel (25 to 35HRC)		Tempered Steel, Hardened Steel (40 to 50HRC)		Stainless Steel		Heat Resistive Steel, Titanium Alloy (20 to 45HRC)	
	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
2,0	9.000	720	6.000	430	4.000	320	5.500	320	2.600	120
4,0	6.600	800	4.500	450	3.000	380	4.000	320	2.000	120
6,0	4.800	960	3.000	480	2.500	380	3.000	480	1.200	120
8,0	3.600	1.000	2.200	610	2.000	400	2.000	520	1.000	140
10,0	2.800	1.000	1.800	610	1.500	400	1.700	550	800	160
12,0	2.400	950	1.500	550	1.200	380	1.500	500	700	140
14,0	2.200	880	1.300	490	1.000	360	1.200	430	600	130
16,0	1.800	650	1.100	420	800	300	1.000	360	500	120
18,0	1.600	580	1.000	360	750	270	900	340	450	110
20,0	1.400	500	900	330	700	250	820	300	400	100
Shoulder cutting d_{oc}	1,5 *D*									
Shoulder cutting w_{oc}	0,1 *D*				0,05 *D*		0,1 *D*		0,05 *D*	
Grooving d_{oc}	1,0 *D*				0,2 *D*		0,3 *D*		0,2 *D*	

Corner Radius Selection

øD	r0,2	r0,3	r0,5	r1,0	r1,5	r2,0	r3,0
ø3	❑		❑				
ø4	❑		❑	❑			
ø5	❑		❑	❑			
ø6		❑	❑	❑	❑		
ø8		❑	❑	❑	❑	❑	
ø10		❑	❑	❑	❑	❑	
ø12			❑	❑	❑	❑	❑
ø16				❑	❑	❑	❑
ø20				❑	❑	❑	❑
ø25				❑	❑	❑	❑

SSEH Series



☞ J 24, J 41

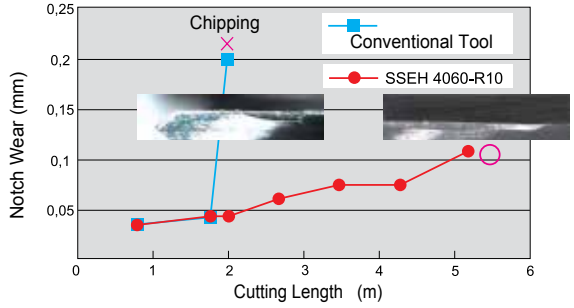
SSEH Radius

■ Characteristics and Applications

- Steep helix (45° helix) improves sharpness.
- Combination of unique flute design and semi-mirrored surface improves chip evacuation and adhesion resistance.
- Ultra-smooth coating with improved hardness and heat resistance combined with tough carbide substrate improves tool life when working with heat resistant alloys.
- Unique, smooth radius shape mitigates cutting impact and improves fracture resistance.
- Both coated and uncoated types are available in stock to meet various conditions.

■ Application Examples

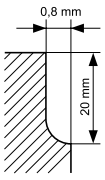
- Inconel 718 (Side Milling)



Tool Diameter: ø6×R1
Cutting Conditions: v_c = 20 m/min, f_t = 0,025 mm/t, d_{oc} = 5 mm, w_{oc} = 0,5 mm, wet

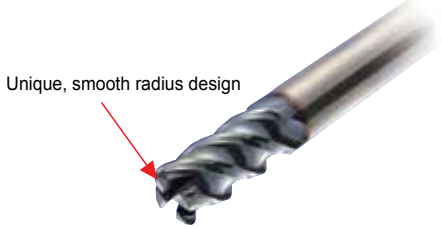
- Inconel 713 (Side Milling)

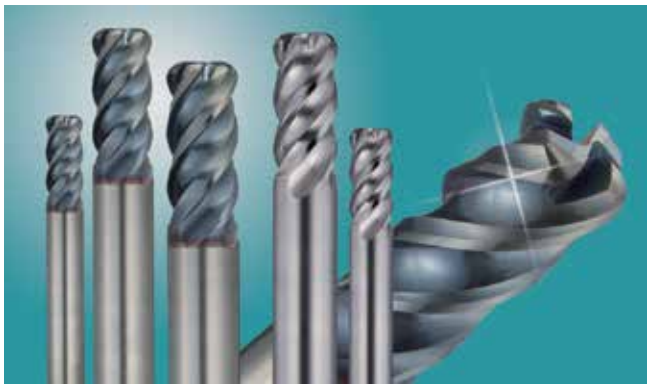
SSEH 4100W-R10	Competitor's Product
	



Tool Diameter : ø10xR1
Cutting Conditions : v_c= 32 m/min, f_t = 0,018 mm/t
d_{oc} = 20 mm, w_{oc} =0,8m, Dry

In Sumitomo Electric Hardmetal tests, the special coating with excellent adhesion resistance provided less cutting edge adhesion than the competitor's product and enabled fracturefree machining.
The competitor's product suffered from edge adhesion leading to breakage.





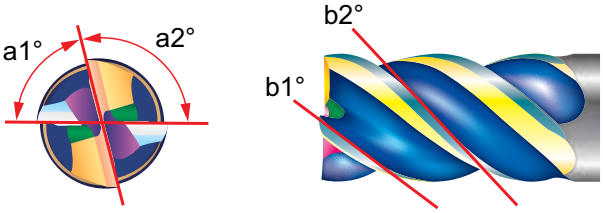
☞ J 23, J 41

SSEH Radius Anti-vibration Type

■ Characteristics and Applications

- New anti-vibration type added to the SSEH type endmill for exotic alloys.
- Builds on the same features of existing endmills by adding an irregular lead for exceptionally good anti-vibration performance.
- Compatible with wide range of milling for exotic alloys including SUS, Inconel, and titanium.
- Reduces chattering for high-speed, high-feed cutting.
- Both coated and uncoated types are available in stock to meet various conditions.

Irregular Pitch + Irregular Lead



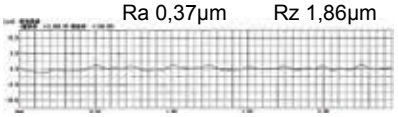
■ Application Examples

- Surface Roughness Comparison

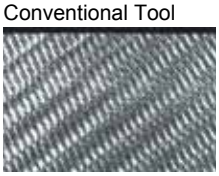
SSEH Anti-vibration Type



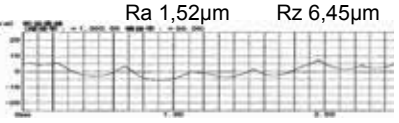
Good Surface Quality
Ra 0,37µm Rz 1,86µm



Conventional Tool



Surface shows chattering
Ra 1,52µm Rz 6,45µm



Work Material: X5CrNi1810 (Surface Milling)
Tool Diameter: ø12mm
Cutting Conditions: n = 1.300 rpm, v_f = 300 mm/min
d_{oc} = 18 mm, w_{oc} = 1,2 mm
Equipment: BT50

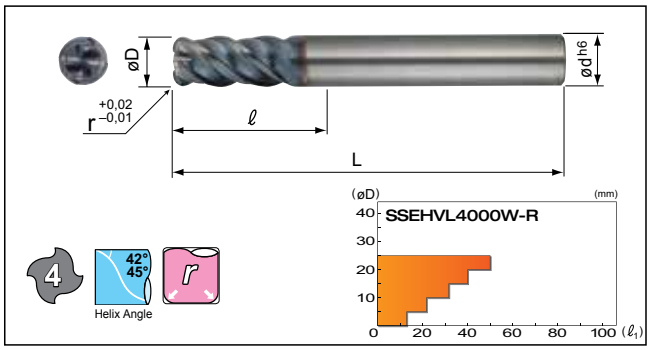
● = Euro stock
❑ = Delivery on request

Anti-Vibration MILL with R. Corner

SSEHVL 4000W-R Type

Coated Carbide Grades | GS HARD Coating

Structal Steel	Carbon Steel	Alloy Steel	Pre-hardened Steel	Tempered Die Steel	Hardened Steel 45~55 HRC	Hardened Steel 55~60 HRC	Hardened Steel 60~65 HRC	Stainless Steel	Ti Alloy / Heat Resistant Alloy	Cast iron	Al Alloy	Cu Alloy	Graphite
○	○	○	○	○				◎	◎				



Grade: ACW52

■ Endmills

(mm)

Cat. No.	Stock	øD	r	ℓ	L	ød
SSEHVL 4045W-R05	●	4,5	0,5	12	50	6
SSEHVL 4045W-R10	●	4,5	1,0	12	50	6
SSEHVL 4050W-R05	●	5,0	0,5	13	60	6
SSEHVL 4050W-R10	●	5,0	1,0	13	60	6
SSEHVL 4060W-R10	●	6,0	1,0	13	60	6
SSEHVL 4080W-R10	●	8,0	1,0	19	80	8
SSEHVL 4100W-R10	●	10,0	1,0	22	90	10
SSEHVL 4100W-R30	●	10,0	3,0	22	90	10
SSEHVL 4120W-R10	●	12,0	1,0	26	90	12
SSEHVL 4120W-R30	●	12,0	3,0	26	90	12
SSEHVL 4160W-R10	●	16,0	1,0	32	115	16
SSEHVL 4160W-R30	●	16,0	3,0	32	115	16
SSEHVL 4200W-R10	❑	20,0	1,0	40	125	20
SSEHVL 4200W-R30	❑	20,0	3,0	40	125	20
SSEHVL 4250W-R10	❑	25,0	1,0	50	140	25
SSEHVL 4250W-R30	❑	25,0	3,0	50	140	25

SAFE-λOCK™

Applicable Endmills





■ Endmills

(mm)

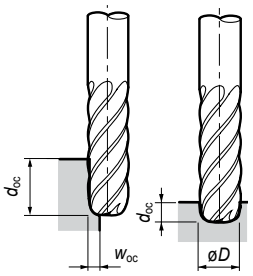
Cat. No.	Stock	øD	r	ℓ	L	ød
SSEHVL 4120WS-R10	❑	12,0	1,0	26	90	12
SSEHVL 4120WS-R30	❑	12,0	3,0	26	90	12
SSEHVL 4160WS-R10	❑	16,0	1,0	32	115	16
SSEHVL 4160WS-R30	❑	16,0	3,0	32	115	16
SSEHVL 4200WS-R10	❑	20,0	1,0	40	125	20
SSEHVL 4200WS-R30	❑	20,0	3,0	40	125	20
SSEHVL 4250WS-R10	❑	25,0	1,0	50	140	25
SSEHVL 4250WS-R30	❑	25,0	3,0	50	140	25

■ Diameter and Corner Radius Selection Range

øD	r0,5	r1,0	r3,0
ø 4,5	●	●	
ø 5	●	●	
ø 6		●	
ø 8		●	
ø 10		●	●
ø 12		●	●
ø 16		●	●
ø 20		❑	❑
ø 25		❑	❑

■ Recommended cutting conditions

1. For stable machining, a more rigid machine is recommended.
2. Wet machining is recommended for stainless steel and heat resistant alloy applications.
3. If cutting noise and vibration are present, please change the cutting conditions accordingly.



● Shoulder Milling

Work Material / Cond.		Stainless Steel		Titanium Alloy		Heat Resistive Steel	
øD (mm)		Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
4,5		3.500	350	3.500	280	2.100	170
5,0		3.200	380	3.200	320	1.900	190
6,0		2.700	430	2.700	320	1.600	190
8,0		2.000	400	2.000	280	1.200	170
10,0		1.600	380	1.600	260	1.000	160
12,0		1.300	360	1.300	230	800	140
16,0		1.000	320	1.000	200	600	120
20,0		800	260	800	160	480	100
25,0		640	200	640	130	380	80
Shoulder cutting	d_{oc}	1,5 *D*					
	w_{oc}	*0,1 D*		*0,05 D*		*0,05 D*	

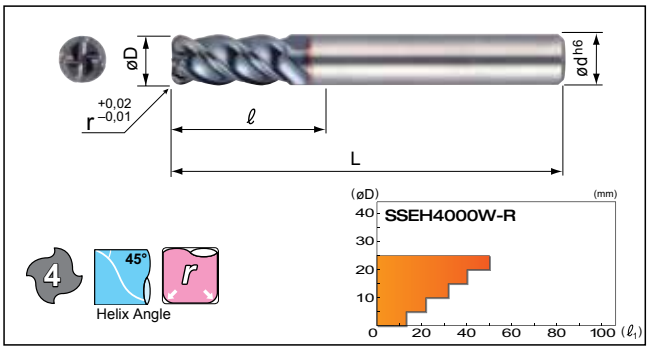
● Grooving

Work Material / Cond.		Stainless Steel		Titanium Alloy		Heat Resistive Steel	
øD (mm)		Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
4,5		4,200	200	3,900	270	1,400	100
5,0		3,800	240	3,500	300	1,300	120
6,0		3,200	260	2,900	300	1,100	140
8,0		2,400	240	2,200	270	800	120
10,0		1,900	220	1,700	250	650	110
12,0		1,600	200	1,400	230	550	100
16,0		1,200	130	1,100	200	400	80
20,0		950	95	890	90	320	60
25,0		760	75	700	70	250	50
Grooving	d_{oc}	0,3 *D*		0,2 *D*		0,15 *D*	

SSEH 4000W-R Type

4 Flutes Endmills with Radius Corner and HAIMER's SAFE-LOCK™ Applicable Endmills

Coated Carbide Grades	GS HARD Coating	Structual Steel	Carbon Steel	Alloy Steel	Pre-hardened Steel	Tempered Die Steel	Hardened Steel 45~55 HRC	Hardened Steel 55~60 HRC	Hardened Steel 60~65 HRC	Stainless Steel	Ti Alloy / Heat Resistant Alloy	Cast iron	Al Alloy	Cu Alloy	Graphite
		○	○	○	○	○				◎	◎				



Grade: ACW52

SAFE-LOCK™

Applicable Endmills





■ Endmills

(mm)

Cat. No.	Stock	øD	ℓ_1	ℓ_2	L	ød
SSEH 4045W-R05	●	4,5	0,5	12	50	6
SSEH 4045W-R10	●	4,5	1,0	12	50	6
SSEH 4050W-R05	●	5,0	0,5	13	60	6
SSEH 4050W-R10	●	5,0	1,0	13	60	6
SSEH 4060W-R10	●	6,0	1,0	13	60	6
SSEH 4080W-R10	●	8,0	1,0	19	80	8
SSEH 4100W-R10	●	10,0	1,0	22	90	10
SSEH 4100W-R30	●	10,0	3,0	22	90	10
SSEH 4120W-R10	●	12,0	1,0	26	90	12
SSEH 4120W-R30	●	12,0	3,0	26	90	12
SSEH 4160W-R10	●	16,0	1,0	32	115	16
SSEH 4160W-R30	●	16,0	3,0	32	115	16
SSEH 4200W-R10	❑	20,0	1,0	40	125	20
SSEH 4200W-R30	❑	20,0	3,0	40	125	20
SSEH 4250W-R10	❑	25,0	1,0	50	140	25
SSEH 4250W-R30	❑	25,0	3,0	50	140	25

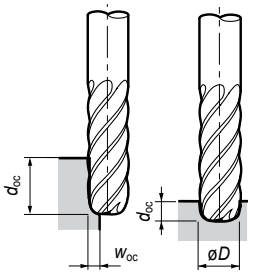
■ Endmills

(mm)

Cat. No.	Stock	øD	ℓ_1	ℓ_2	L	ød
SSEH 4120WS-R10	❑	12,0	1,0	26	90	12
SSEH 4120WS-R30	❑	12,0	3,0	26	90	12
SSEH 4160WS-R10	❑	16,0	1,0	32	115	16
SSEH 4160WS-R30	❑	16,0	3,0	32	115	16
SSEH 4200WS-R10	❑	20,0	1,0	40	125	20
SSEH 4200WS-R30	❑	20,0	3,0	40	125	20
SSEH 4250WS-R10	❑	25,0	1,0	50	140	25
SSEH 4250WS-R30	❑	25,0	3,0	50	140	25

■ Diameter and Corner Radius Selection Range

øD	r0,5	r1,0	r3,0
ø 4,5	●	●	
ø 5	●	●	
ø 6		●	
ø 8		●	
ø 10		●	●
ø 12		●	●
ø 16		●	●
ø 20		❑	❑
ø 25		❑	❑



■ Recommended cutting conditions

1. For stable machining, a more rigid machine is recommended.
2. Wet machining is recommended for stainless steel and heat resistant alloy applications.
3. If cutting noise and vibration are present, please change the cutting conditions accordingly.

● Shoulder Milling

Work Material / Cond.		Stainless Steel		Titanium Alloy		Heat Resistive Steel	
øD (mm)		Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
4,5		3.500	350	3.500	280	2.100	170
5,0		3.200	380	3.200	320	1.900	190
6,0		2.700	430	2.700	320	1.600	190
8,0		2.000	400	2.000	280	1.200	170
10,0		1.600	380	1.600	260	1.000	160
12,0		1.300	360	1.300	230	800	140
16,0		1.000	320	1.000	200	600	120
20,0		800	260	800	160	480	100
25,0		640	200	640	130	380	80
Shoulder cutting	d_{oc}	1,5 *D*					
	w_{oc}	*0,1 D*		*0,05 D*		*0,05 D*	

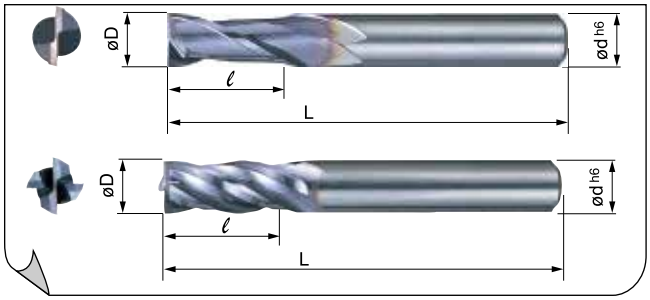
● Grooving

Work Material / Cond.		Stainless Steel		Titanium Alloy		Heat Resistive Steel	
øD (mm)		Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
4,5		4,200	200	3,900	270	1,400	100
5,0		3,800	240	3,500	300	1,300	120
6,0		3,200	260	2,900	300	1,100	140
8,0		2,400	240	2,200	270	800	120
10,0		1,900	220	1,700	250	650	110
12,0		1,600	200	1,400	230	550	100
16,0		1,200	130	1,100	200	400	80
20,0		950	95	890	90	320	60
25,0		760	75	700	70	250	50
Grooving	d_{oc}	0,3 *D*		0,2 *D*		0,15 *D*	

● = Euro stock
❑ = Delivery on request
▲ = To be replaced by new item

GS MILL Series
GLM 2000/4000 SF Type

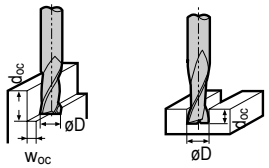
Coated carbide grade: **ACZ20W**



■ Endmills

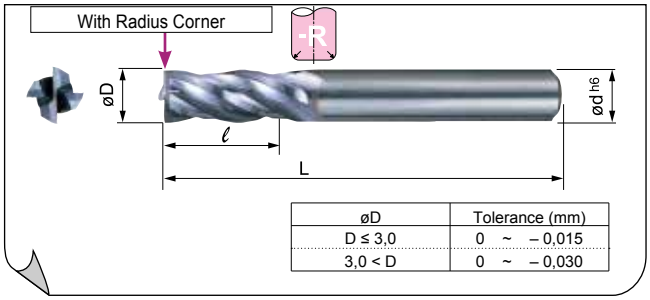
(mm)

No. of teeth	Cat. No.	Stock	øD	ℓ	L	ød
2	GLM 2005 SF	▲	0,5	1,25	38	3
	GLM 2010 SF	▲	1,0	2,5	38	3
	GLM 2015 SF	▲	1,5	3,75	38	3
	GLM 2020 SF	▲	2,0	5,0	38	3
	GLM 2025 SF	▲	2,5	6,25	38	3
	GLM 2030 SF	▲	3,0	7,5	38	3
	GLM 2040 SF	▲	4,0	11,0	45	4
	GLM 2050 SF	▲	5,0	13,0	50	6
	GLM 2060 SF	▲	6,0	13,0	50	6
	GLM 2080 SF	▲	8,0	19,0	60	8
	GLM 2100 SF	▲	10,0	22,0	70	10
	GLM 2120 SF	▲	12,0	26,0	75	12
4	GLM 4010 SF	▲	1,0	2,5	38	3
	GLM 4020 SF	▲	2,0	5,0	38	3
	GLM 4030 SF	▲	3,0	7,5	38	3
	GLM 4040 SF	▲	4,0	11,0	45	4
	GLM 4050 SF	▲	5,0	13,0	50	6
	GLM 4060 SF	▲	6,0	13,0	50	6
	GLM 4080 SF	▲	8,0	19,0	60	8
	GLM 4100 SF	▲	10,0	22,0	70	10
	GLM 4120 SF	▲	12,0	26,0	75	12



GS MILL Series
GLM 4000SF-R Type

Coated carbide grade: **ACZ20W**



øD	Tolerance (mm)
D ≤ 3,0	0 ~ – 0,015
3,0 < D	0 ~ – 0,030

■ Endmills

(mm)

No. of teeth	Cat. No.	Stock	øD	R	ℓ	L	ød
4	GLM 4030 SF-R02	▲	3,0	0,2	7,5	38	3
	GLM 4030 SF-R05	▲	3,0	0,5	7,5	38	3
	GLM 4040 SF-R02	▲	4,0	0,2	11	45	4
	GLM 4040 SF-R05	▲	4,0	0,5	11	45	4
	GLM 4040 SF-R10	▲	4,0	1,0	11	45	4
	GLM 4050 SF-R02	▲	5,0	0,2	13	50	6
	GLM 4050 SF-R05	▲	5,0	0,5	13	50	6
	GLM 4050 SF-R10	▲	5,0	1,0	13	50	6
	GLM 4060 SF-R02	▲	6,0	0,2	13	50	6
	GLM 4060 SF-R05	▲	6,0	0,5	13	50	6
	GLM 4060 SF-R10	▲	6,0	1,0	13	50	6
	GLM 4060 SF-R15	▲	6,0	1,5	13	50	6
	GLM 4080 SF-R02	▲	8,0	0,2	19	60	8
	GLM 4080 SF-R05	▲	8,0	0,5	19	60	8
	GLM 4080 SF-R10	▲	8,0	1,0	19	60	8
	GLM 4080 SF-R15	▲	8,0	1,5	19	60	8
	GLM 4100 SF-R02	▲	10,0	0,2	22	70	10
	GLM 4100 SF-R05	▲	10,0	0,5	22	70	10
	GLM 4100 SF-R10	▲	10,0	1,0	22	70	10
	GLM 4100 SF-R15	▲	10,0	1,5	22	70	10
	GLM 4100 SF-R20	▲	10,0	2,0	22	70	10
	GLM 4120 SF-R02	▲	12,0	0,2	26	75	12
	GLM 4120 SF-R05	▲	12,0	0,5	26	75	12
	GLM 4120 SF-R10	▲	12,0	1,0	26	75	12
	GLM 4120 SF-R15	▲	12,0	1,5	26	75	12
	GLM 4120 SF-R20	▲	12,0	2,0	26	75	12

■ Recommended cutting conditions

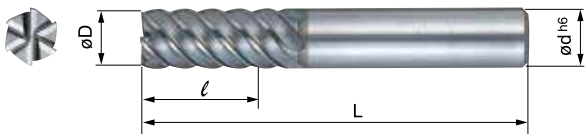
● GS Mill, 2 teeth square type endmill, GLM 2000SF

Material / Cutting data / Tool Dia. (mm)		Carbon steel, Cast iron (HB150~250)		Alloy steel, Prehardened steel (HRC25~35)		Heat treated alloy steel, hardened steel (HRC35~45)		Hardened steel (HRC45~55)		Stainless steel		Heat resistant alloys Titanium alloy	
		Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)
2		11.200	340	10.500	240	7.300	130	5.300	80	5.300	90	3.300	50
4		6.400	460	6.000	320	4.200	180	3.000	110	3.000	130	1.900	70
6		4.600	550	4.300	390	3.000	210	2.200	130	2.200	150	1.400	80
8		3.400	550	3.200	390	2.200	210	1.600	130	1.600	150	1.000	80
10		2.800	560	2.600	390	1.800	210	1.300	130	1.300	150	800	80
12		2.300	560	2.200	400	1.500	210	1.100	130	1.100	150	700	80
Shoulder cutting	d_{oc}	1,5D						1,0D		1,5D		1,0D	
	w_{oc}	0,1D				0,05D		0,02D		0,1D		0,05D	
Slotting	d_{oc}	0,5D				0,2D		0,05D		0,3D		0,05D	

● GS Mill, 4 teeth square type endmill, GLM 4000SF

Material / Cutting data / Tool Dia. (mm)		Carbon steel, Cast iron (HB150~250)		Alloy steel, Prehardened steel (HRC25~35)		Heat treated alloy steel, hardened steel (HRC35~45)		Hardened steel (HRC45~55)		Stainless steel		Heat resistant alloys Titanium alloy	
		Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)
2		12.800	570	12.000	380	8.300	230	6.000	150	6.000	130	3.700	70
4		6.800	730	6.400	490	4.400	300	3.200	200	3.200	170	2.000	90
6		4.600	770	4.300	520	3.000	320	2.200	210	2.200	180	1.400	100
8		3.400	770	3.200	520	2.200	320	1.600	210	1.600	180	1.000	100
10		2.800	780	2.600	520	1.800	320	1.300	210	1.300	180	800	100
12		2.300	780	2.200	530	1.500	320	1.100	210	1.100	180	700	100
Shoulder cutting	d_{oc}	1,5D						1,0D		1,5D		1,0D	
	w_{oc}	0,1D				0,05D		0,02D		0,1D		0,05D	
Slotting	d_{oc}	0,5D				0,2D		0,05D		0,3D		0,05D	

Coated carbide grade: **ACF07C**



Helix angle : 50˚
Corner : Edge with honing

øD	Tolerance (mm)
D ≤ 3,0	0 ~ – 0,015
3,0 < D	0 ~ – 0,030



■ Endmills

(mm)

No. of teeth	Cat. No.	Stock	øD	ℓ	L	ød
4	**GSH 4010 SF**	●	1,0	3	50	6
	GSH 4015 SF	●	1,5	4	50	6
	GSH 4020 SF	●	2,0	6	50	6
6	**GSH 6030 SF**	●	3,0	8	50	6
	GSH 6040 SF	●	4,0	11	50	6
	GSH 6050 SF	●	5,0	12	50	6
	GSH 6060 SF	●	6,0	13	50	6
	GSH 6080 SF	●	8,0	19	60	8
	GSH 6100 SF	●	10,0	22	70	10
	GSH 6120 SF	●	12,0	26	75	12
8	**GSH 8160 SF**	●	16,0	32	90	16
	GSH 8200 SF	●	20,0	38	100	20

Recommended :
(1) Cutting performance is improved when using a high rigidity machine.
(2) Speeds and feeds should be reduced when there is any excessive vibration or strange noise during the operation.

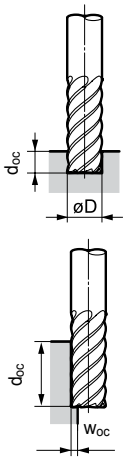
■ Recommended cutting conditions

Conventional Milling Operations

Material / Cutting data / Tool Dia. (mm)		Alloy steel, Prehardened steel (~ HRC35)		Heat treated alloy steel, hardened steel (HRC35~45)		Hardened steel (HRC45~55)		Hardened steel (HRC55~60)		Hardened steel (HRC60~65)		Hardened steel (HRC65 ~)	
		Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)
1		20.000	540	20.000	390	15.600	260	12.300	160	11.100	140	7.800	95
2		19.000	1.100	17.200	770	13.400	530	10.500	320	9.500	270	6.700	190
3		15.000	2.150	13.400	1.540	10.400	1.050	8.200	650	7.400	540	5.200	380
4		11.200	2.400	10.000	1.740	7.800	1.180	6.100	730	5.600	600	3.900	420
5		9.000	2.700	8.000	1.930	6.200	1.300	4.900	810	4.400	670	3.100	470
6		7.500	2.700	6.700	1.930	5.200	1.300	4.100	810	3.700	670	2.600	470
8		5.600	2.700	5.000	1.930	3.900	1.300	3.050	810	2.800	670	1.950	470
10		4.500	2.700	4.000	1.930	3.100	1.300	2.450	810	2.200	670	1.550	470
12		3.750	2.700	3.350	1.930	2.600	1.300	2.050	810	1.850	670	1.300	470
16		2.800	2.500	2.500	1.800	1.950	1.220	1.530	760	1.400	630	980	440
20		2.250	2.100	2.000	1.540	1.550	1.050	1.230	650	1.100	540	780	380
Shoulder cutting	d_{oc}	1 ~ 1,5D				1 ~ 1,5D				1 ~ 1,5D			
	w_{oc}	0,1D				0,05D				0,02D			
Slotting	d_{oc}	0,1D				0,05D				~ 0,05D (Max 0,5)			

HSC Machining Centre Operations

Material / Cutting data / Tool Dia. (mm)		Alloy steel, Prehardened steel (~ HRC35)		Heat treated alloy steel, hardened steel (HRC35~45)		Hardened steel (HRC45~55)		Hardened steel (HRC55~60)		Hardened steel (HRC60~65)	
		Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)
1		48.000	1.250	48.000	1.250	48.000	1.250	48.000	930	38.000	700
2		48.000	2.850	48.000	2.850	48.000	2.850	36.000	1.600	24.000	1.000
3		32.000	4.900	32.000	4.900	32.000	4.900	24.000	2.740	16.000	1.700
4		24.000	5.200	24.000	5.200	24.000	5.200	18.000	2.900	12.000	1.800
5		19.200	5.800	19.200	5.800	19.200	5.800	14.300	3.200	9.600	2.000
6		16.000	5.800	16.000	5.800	16.000	5.800	12.000	3.200	8.000	2.000
8		12.000	5.800	12.000	5.800	12.000	5.800	9.000	3.200	6.000	2.000
10		9.600	5.800	9.600	5.800	9.600	5.800	7.200	3.200	4.800	2.000
12		8.000	5.800	8.000	5.800	8.000	5.800	6.000	3.200	4.000	2.000
16		6.000	5.400	6.000	5.400	6.000	5.400	4.500	3.000	3.000	1.900
20		4.800	4.600	4.800	4.600	4.800	4.600	3.600	2.580	2.400	1.600
Shoulder cutting	d_{oc}	1 ~ 1,5D		1 ~ 1,5D				1 ~ 1,5D		1 ~ 1,5D	
	w_{oc}	0,1D		0,05D				0,02D		0,12D	



● = Euro stock

GS MILL Series
GSRE 4000SF Type

Coated carbide grade: **ACZ20W**



Helix angle : 40°



■ Endmills

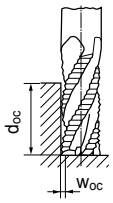
(mm)

No. of teeth	Cat. No.	Stock	øD	ℓ	L	ød
4	**GSRE 4060 SF**	●	6,0	13	50	6
	GSRE 4070 SF	●	7,0	16	60	8
	GSRE 4080 SF	●	8,0	19	60	8
	GSRE 4090 SF	●	9,0	19	70	10
	GSRE 4100 SF	●	10,0	22	70	10
	GSRE 4110 SF	●	11,0	22	75	12
	GSRE 4120 SF	●	12,0	26	75	12
	GSRE 4140 SF	●	14,0	26	90	16
	GSRE 4160 SF	●	16,0	32	90	16
	GSRE 4180 SF	●	18,0	32	100	20
	GSRE 4200 SF	●	20,0	38	100	20

Recommended :

(1) Cutting performance is improved when using a high rigidity machine.

(2) Speeds and feeds should be reduced when there is any excessive vibration or strange noise during the operation.

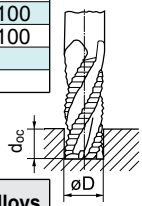


■ Recommended cutting conditions

● Shoulder cutting

Material / Cutting data / Tool Dia. (mm)		Carbon steel (HB150~250)		Cast iron		Alloy steel, Prehardened steel (HRC25~35)		Hardened steel (HRC40~50)		Stainless steel		Heat resistant alloys Titanium alloy	
		Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)
1		4.800	1.200	5.800	1.500	3.200	380	2.600	400	4.300	250	1.600	90
2		4.100	1.200	5.000	1.500	2.700	380	2.200	400	4.500	250	1.350	90
3		3.600	1.200	4.500	1.500	2.400	380	2.000	400	4.000	250	1.250	90
4		3.200	1.200	4.000	1.500	2.100	380	1.800	400	3.500	250	1.050	90
5		2.800	1.200	2.500	1.500	1.900	380	1.600	400	3.200	250	1.000	100
6		2.600	1.200	3.000	1.400	1.700	380	1.500	400	2.900	250	900	100
8		2.400	1.200	2.900	1.400	1.600	400	1.300	400	2.600	250	800	100
10		2.200	1.100	2.600	1.300	1.300	380	1.100	350	2.200	200	700	100
12		1.800	900	2.200	1.100	1.200	380	1.000	350	2.000	180	600	100
16		1.400	700	1.800	900	1.000	380	900	350	1.800	150	550	100
20		1.400	700	1.700	800	850	380	800	350	1.600	150	500	100
Shoulder cutting	d_{oc}	1,5D						1,5D					
	w_{oc}	0,5D						0,3D					

● Slotting



Material / Cutting data / Tool Dia. (mm)		Carbon steel (HB150~250)		Cast iron		Alloy steel, Prehardened steel (HRC25~35)		Hardened steel (HRC40~50)		Stainless steel		Heat resistant alloys Titanium alloy	
		Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)
1		3.600	900	4.300	1.100	2.400	300	1.700	260	4.200	250	1.100	60
2		3.000	900	3.700	1.100	2.000	280	1.500	260	3.600	250	900	60
3		2.700	900	3.400	1.100	1.800	280	1.350	260	3.200	250	800	60
4		2.400	900	3.000	1.100	1.600	280	1.200	260	2.800	250	700	60
5		2.100	900	2.600	1.100	1.400	280	1.100	270	2.500	250	650	65
6		2.000	900	2.300	1.100	1.300	280	1.000	270	2.300	250	600	70
8		1.800	900	2.200	1.100	1.200	300	900	270	2.100	250	550	70
10		1.600	800	2.000	1.100	1.000	290	750	240	1.800	180	450	65
12		1.350	650	1.650	850	900	280	700	240	1.600	160	400	65
16		1.200	550	1.500	750	800	280	600	230	1.400	140	350	60
20		1.050	500	1.350	700	700	280	550	210	1.250	125	300	60
Slotting	d_{oc}	1,0D						0,5D					

UP MILL Series



Features

ZX coated general use endmill for high efficient slotting and side cutting of steels, stainless steels, high temperature alloys and cast irons.

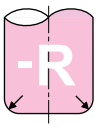
Unique flute design and strong cutting edge ensure excellent chip control even when rough machining slots.

Feed rate up to 2000 mm/min with and without coolant

Advantages



- Unique flute design for excellent chip removal
- Extra strong cutting edge
- 40° high helix angle for high feed rates
- New ZX coating for excellent wear resistance
- Smooth cutting
- Excellent rigid wide cutting land

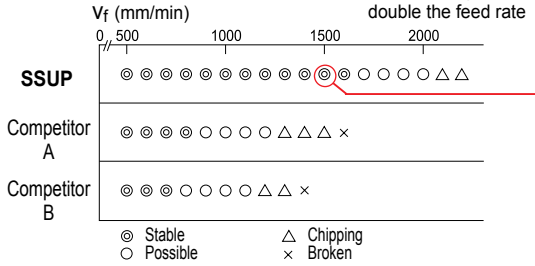


SSUP 4000ZX-R Series
Diameter and Corner Radius Range

øD \ R	R0,2	R0,3	R0,5	R1,0	R1,5	R2.0	R3.0
ø3	●		●				
ø4	●		●	●			
ø5	●		●	●			
ø6		●	●	●	●		
ø8		●	●	●	●		
ø10		●	●	●	●	●	
ø12			●	●	●	●	●
ø16				●	●	●	●
ø20				●	●	●	●

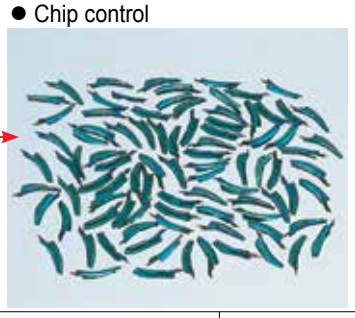
Performance

● Feed rate comparisons



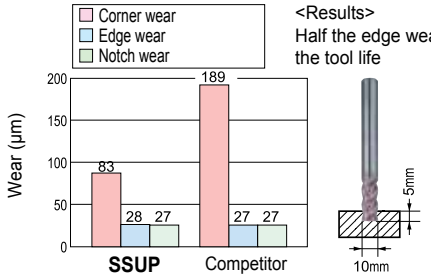
Work material: X155CrVMo12 1 (HB220) Tool : ø10mm, 4 flute Cutting length: 10m	Cutting conditions : n = 2250 rpm, v_c = 80m/min d_{oc}=10mm, w_{oc}=10mm Dry

● Chip control



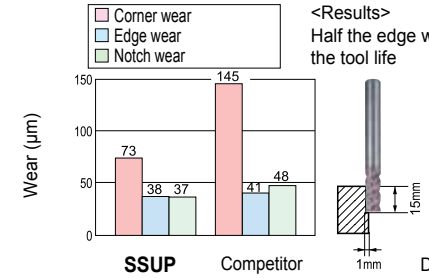
Work material: X155CrVMo12 1 (HB220) Tool : ø10mm, 4 flute	Cutting conditions : n = 2250 rpm, v_c = 80m/min f_t = 0,147mm/tooth (v_f =1500 mm/min) d_{oc}=10mm, w_{oc}=10mm, Dry

● Wear resistance comparison - slotting



Work material: 40CrMoV5 H_RC40 Tool : ø10mm, 4 flute Cutting length: 7,5m	Cutting conditions : n = 1600 rpm, v_c = 50m/min f_t = 0,04mm/tooth (v_f =500 mm/min) d_{oc}=5mm, w_{oc}=10mm, Dry

● Wear resistance comparison - shoulder cutting

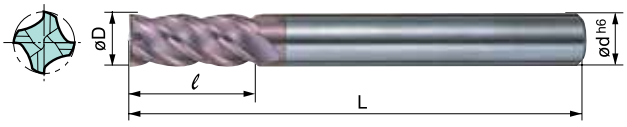


Work material: X155CrVMo12 1 (HB220) Tool : ø10mm, 4 flute Cutting length: 15m	Cutting conditions : n = 1750 rpm, v_c = 55m/min f_t = 0,086mm/tooth (v_f =600 mm/min) d_{oc}=15mm, w_{oc}=1mm, Dry

● = Euro stock
❑ = Delivery on request

ZX Coated UP MILL
SSUP 4000ZX Type

Coated carbide grade: ACZ50M



Helix angle : 40°
Corner : Sharp edge

øD	Tolerance (mm)
D ≤ 3,0	– 0,014 – 0,028
3,0 < D ≤ 6,0	– 0,020 – 0,038
6,0 < D	– 0,025 – 0,047

■ Endmills

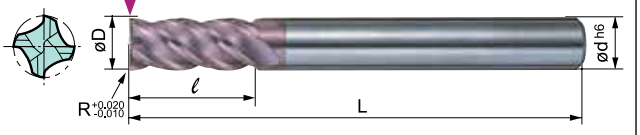
(mm)

	Cat. No.	Stock	øD	ℓ	L	ød
4	SSUP 4020ZX	●	2,0	6	50	4
	SSUP 4030ZX	●	3,0	8	50	6
	SSUP 4040ZX	●	4,0	11	50	6
	SSUP 4050ZX	●	5,0	13	60	6
	SSUP 4060ZX	●	6,0	13	60	6
	SSUP 4070ZX	●	7,0	16	70	8
	SSUP 4080ZX	●	8,0	19	80	8
	SSUP 4090ZX	●	9,0	19	90	10
	SSUP 4100ZX	●	10,0	22	90	10
	SSUP 4110ZX	●	11,0	22	90	12
	SSUP 4120ZX	●	12,0	26	90	12
	SSUP 4140ZX	●	14,0	26	110	16
	SSUP 4150ZX	❑	15,0	26	110	16
	SSUP 4160ZX	●	16,0	32	115	16
	SSUP 4180ZX	❑	18,0	32	120	20
	SSUP 4200ZX	●	20,0	38	125	20

ZX Coated UP MILL
SSUP 4000ZX-R Type

With Radius Corner

Coated carbide grade: ACZ50M



Helix angle : 40°
Corner : Sharp edge

-R

øD	Tolerance (mm)
D ≤ 3,0	– 0,014 – 0,028
3,0 < D ≤ 6,0	– 0,020 – 0,038
6,0 < D	– 0,025 – 0,047

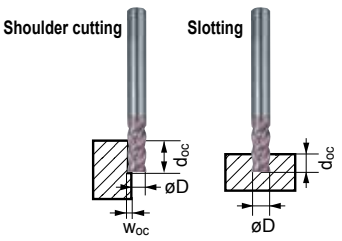
■ Endmills

(mm)

	Cat. No.	Stock	øD	R	ℓ	L	ød
4	SSUP 4030ZX-R02	●	3,0	0,2	8	50	6
	SSUP 4030ZX-R05	❑	3,0	0,5	8	50	6
	SSUP 4040ZX-R02	●	4,0	0,2	11	50	6
	SSUP 4040ZX-R05	●	4,0	0,5	11	50	6
	SSUP 4040ZX-R10	❑	4,0	1,0	11	50	6
	SSUP 4050ZX-R02	●	5,0	0,2	13	60	6
	SSUP 4050ZX-R05	●	5,0	0,5	13	60	6
	SSUP 4050ZX-R10	❑	5,0	1,0	13	60	6
	SSUP 4060ZX-R03	●	6,0	0,3	13	60	6
	SSUP 4060ZX-R05	●	6,0	0,5	13	60	6
	SSUP 4060ZX-R10	●	6,0	1,0	13	60	6
	SSUP 4060ZX-R15	❑	6,0	1,5	13	60	6
	SSUP 4080ZX-R03	●	8,0	0,3	13	80	8
	SSUP 4080ZX-R05	●	8,0	0,5	13	80	8
	SSUP 4080ZX-R10	●	8,0	1,0	19	80	8
	SSUP 4080ZX-R15	❑	8,0	1,5	19	80	8
	SSUP 4080ZX-R20	❑	8,0	2,0	19	80	8
	SSUP 4100ZX-R03	●	10,0	0,3	22	90	10
	SSUP 4100ZX-R05	●	10,0	0,5	22	90	10
	SSUP 4100ZX-R10	●	10,0	1,0	22	90	10
	SSUP 4100ZX-R15	❑	10,0	1,5	22	90	10
	SSUP 4100ZX-R20	❑	10,0	2,0	22	90	10
	SSUP 4120ZX-R05	●	12,0	0,5	26	90	12
	SSUP 4120ZX-R10	●	12,0	1,0	26	90	12
	SSUP 4120ZX-R15	●	12,0	1,5	26	90	12
	SSUP 4120ZX-R20	❑	12,0	2,0	26	90	12
	SSUP 4120ZX-R30	❑	12,0	3,0	26	90	12
	SSUP 4160ZX-R10	●	16,0	1,0	32	115	16
	SSUP 4160ZX-R15	●	16,0	1,5	32	115	16
	SSUP 4160ZX-R20	❑	16,0	2,0	32	115	16
	SSUP 4160ZX-R30	❑	16,0	3,0	32	115	16
	SSUP 4200ZX-R10	●	20,0	1,0	38	125	20
	SSUP 4200ZX-R15	❑	20,0	1,5	38	125	20
	SSUP 4200ZX-R20	❑	20,0	2,0	38	125	20
	SSUP 4200ZX-R30	❑	20,0	3,0	38	125	20

● Recommended cutting conditions

Material / Cutting data / øD (mm)	Carbon steel, Cast iron (HB150~250) Speed (rpm)	Feed (mm/min)	Alloy steel, Prehardened steel (HRC25~35) Speed (rpm)	Feed (mm/min)	Hardened steel (HRC40~50) Speed (rpm)	Feed (mm/min)	Stainless steel Speed (rpm)	Feed (mm/min)	Heat resistant alloys Titanium alloy (HRC20~45) Speed (rpm)	Feed (mm/min)
2	9000	720	6000	430	4000	320	5500	320	2600	120
4	6600	800	4500	450	3000	380	4000	320	2000	120
6	4800	960	3000	480	2500	380	3000	480	1200	120
8	3600	1000	2200	610	2000	400	2000	520	1000	140
10	2800	1000	1800	610	1500	400	1700	550	800	160
12	2400	950	1500	550	1200	380	1500	500	700	140
14	2200	880	1300	490	1000	360	1200	430	600	130
16	1800	650	1100	420	800	300	1000	360	500	120
18	1600	580	1000	360	750	270	900	340	450	110
20	1400	500	900	330	700	250	820	300	400	100
Shoulder cutting d_{oc}	1,5D									
Shoulder cutting w_{oc}	0,1D				0,05D		0,1D		0,05D	
Slotting d_{oc}	1,0D				0,2D		0,3D		0,2D	



(1) Cutting performance is improved when using a high rigidity machine.
(2) Speeds and feeds should be reduced when slotting some stainless steels.
(3) In case of chatter first check the cutting conditions.

AURORA COAT Series



Features

Sumitomo Electric's "AURORA" COAT is a high hardness, low coefficient layer of "Diamond Like Carbon" (DLC).

Other than producing excellent surface finish for machining of Aluminium and non-ferrous metals, DLC coat can be used for dry cutting and is environmental friendly.

Characteristics / Application

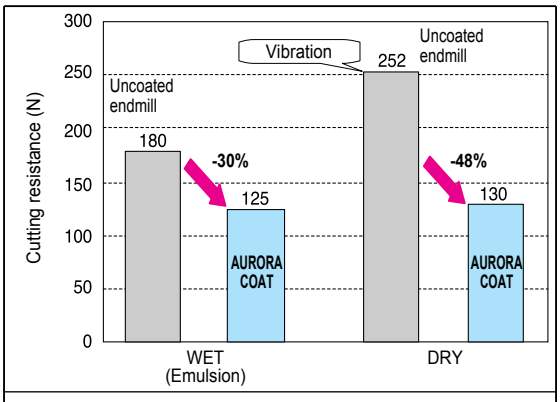
- Very smooth AURORA COAT results in low adhesion as well as good surface finish
- With lower cutting forces and high rigidity, this series is suitable for low rigidity machine
- Available in 2 and 4 flutes square type as well as ballnose type endmills

Product Range

Series	No. of teeth	Shape	Diameter
ASM2000DL	2	Square 	ø2~ø16
ASM4000DL	4	Square 	ø2~ø16
SNB2000DL	2	Ballnose 	ø2~ø16 (R1~R8)

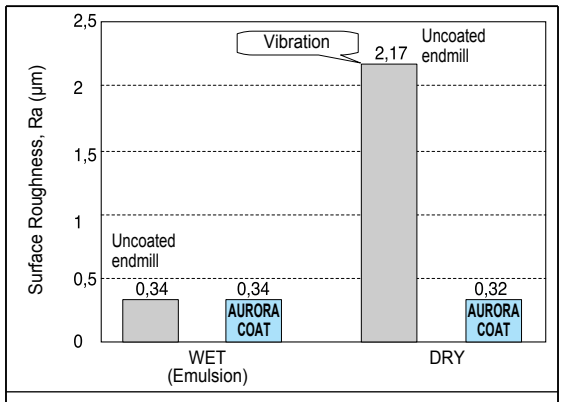
Efficiency

● Performance Comparison

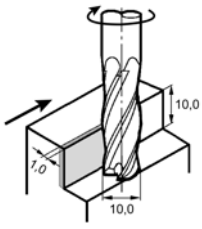


Work Material: A5052
Tool: ASM4100DL, ø10mm 4 teeth
Cutting Conditions: v_c=200m/min, n=6,300rpm, v_f=1300mm/min
f_t=0,05mm/tooth, d_{oc}=10mm, w_{oc}=1,0mm
Down Cut

● Surface Finish Comparison



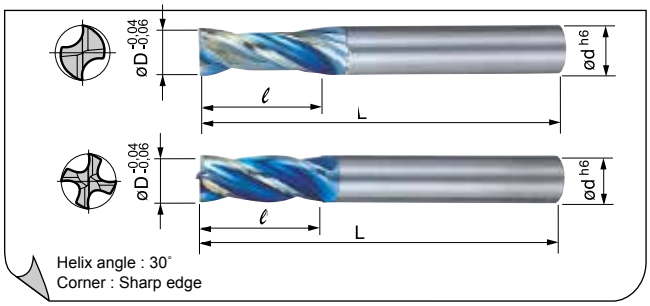
Work Material: A5052
Tool: ASM4100DL, ø10mm 4 teeth
Cutting Conditions: v_c=200m/min, n=6,300rpm, v_f=1300mm/min
f_t=0,05mm/tooth, d_{oc}=10mm, w_{oc}=1,0mm
Down Cut



● = Euro stock

AURORA Coated Spiral Endmills
ASM 2000/4000 DL Type

DLC coated carbide grade: DL1000



■ Endmills (mm)

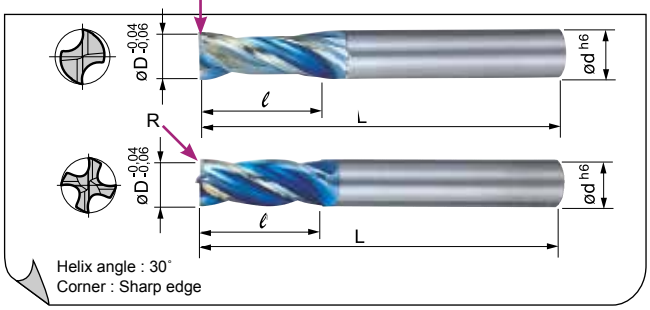
	Cat. No.	Stock	øD	ℓ	L	ød
2	**ASM 2020 DL**	●	2,0	6	40	4
	ASM 2030 DL	●	3,0	10	45	6
	ASM 2040 DL	●	4,0	12	45	6
	ASM 2050 DL	●	5,0	15	50	6
	ASM 2060 DL	●	6,0	15	50	6
	ASM 2080 DL	●	8,0	18	60	8
	ASM 2100 DL	●	10,0	22	71	10
	ASM 2120 DL	●	12,0	25	75	12
	ASM 2160 DL	●	16,0	32	90	16

	Cat. No.	Stock	øD	ℓ	L	ød
4	**ASM 4020 DL**	●	2,0	6	40	4
	ASM 4030 DL	●	3,0	10	45	6
	ASM 4040 DL	●	4,0	12	45	6
	ASM 4050 DL	●	5,0	15	50	6
	ASM 4060 DL	●	6,0	15	50	6
	ASM 4080 DL	●	8,0	18	60	8
	ASM 4100 DL	●	10,0	22	71	10
	ASM 4120 DL	●	12,0	25	75	12
	ASM 4160 DL	●	16,0	32	90	16

AURORA Coated Spiral Endmills
ASM 2000/4000 DL-R Type

With Radius Corner

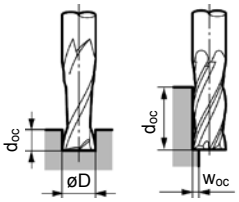
DLC coated carbide grade: DL1000



■ Endmills (mm)

	Cat. No.	Stock	øD	R	ℓ	L	ød
2	**ASM 2080 DL-R10**	●	8,0	1,0	18	60	8
	ASM 2080 DL-R20	●	8,0	2,0	18	60	8
	ASM 2100 DL-R10	●	10,0	1,0	22	71	10
	ASM 2100 DL-R20	●	10,0	2,0	22	71	10
	ASM 2120 DL-R20	●	12,0	2,0	25	75	12
	ASM 2120 DL-R30	●	12,0	3,0	25	75	12
	ASM 2160 DL-R30	●	16,0	3,0	32	90	16

	Cat. No.	Stock	øD	R	ℓ	L	ød
4	**ASM 4080 DL-R10**	●	8,0	1,0	18	60	8
	ASM 4080 DL-R20	●	8,0	2,0	18	60	8
	ASM 4100 DL-R10	●	10,0	1,0	22	71	10
	ASM 4100 DL-R20	●	10,0	2,0	22	71	10
	ASM 4120 DL-R20	●	12,0	2,0	25	75	12
	ASM 4120 DL-R30	●	12,0	3,0	25	75	12
	ASM 4160 DL-R30	●	16,0	3,0	32	90	16



■ Recommended cutting conditions

Recommended :

(1) Cutting performance is improved when using a high rigidity machine.

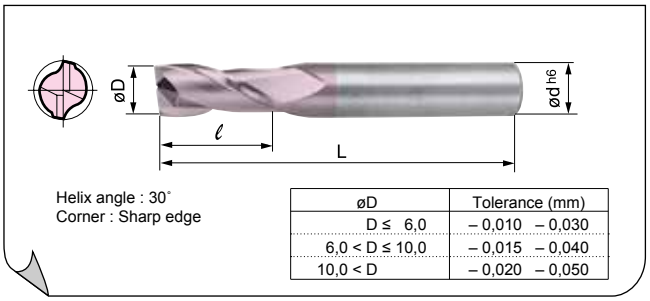
(2) Speeds and feeds should be reduced when there is any excessive vibration or strange noise during the operation.

(3) In case of chatter first check the cutting conditions.

Work Material		Aluminium Alloy							
Cutting data / øD (mm)		Wet (Emulsion)				Dry			
		Side Milling (4 teeth)		Groove Milling (4 teeth)		Side Milling (4 teeth)		Groove Milling (4 teeth)	
		Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)
2,0		40.000	1.400	28.000	280	40.000	980	28.000	200
3,0		32.000	2.000	22.000	400	32.000	1.400	22.000	280
4,0		26.000	2.600	18.000	520	26.000	1.800	18.000	360
5,0		20.000	2.600	14.000	520	20.000	1.800	14.000	360
6,0		17.000	2.700	12.000	540	17.000	1.900	12.000	370
8,0		13.000	2.700	9.000	540	13.000	1.900	9.000	370
10,0		11.000	2.800	7.200	560	11.000	2.000	7.200	390
12,0		8.500	2.800	6.000	560	8.500	2.000	6.000	390
16,0		6.400	2.800	4.500	560	6.400	2.000	4.500	390
Depth and wide of cut	d_{oc}	1,5D		1,0D		1,5D		0,5D	
	W_{oc}	0,2D		(D)		0,2D		(D)	

ZX Coated Spiral Endmills
SSM 2000ZX Type

Coated carbide grade: ACZ50



Helix angle : 30˚
Corner : Sharp edge

øD	Tolerance (mm)
D ≤ 6,0	– 0,010 – 0,030
6,0 < D ≤ 10,0	– 0,015 – 0,040
10,0 < D	– 0,020 – 0,050

Endmills

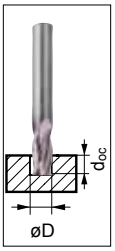
(mm)

	Cat. No.	Stock	øD	ℓ	L	ød
2	SSM 2010ZX	▲	1,0	3	40	4
	SSM 2015ZX	▲	1,5	5	40	4
	SSM 2020ZX	▲	2,0	6	40	4
	SSM 2021ZX		2,1	6	40	4
	SSM 2022ZX		2,2	6	40	4
	SSM 2023ZX		2,3	6	40	4
	SSM 2024ZX		2,4	6	40	4
	SSM 2025ZX	▲	2,5	8	40	4
	SSM 2026ZX		2,6	8	40	4
	SSM 2027ZX		2,7	8	40	4
	SSM 2028ZX		2,8	8	40	4
	SSM 2029ZX		2,9	8	40	4
	SSM 2030ZX	▲	3,0	8	45	6
	SSM 2035ZX	▲	3,5	8	45	6
	SSM 2040ZX	▲	4,0	10	45	6
	SSM 2045ZX	▲	4,5	10	45	6
	SSM 2050ZX	▲	5,0	12	50	6
	SSM 2055ZX	▲	5,5	12	50	6
	SSM 2060ZX	▲	6,0	12	50	6
	SSM 2065ZX	❑	6,5	12	50	8
	SSM 2070ZX	▲	7,0	15	55	8
	SSM 2075ZX	▲	7,5	15	55	8
	SSM 2080ZX	▲	8,0	15	55	8
	SSM 2085ZX	▲	8,5	15	55	10
	SSM 2090ZX	▲	9,0	15	55	10
	SSM 2095ZX	▲	9,5	15	55	10
	SSM 2100ZX	▲	10,0	18	65	10
	SSM 2105ZX		10,5	18	70	12
	SSM 2110ZX	▲	11,0	18	70	12
	SSM 2115ZX		11,5	18	70	12
	SSM 2120ZX	▲	12,0	18	70	12
	SSM 2130ZX		13,0	20	80	16
	SSM 2140ZX	▲	14,0	20	80	16
	SSM 2150ZX	▲	15,0	25	80	16
	SSM 2160ZX	▲	16,0	35	90	16
	SSM 2180ZX	▲	18,0	40	105	20
	SSM 2200ZX	▲	20,0	40	105	20

Recommended conditions

(Slotting) øD<ø3 ; d_{oc} =0,5 x øD
øD≥ø3 ; d_{oc} =1,0 x øD

øD	Material	Carbon steel, Alloy steel (BelowHRC25)	Carbon steel, Alloy steel (BelowHRC45)	Cast iron	Stainless steel, Ti-alloy etc,
1,0 ~ 2,9	v_c	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f_t	0,003~0,010	0,002~0,005	0,005~0,016	0,002~0,005
3,0 ~ 5,9	v_c	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f_t	0,012~0,024	0,006~0,011	0,018~0,040	0,006~0,011
6,0 ~ 12,9	v_c	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f_t	0,025~0,050	0,013~0,025	0,045~0,105	0,013~0,025
13,0 ~ 20,0	v_c	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f_t	0,055~0,085	0,030~0,050	0,110~0,170	0,030~0,050

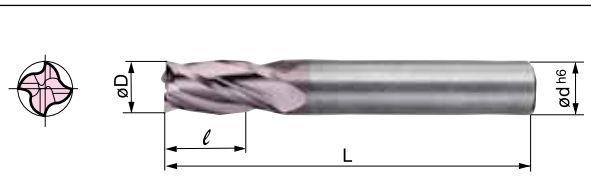


v_c =m/min f_t =mm/tooth

▲ = To be replaced by new item
❑ = Delivery on request

ZX Coated Spiral Endmills
SSM 4000ZX Type

Coated carbide grade: ACZ50



Helix angle : 30˚
Corner : Sharp edge

øD	Tolerance (mm)
D ≤ 6,0	– 0,010 – 0,030
6,0 < D ≤ 10,0	– 0,015 – 0,040
10,0 < D	– 0,020 – 0,050

Endmills

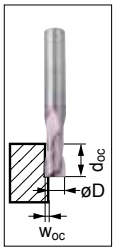
(mm)

	Cat. No.	Stock	øD	ℓ	L	ød
4	SSM 4015ZX	▲	1,5	5,0	40	4
	SSM 4020ZX	▲	2,0	6,0	40	4
	SSM 4025ZX	▲	2,5	8,0	40	4
	SSM 4030ZX	▲	3,0	8,0	45	6
	SSM 4035ZX	▲	3,5	8,0	45	6
	SSM 4040ZX	▲	4,0	10,0	45	6
	SSM 4045ZX	▲	4,5	10,0	45	6
	SSM 4050ZX	▲	5,0	12,0	50	6
	SSM 4055ZX	▲	5,5	12,0	50	6
	SSM 4060ZX	▲	6,0	12,0	50	6
	SSM 4065ZX	▲	6,5	12,0	50	8
	SSM 4070ZX	▲	7,0	15,0	55	8
	SSM 4075ZX	▲	7,5	15,0	55	8
	SSM 4080ZX	▲	8,0	15,0	55	8
	SSM 4085ZX	▲	8,5	15,0	55	10
	SSM 4090ZX	▲	9,0	15,0	55	10
	SSM 4095ZX	▲	9,5	15,0	55	10
	SSM 4100ZX	▲	10,0	18,0	65	10
	SSM 4105ZX		10,5	18,0	65	12
	SSM 4110ZX	▲	11,0	18,0	70	12
	SSM 4115ZX		11,5	18,0	70	12
	SSM 4120ZX	▲	12,0	18,0	70	12
	SSM 4130ZX	▲	13,0	20,0	80	16
	SSM 4135ZX		13,5	20,0	80	16
	SSM 4140ZX	▲	14,0	20,0	80	16
	SSM 4150ZX	▲	15,0	25,0	80	16
	SSM 4160ZX	▲	16,0	35,0	90	16
	SSM 4170ZX		17,0	35,0	90	20
	SSM 4180ZX		18,0	40,0	105	20
	SSM 4190ZX		19,0	40,0	105	20
	SSM 4200ZX	▲	20,0	40,0	105	20
	SSM 4220ZX		22,0	40,0	105	25
	SSM 4240ZX	▲	24,0	45,0	115	25
	SSM 4250ZX		24,0	50,0	120	25
	SSM 4300ZX		30,0	55,0	130	32
	SSM 4320ZX		32,0	55,0	130	32

Recommended conditions

(Shoulder processing) d_{oc} =1,5 x øD
w_{oc} =0,1 x øD

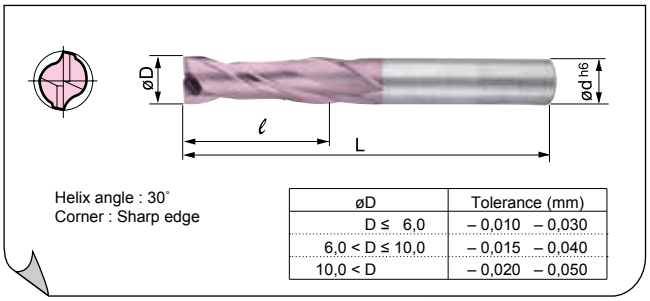
øD	Material	Carbon steel, Alloy steel (BelowHRC25)	Carbon steel, Alloy steel (BelowHRC45)	Cast iron	Stainless steel, Ti-alloy etc,
1,0 ~ 2,9	v_c	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f_t	0,004~0,017	0,002~0,008	0,008~0,020	0,002~0,008
3,0 ~ 5,9	v_c	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f_t	0,018~0,036	0,009~0,018	0,027~0,060	0,009~0,018
6,0 ~ 12,9	v_c	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f_t	0,038~0,070	0,019~0,035	0,065~0,157	0,019~0,035
13,0 ~ 19,9	v_c	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f_t	0,075~0,125	0,040~0,075	0,160~0,250	0,040~0,075
20,0 ~ 32,0	v_c	200-250-300	100-**150**-200	100-**120**-150	60-**75**-90
	f_t	0,135~0,170	0,085~0,110	0,257~0,390	0,085~0,110



v_c =m/min f_t =mm/tooth

ZX Coated Long Spiral Endmills
LSM 2000ZX Type

Coated carbide grade: ACZ50



Helix angle : 30°
Corner : Sharp edge

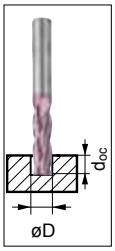
øD	Tolerance (mm)
D ≤ 6,0	– 0,010 – 0,030
6,0 < D ≤ 10,0	– 0,015 – 0,040
10,0 < D	– 0,020 – 0,050

■ Endmills (mm)

	Cat. No.	Stock	øD	ℓ	L	ød
2	**LSM 2010ZX**		1,0	5,0	45	4
	LSM 2015ZX		1,5	7,0	45	4
	LSM 2020ZX		2,0	9,0	45	4
	LSM 2025ZX		2,5	12,0	45	4
	LSM 2030ZX	❑	3,0	12,0	50	6
	LSM 2035ZX	❑	3,5	12,0	50	6
	LSM 2040ZX	❑	4,0	15,0	50	6
	LSM 2045ZX		4,5	15,0	50	6
	LSM 2050ZX	❑	5,0	18,0	55	6
	LSM 2055ZX		5,5	18,0	55	6
	LSM 2060ZX	❑	6,0	18,0	55	6
	LSM 2065ZX	❑	6,5	18,0	55	8
	LSM 2070ZX	❑	7,0	25,0	65	8
	LSM2075ZX		7,5	25,0	65	8
	LSM 2080ZX	❑	8,0	25,0	65	8
	LSM 2085ZX		8,5	25,0	65	10
	LSM 2090ZX	❑	9,0	25,0	65	10
	LSM 2095ZX		9,5	25,0	65	10
	LSM 2100ZX	❑	10,0	30,0	75	10
	LSM 2105ZX		10,5	30,0	80	12
	LSM 2110ZX	❑	11,0	30,0	80	12
	LSM 2115ZX		11,5	30,0	80	12
	LSM 2120ZX	❑	12,0	30,0	80	12
	LSM 2130ZX	❑	13,0	35,0	95	16
	LSM 2140ZX		14,0	40,0	95	16
	LSM 2150ZX		15,0	40,0	95	16
	LSM 2160ZX		16,0	50,0	105	16
	LSM 2170ZX		17,0	50,0	105	20
	LSM 2180ZX		18,0	50,0	115	20
	LSM 2190ZX		19,0	55,0	120	20
	LSM 2200ZX		20,0	55,0	120	20
	LSM 2240ZX		24,0	65,0	140	25
	LSM 2250ZX		25,0	65,0	140	25

Recommended conditions (Slotting) øD<ø3 ; d_{oc} =0,5 x øD
øD≥ø3 ; d_{oc} =1,0 x øD

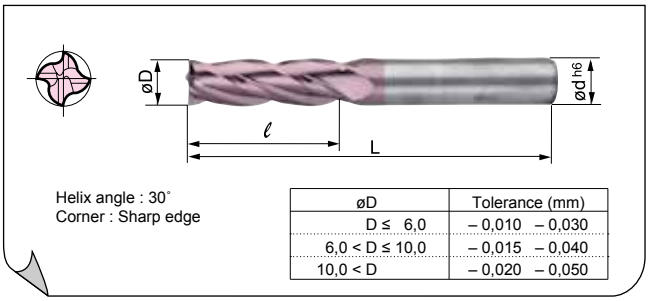
øD \ Material		Carbon steel, Alloy steel (BelowHRC25)	Carbon steel, Alloy steel (BelowHRC45)	Cast iron	Stainless steel, Ti-alloy etc,
1,0 ~ 2,9	v_c	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f_t	0,002~0,008	0,001~0,004	0,003~0,01 2	0,001~0,004
3,0 ~ 5,9	v_c	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f_t	0,009~0,018	0,004~0,008	0,014~0,030	0,004~0,008
6,0 ~ 12,9	v_c	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f_t	0,019~0,038	0,009~0,019	0,034~0,079	0,009~0,019
13,0 ~ 19,9	v_c	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f_t	0,041~0,064	0,023~0,038	0,083~0,128	0,023~0,038
20,0 ~ 25,0	v_c	200-250-300	100-**150**-200	100-**120**-150	60-**75**-90
	f_t	0,071~0,090	0,041~0,052	0,139~0,195	0,041~0,052



v_c =m/min f_t =mm/tooth

ZX Coated Long Spiral Endmills
LSM 4000ZX Type

Coated carbide grade: ACZ50



Helix angle : 30°
Corner : Sharp edge

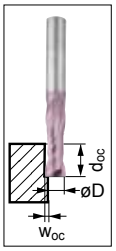
øD	Tolerance (mm)
D ≤ 6,0	– 0,010 – 0,030
6,0 < D ≤ 10,0	– 0,015 – 0,040
10,0 < D	– 0,020 – 0,050

■ Endmills (mm)

	Cat. No.	Stock	øD	ℓ	L	ød
4	**LSM 4030ZX**	❑	3,0	12,0	50	6
	LSM 4035ZX	❑	3,5	12,0	50	6
	LSM 4040ZX	❑	4,0	15,0	50	6
	LSM 4045ZX	❑	4,5	15,0	50	6
	LSM 4050ZX	❑	5,0	18,0	55	6
	LSM 4055ZX		5,5	18,0	55	6
	LSM 4060ZX	❑	6,0	18,0	55	6
	LSM 4065ZX		6,5	18,0	55	8
	LSM 4070ZX	❑	7,0	25,0	65	8
	LSM 4075ZX	❑	7,5	25,0	65	8
	LSM 4080ZX	❑	8,0	25,0	65	8
	LSM 4085ZX		8,5	25,0	65	10
	LSM 4090ZX	❑	9,0	25,0	65	10
	LSM 4095ZX		9,5	25,0	65	10
	LSM 4100ZX	❑	10,0	30,0	75	10
	LSM 4110ZX	❑	11,0	30,0	80	12
	LSM 4115ZX		11,5	30,0	80	12
	LSM 4120ZX	❑	12,0	30,0	80	12
	LSM 4130ZX	❑	13,0	35,0	95	16
	LSM4140ZX	❑	14,0	40,0	95	16
	LSM 4150ZX	❑	15,0	40,0	95	16
	LSM 4160ZX	❑	16,0	50,0	105	16
	LSM 4170ZX		17,0	50,0	105	20
	LSM 4180ZX		18,0	50,0	115	20
	LSM 4190ZX		19,0	55,0	120	20
	LSM 4200ZX	❑	20,0	55,0	120	20
	LSM 4220ZX		22,0	60,0	135	25
	LSM 4250ZX	❑	25,0	65,0	140	25

Recommended conditions (Shoulder processing) d_{oc} =1,5 x øD
w_{oc} =0,1 x øD

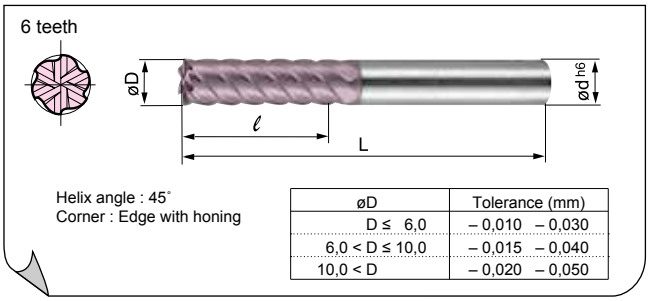
øD \ Material		Carbon steel, Alloy steel (BelowHRC25)	Carbon steel, Alloy steel (BelowHRC45)	Cast iron	Stainless steel, Ti-alloy etc,
3,0 ~ 5,9	v_c	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f_t	0,013~0,027	0,007~0,01 3	0,020~0,045	0,007~0,013
6,0 ~ 12,9	v_c	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f_t	0,028~0,052	0,014~0,026	0,049~0,118	0,014~0,026
13,0 ~ 19,9	v_c	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f_t	0,056~0,094	0,030~0,056	0,120~0,187	0,030~0,056
20,0 ~ 25,0	v_c	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f_t	0,101~0,127	0,064~0,082	0,193~0,292	0,064~0,082



v_c =m/min f_t =mm/tooth

ZX Coated Long Fast Helix Endmills
LHHM 4000/6000/8000 ZX Type

Coated carbide grade: ACZ10M



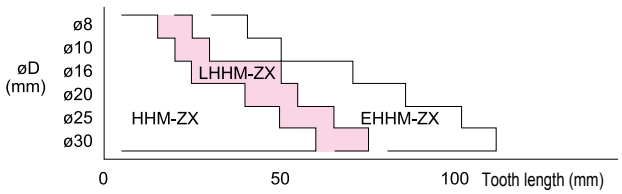
Helix angle : 45°
Corner : Edge with honing

øD	Tolerance (mm)
D ≤ 6,0	– 0,010 – 0,030
6,0 < D ≤ 10,0	– 0,015 – 0,040
10,0 < D	– 0,020 – 0,050

Endmills

(mm)

	Cat. No.	Stock	øD	ℓ	L	ød
4	**LHHM 4030ZX**	❑	3,0	12	55	6
	LHHM 4040ZX	❑	4,0	15	60	6
	LHHM 4050ZX	❑	5,0	18	60	6
6	**LHHM 6060ZX**	❑	6,0	18	60	6
	LHHM 6080ZX	❑	8,0	25	75	8
	LHHM 6100ZX	❑	10,0	30	80	10
	LHHM 6120ZX	❑	12,0	30	100	12
8	**LHHM 8160ZX**	❑	16,0	50	105	16
	LHHM 8200ZX	❑	20,0	55	120	20
	LHHM 8250ZX	❑	25,0	65	140	25
	LHHM 8300ZX	❑	30,0	75	160	32
	LHHM 8320ZX	❑	32,0	85	170	32

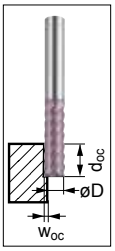


Recommended conditions

(Shoulder processing) d_{oc} = 1,5 x øD

w_{oc}=0,025(HRC56~65) ~ 0,2(below HRC25) x øD

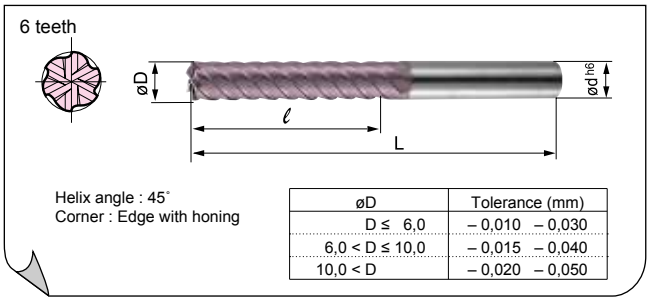
øD \ Material		Carbon steel, Alloy steel (BelowHRC25)	Carbon steel, Alloy steel (BelowHRC45)	Hardened steel (BelowHRC65)	Cast iron
3,0 ~ 5,0	v_c	200-**250**-300	100-**150**-200	80-**100**-120	60-**75**-90
	f_t	0,030~0,060	0,022~0,037	0,007~0,015	0,030~0,060
6,0 ~ 12,0	v_c	200-**250**-300	100-**150**-200	80-**100**-120	40-**50**-60
	f_t	0,061~0,090	0,037~0,067	0,015~0,028	0,060~0,165
16,0 ~ 32,0	v_c	200-**250**-300	100-**150**-200	80-**100**-120	40-**50**-60
	f_t	0,090~0,098	0,067~0,075	0,028~0,038	0,187~0,262



v_c =m/min f_t =mm/tooth

ZX Coated Extra Long Fast Helix Endmills
EHHM 4000/6000/8000 ZX Type

Coated carbide grade: ACZ10M



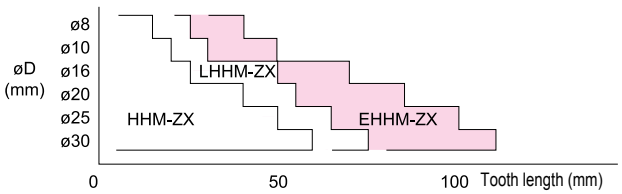
Helix angle : 45°
Corner : Edge with honing

øD	Tolerance (mm)
D ≤ 6,0	– 0,010 – 0,030
6,0 < D ≤ 10,0	– 0,015 – 0,040
10,0 < D	– 0,020 – 0,050

Endmills

(mm)

	Cat. No.	Stock	øD	ℓ	L	ød
4	**EHHM 4030ZX**	❑	3,0	20	60	6
	EHHM 4040ZX	❑	4,0	25	65	6
	EHHM 4050ZX	❑	5,0	30	70	6
6	**EHHM 6060ZX**	❑	6,0	30	70	6
	EHHM 6080ZX	❑	8,0	40	90	8
	EHHM 6100ZX	❑	10,0	50	100	10
	EHHM 6120ZX	❑	12,0	50	120	12
8	**EHHM 8160ZX**	❑	16,0	70	140	16
	EHHM 8200ZX	❑	20,0	85	165	20
	EHHM 8250ZX	❑	25,0	100	185	25
	EHHM 8300ZX		30,0	110	205	32
	EHHM 8320ZX		32,0	110	205	32

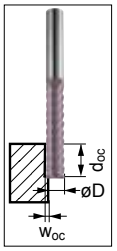


Recommended conditions

(Shoulder processing) d_{oc} = 1,5 x øD

w_{oc}=0,025(HRC56~65) ~ 0,2(below HRC25) x øD

øD \ Material		Carbon steel, Alloy steel (BelowHRC25)	Carbon steel, Alloy steel (BelowHRC45)	Hardened steel (BelowHRC65)	Cast iron
3,0 ~ 5,0	v_c	200-**250**-300	100-**150**-200	80-**100**-120	100-**120**-150
	f_t	0,020~0,040	0,015~0,025	0,005~0,010	0,020~0,040
6,0 ~ 12,0	v_c	200-**250**-300	100-**150**-200	80-**100**-120	100-**120**-150
	f_t	0,041~0,060	0,025~0,045	0,01 0~0,019	0,040~0,110
16,0 ~ 32,0	v_c	200-**250**-300	100-**150**-200	80-**100**-120	100-**120**-150
	f_t	0,060~0,065	0,045~0,050	0,019~0,025	0,125~0,175

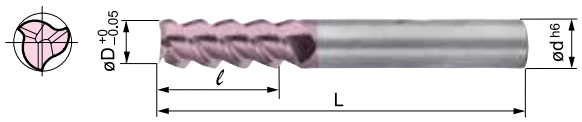


v_c =m/min f_t =mm/tooth

▲ = To be replaced by new item
❑ = Delivery on request

HSM 2000/3000/4000 ZX Type

Coated carbide grade: ACZ50



Helix angle : 60°
Corner : Edge with honing

øD	Tolerance (mm)
D ≤ 6,0	– 0,010 – 0,030
6,0 < D ≤ 10,0	– 0,015 – 0,040
10,0 < D	– 0,020 – 0,050

■ Endmills

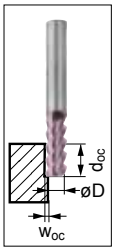
(mm)

	Cat. No.	Stock	øD	ℓ	L	ød
2	**HSM 2020ZX**	❑	2,0	6	40	4
	HSM 2030ZX	❑	3,0	8	45	6
	HSM 2040ZX	❑	4,0	10	45	6
3	**HSM 3030ZX**	▲	3,0	12	45	6
	HSM 3040ZX	▲	4,0	15	45	6
	HSM 3050ZX	▲	5,0	12	50	6
	HSM 3060ZX	▲	6,0	15	50	6
	HSM 3070ZX	❑	7,0	18	60	8
	HSM 3080ZX	▲	8,0	18	60	8
	HSM 3090ZX	❑	9,0	20	65	10
	HSM 3100ZX	▲	10,0	25	70	10
	HSM 3110ZX		11,0	25	75	12
	HSM 3120ZX	▲	12,0	30	75	12
	HSM 3130ZX		13,0	30	80	16
	HSM 3140ZX	❑	14,0	30	90	16
	HSM 3150ZX	▲	15,0	30	95	16
	HSM 3160ZX	▲	16,0	35	95	16
	HSM 3180ZX		18,0	40	110	20
	HSM 3200ZX	❑	20,0	40	110	20
4	**HSM 4200ZX**	❑	20,0	40	110	20
	HSM 4250ZX		25,0	50	120	25

Recommended conditions

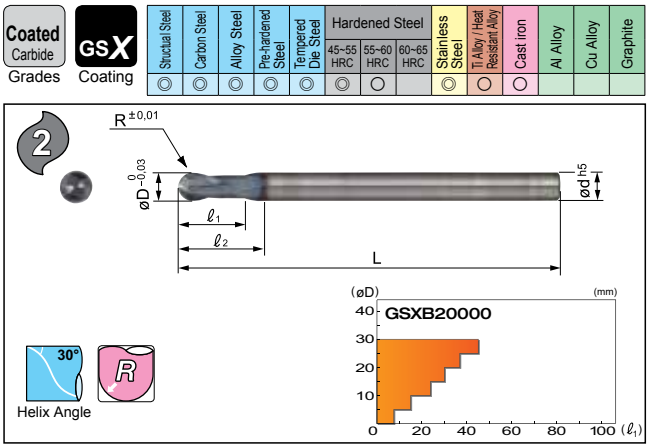
(Shoulder processing) d_{oc} =1,5 x øD
w_{oc} =0,1 x øD

øD \ Material		Carbon steel, Alloy steel (BelowHRC25)	Carbon steel, Alloy steel (BelowHRC45)	Cast iron	Stainless steel, Ti-alloy etc,
1,0 ~ 2,9	v_c	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f_t	0,010~0,035	0,005~0,017	0,015~0,055	0,005~0,017
3,0 ~ 5,9	v_c	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f_t	0,040~0050	0,020~0,025	0,060~0,070	0,020~0,025
6,0 ~ 12,9	v_c	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f_t	0,055~0,110	0,028~0,055	0,080~0,220	0,028~0,055
13,0 ~ 19,9	v_c	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f_t	0,120~0,180	0,060~0,090	0,250~0,350	0,060~0,090
20,0 ~ 25,0	v_c	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f_t	0,190~0,245	0,095~0,125	0,380~0,490	0,095~0,125



v_c =m/min f_t =mm/tooth

GSX MILL Ball Endmills
GSXB 20000 Type



Coated carbide grade: **ACB20**

■ Endmill Identification (GSXB Type)

GSXB 2 0200

①	②	③
Series Code	No. of Teeth	Radius of Ballnose

■ Endmills

(mm)

Cat. No.	Stock	R	øD	ℓ1	ℓ2	L	ød
GSXB 20020	●	0,20	0,4	0,6	0,8	50	4
GSXB 20030	●	0,30	0,6	0,9	1,2	50	4
GSXB 20050	●	0,50	1,0	1,5	2,0	50	4
GSXB 20075	●	0,75	1,5	2,5	3,0	50	4
GSXB 20100	●	1,00	2,0	3,0	4,0	60	6
GSXB 20125	●	1,25	2,5	4,0	5,0	60	6
GSXB 20150	●	1,50	3,0	4,5	6,0	60	6
GSXB 20200	●	2,00	4,0	6,0	8,0	70	6
GSXB 20250	●	2,50	5,0	7,5	10,0	80	6
GSXB 20300	●	3,00	6,0	9,0	–	80	6
GSXB 20350	●	3,50	7,0	11,0	20,0	90	8
GSXB 20400	●	4,00	8,0	12,0	–	90	8
GSXB 20500	●	5,00	10,0	15,0	–	100	10
GSXB 20600	●	6,00	12,0	18,0	–	110	12
GSXB 20700	●	7,00	14,0	21,0	38,0	110	16
GSXB 20800	●	8,00	16,0	24,0	–	140	16
GSXB 20900	●	9,00	18,0	27,0	50,0	140	20
GSXB 21000	●	10,00	20,0	30,0	–	160	20
GSXB 21250		12,50	25,0	38,0	–	180	25
GSXB 21500		15,00	30,0	45,0	80,0	180	32



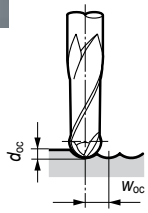
New "Global Standard" Mills
Ball nose type with 2 teeth





■ Recommended cutting conditions

(1) If cutting noise and vibration are present, please change the cutting conditions accordingly.
(2) If the machine is not designed to achieve the recommended spindle speed, please use the max. spindle speed available.



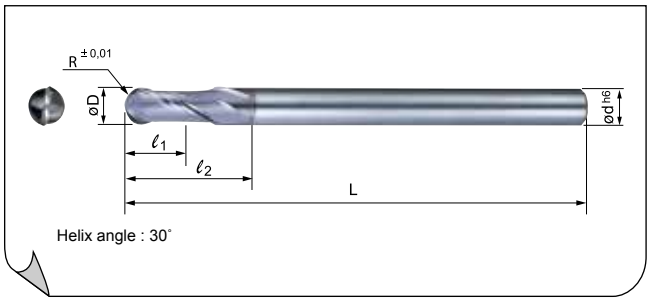
●Radius Milling

Work Material / Cutting Conditions / R (mm)	Carbon Steel, Alloy Steel (Below 25HRC)		Carbon Steel, Alloy Steel (Below 50HRC)		Cast Iron Special Cast Iron		Stainless Steel Titanium Alloy	
	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
0,20	50.000	2.100	35.000	1.150	50.000	2.100	50.000	1.750
0,30	50.000	2.500	35.000	1.350	50.000	2.500	50.000	2.100
0,50	50.000	3.000	35.000	1.600	50.000	3.000	50.000	2.500
0,75	35.000	3.000	24.000	1.650	35.000	3.200	34.000	2.500
1,00	27.500	3.000	19.000	1.700	35.000	3.900	26.000	2.500
1,25	22.500	3.000	15.500	1.700	28.000	3.900	21.000	2.500
1,50	19.000	3.000	13.000	1.700	24.000	3.900	17.500	2.500
2,00	17.000	3.800	12.000	2.100	20.000	4.100	15.000	2.700
2,50	15.500	4.300	11.000	2.200	18.000	4.600	12.000	2.500
3,00	14.000	4.700	10.500	2.500	16.500	5.300	10.500	2.500
3,50	12.500	4.200	9.000	2.100	14.000	4.500	9.000	2.200
4,00	11.000	3.500	7.900	1.900	12.500	4.000	7.800	1.900
5,00	9.000	2.800	6.300	1.500	10.500	3.300	6.300	1.500
6,00	7.500	2.400	5.200	1.250	8.700	2.800	5.200	1.250
7,00	6.400	2.100	4.500	1.100	7.400	2.400	4.500	1.100
8,00	5.600	1.800	3.900	950	6.500	2.100	3.900	950
9,00	5.000	1.600	3.500	850	5.800	1.900	3.500	850
10,00	4.500	1.450	3.100	750	5.200	1.700	3.150	750
12,50	3.600	1.150	2.500	600	4.200	1.350	2.500	600
15,00	3.000	960	2.100	500	3.500	1.150	2.100	500
Depth and wide of cut d_{oc}	0,02 *D*		0,02 *D*		0,02 *D*		0,02 *D*	
Depth and wide of cut w_{oc}	0,05 *D*		0,05 *D*		0,05 *D*		0,05 *D*	

● = Euro stock
▲ = To be replaced by new item

GLB 2000SF Type

Coated carbide grade: **ACZ20W**



■ Endmills

(mm)

	Cat. No.	Stock	R	øD	ℓ_1	ℓ_2	L	ød
2	**GLB 2010 SF**	▲	0,5	1,0	1,5	2	50	4
	GLB 2015 SF	▲	0,75	1,5	2,5	3	50	4
	GLB 2020 SF	▲	1,0	2,0	3	4	60	6
	GLB 2025 SF	▲	1,25	2,5	4	5	60	6
	GLB 2030 SF	▲	1,5	3,0	4,5	6	60	6
	GLB 2040 SF	▲	2,0	4,0	6	8	70	6
	GLB 2050 SF	▲	2,5	5,0	7,5	10	80	6
	GLB 2060 SF	▲	3,0	6,0	9	–	80	6
	GLB 2080 SF	▲	4,0	8,0	12	–	90	8
	GLB 2100 SF	▲	5,0	10,0	15	–	100	10
	GLB 2120 SF	▲	6,0	12,0	21	–	110	12



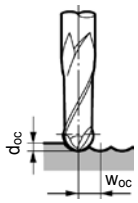
■ Recommended cutting conditions

Conventional Milling Operations

Recommended :

(1) Cutting performance is enhanced when using a high quality machine and rigid set up.

(2) In case of chatter check immediately rigidity of set up and the cutting conditions.



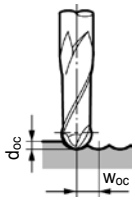
● GS Mill, 2 teeth ball nose type endmill, GLB 2000SF

Material / Cutting data / R (mm)		Carbon steel, Cast iron (HB150~250)		Alloy steel, Prehardened steel (HRC25~35)		Heat treated alloy steel, hardened steel (HRC35~45)		Hardened steel (HRC45~55)		Stainless steel		Heat resistant alloys Titanium alloy	
		Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)
R = 1		19.100	770	12.800	370	10.200	270	8.900	190	8.900	210	6.400	120
R = 2		10.800	1.100	7.200	550	5.700	400	5.000	280	5.000	310	3.600	180
R = 3		7.700	1.300	5.200	660	4.100	480	3.600	330	3.600	380	2.600	210
R = 4		6.000	1.400	4.000	700	3.200	510	2.800	360	2.800	400	2.000	230
R = 5		4.800	1.400	3.200	700	2.600	520	2.300	370	2.300	410	1.600	230
R = 6		4.000	1.400	2.700	710	2.200	530	1.900	370	1.900	410	1.400	240
Depth and width of cut	d_{oc}	0,1D				0,05D				0,1D		0,05D	
	w_{oc}	0,2D				0,05D				0,2D		0,1D	

HSC Machining Centre Operations

● GS Mill, HSC operations with 2 teeth ball nose type endmill, GLB 2000SF

Material / Cutting data / R (mm)		Carbon steel, Cast iron (HB150~250)		Alloy steel, Prehardened steel (HRC25~35)		Heat treated alloy steel, hardened steel (HRC35~45)		Hardened steel (HRC45~55)		Stainless steel	
		Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)
R = 1		51.000	2.100	39.800	1.300	35.700	960	23.700	640	35.700	960
R = 2		25.500	2.700	19.900	1.700	17.900	1.300	11.900	830	17.900	1.300
R = 3		17.000	3.000	13.300	1.900	11.900	1.400	7.900	920	11.900	1.400
R = 4		12.800	3.100	10.000	2.000	9.000	1.500	6.000	960	9.000	1.500
R = 5		10.200	3.100	8.000	2.000	7.200	1.500	4.800	960	7.200	1.500
R = 6		8.500	3.100	6.700	2.000	6.000	1.500	4.000	960	6.000	1.500
Depth and wide of cut	d_{oc}	0,05D						0,02D		0,05D	
	w_{oc}	0,1D						0,05D		0,1D	



Ball Endmills "Neo"

Extreme Hard ZX Coated Ball Endmills

Grade: ACZ10M



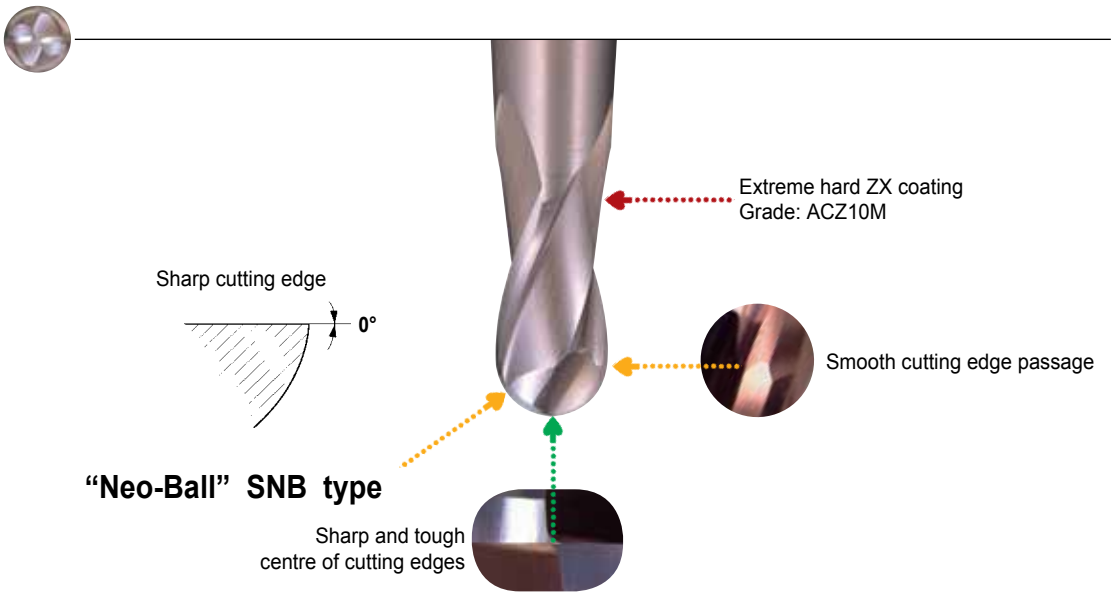
Features

ZX coated ball-nose endmill "Neo" features the wave shaped sharp cutting edge for optimized chip control and performs a varity of high performance machining steels, stainless steels and high temperature alloys.

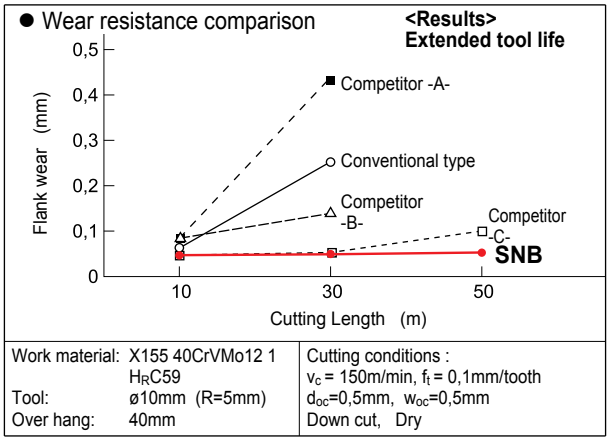
Extended tool life is realized even when hard machining thanks to a special stiff substrate and new ultra hard ZX coating.

Advantages

- Smooth cutting due to sharp cutting edge
- Smooth passage at the cutting edge of radius part and straight part
- Sharp and tough ball-nose centre
- Extra durable due to the combination of extreme hard ZX coating (Hv4000) and stiff substrate
- Possible to high precision cutting with this high young ratio substrate



Performance



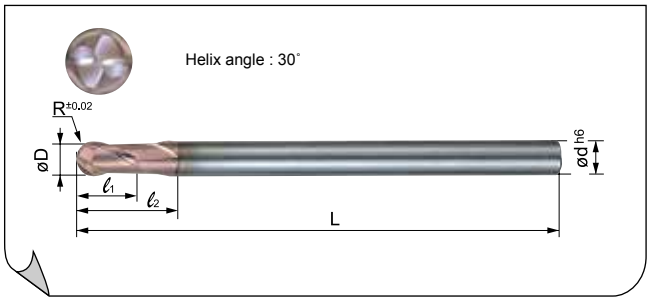
Work material:	X155 40CrVMo12 1 H_RC59	Cutting conditions :	
Tool:	ø10mm (R=5mm)	v_c = 150m/min, f_t = 0,1mm/tooth	
Over hang:	40mm	d_{oc}=0,5mm, w_{oc}=0,5mm	
		Down cut, Dry	

● = Euro stock
❑ = Delivery on request

SNB 2000ZX Type

2

Coated carbide grade: ACZ10M



■ Endmills

(mm)

	Cat. No.	Stock	R	øD	ℓ_1	ℓ_2	L	ød
	SNB 2010ZX	●	0,5	1	1,5	3	50	4
	SNB 2020ZX	●	1,0	2	3,0	5	60	6
	SNB 2030ZX	●	1,5	3	4,5	8	80	6
	SNB 2040ZX	●	2,0	4	6,0	12	80	6
	SNB 2050ZX	●	2,5	5	7,5	14	90	6
	SNB 2060ZX	●	3,0	6	9,0	–	100	6
	SNB 2070ZX	❑	3,5	7	11,0	20	100	8
	SNB 2080ZX	●	4,0	8	12,0	–	100	8
	SNB 2100ZX	●	5,0	10	15,0	–	120	10
	SNB 2120ZX	●	6,0	12	18,0	–	120	12
	SNB 2140ZX	●	7,0	14	21,0	38	160	16
	SNB 2160ZX	●	8,0	16	24,0	–	160	16
	SNB 2180ZX	●	9,0	18	27,0	50	180	20
	SNB 2200ZX	●	10,0	20	30,0	–	180	20
	SNB 2250ZX		12,5	25	38,0	–	200	25
	SNB 2300ZX		15,0	30	45,0	80	200	32



Recommended conditions

d_{oc} =0,3 x øD, (Below R1,0 ; 0,2 x øD)
w_{oc} =0,7 x øD, (Below R1,0 ; 0,6 x øD)

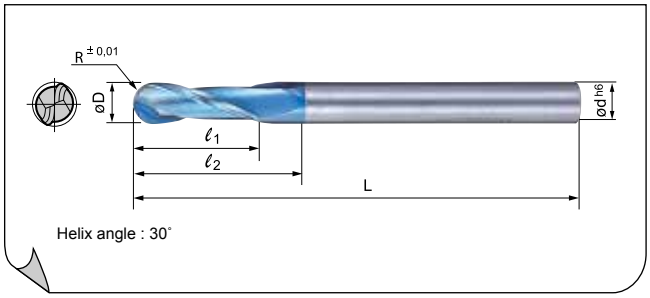
R \ Material		Carbon steel, Alloy steel (BelowHRC25)	Carbon steel, Alloy steel (BelowHRC45)	Hardened steel	Cast iron	Stainless steel, Ti-alloy etc,
R0,5 ~ R1,4	v_c	200-**250**-300	100-**150**-200	100-**120**-150	100-**120**-150	60-**75**-90
	f_t	0,005~0,010	0,003~0,005	0,002~0,003	0,008~0,015	0,003~0,005
R1,5 ~ R2,9	v_c	200-**250**-300	100-**150**-200	100-**120**-150	100-**120**-150	60-**75**-90
	f_t	0,013~0,025	0,007~0,013	0,005~0,008	0,017~0,042	0,007~0,013
R3,0 ~ R6,4	v_c	200-**250**-300	100-**150**-200	100-**120**-150	100-**120**-150	60-**75**-90
	f_t	0,030~0,050	0,017~0,033	0,010~0,020	0,056~0,136	0,017~0,033
R6,5 ~ R9,9	v_c	200-**250**-300	100-**150**-200	100-**120**-150	100-**120**-150	60-**75**-90
	f_t	0,070~0,100	0,040~0,057	0,020~0,040	0,167~0,238	0,040~0,057
R10,0 ~ R15,0	v_c	200-**250**-300	100-**150**-200	100-**120**-150	100-**120**-150	60-**75**-90
	f_t	0,118~0,167	0,085~0,095	0,045~0,080	0,250~0,350	0,085~0,095

v_c =m/min f_t =mm/tooth

SNB 2000DL Type

DLC (Diamond Like Carbon) Coating

DLC coated carbide grade: DL1200



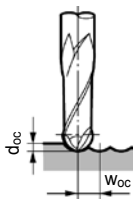
■ Endmills

(mm)

	Cat. No.	Stock	R	øD	ℓ1	ℓ2	L	ød
2	**SNB 2020 DL**	●	1,0	2,0	3	5	60	6
	SNB 2030 DL	●	1,5	3,0	4,5	8	80	6
	SNB 2040 DL	●	2,0	4,0	6	12	80	6
	SNB 2050 DL	●	2,5	5,0	7,5	14	90	6
	SNB 2060 DL	●	3,0	6,0	9	–	100	6
	SNB 2080 DL	●	4,0	8,0	12	–	100	8
	SNB 2100 DL	●	5,0	10,0	15	–	120	10
	SNB 2120 DL	●	6,0	12,0	18	–	120	12
	SNB 2160 DL	●	8,0	16,0	24	–	160	16

■ Characteristics / Application

- Very smooth AURORA COAT results in low adhesion as well as good surface finish
- With lower cutting forces and high rigidity, this series is suitable for low rigidity machine





■ Recommended cutting conditions

Work Material		Aluminum Alloy			
Cutting data / R (mm)		Wet (Emulsion)		Dry	
		Speed (rpm)	Feed (mm/min)	Speed (rpm)	Feed (mm/min)
R = 1		48.000	1.500	48.000	1.000
R = 1,5		48.000	2.100	48.000	1.500
R = 2		31.000	2.800	31.000	2.000
R = 2,5		24.000	2.800	24.000	2.000
R = 3		20.000	2.800	20.000	2.000
R = 4		15.000	2.800	15.000	2.000
R = 5		13.000	3.000	13.000	2.100
R = 6		10.000	3.000	10.000	2.100
R = 8		7.700	3.000	7.700	2.100
Depth and wide of cut	d_{oc}	1,5D		1,0D	
	w_{oc}	0,2D		(D)	

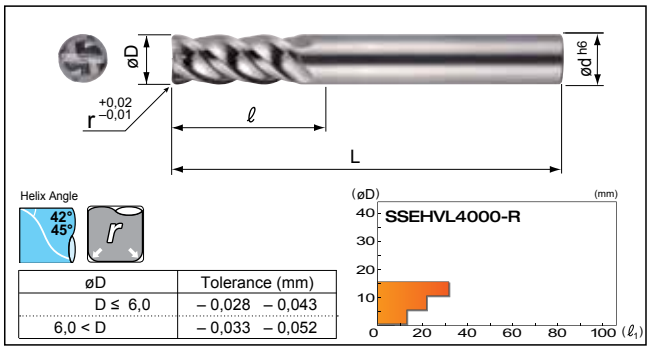
● = Euro stock

Anti-Vibration Type Radius Endmills for Exotic Alloys

SSEHVL 4000-R Type

Uncoated Carbide | 4

Structal Steel	Carbon Steel	Alloy Steel	Pre-hardened Steel	Tempered Die Steel	Hardened Steel 45~55 HRC	Hardened Steel 55~60 HRC	Hardened Steel 60~65 HRC	Stainless Steel	Ti Alloy / Heat Resistant Alloy	Cast iron	Al Alloy	Cu Alloy	Graphite
								○	◎				



øD	Tolerance (mm)	
D ≤ 6,0	− 0,028	− 0,043
6,0 < D	− 0,033	− 0,052

Carbide grade: EH520

■ Endmills

(mm)

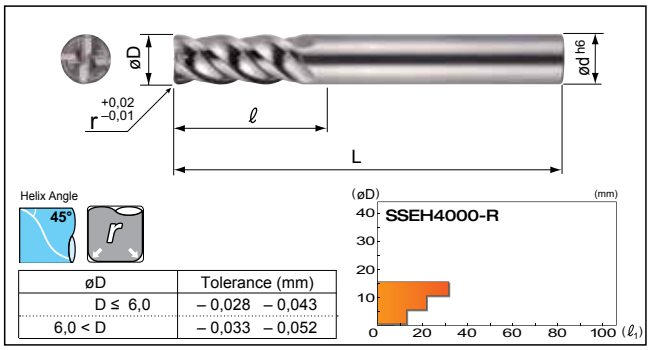
Cat. No.	Stock	øD	ℓ_1	ℓ_2	L	ød
SSEHVL 4045-R05	●	4,5	0,5	12	50	6
SSEHVL 4045-R10	●	4,5	1,0	12	50	6
SSEHVL 4050-R05	●	5,0	0,5	13	60	6
SSEHVL 4050-R10	●	5,0	1,0	13	60	6
SSEHVL 4060-R10	●	6,0	1,0	13	60	6
SSEHVL 4080-R10	●	8,0	1,0	19	80	8
SSEHVL 4100-R10	●	10,0	1,0	22	90	10
SSEHVL 4100-R30	●	10,0	3,0	22	90	10
SSEHVL 4120-R10	●	12,0	1,0	26	90	12
SSEHVL 4120-R30	●	12,0	3,0	26	90	12
SSEHVL 4160-R10	●	16,0	1,0	32	115	16
SSEHVL 4160-R30	●	16,0	3,0	32	115	16

Radius Endmills for Exotic Alloys

SSEH 4000-R Type

Uncoated Carbide | 4

Structal Steel	Carbon Steel	Alloy Steel	Pre-hardened Steel	Tempered Die Steel	Hardened Steel 45~55 HRC	Hardened Steel 55~60 HRC	Hardened Steel 60~65 HRC	Stainless Steel	Ti Alloy / Heat Resistant Alloy	Cast iron	Al Alloy	Cu Alloy	Graphite
								○	◎				



øD	Tolerance (mm)	
D ≤ 6,0	− 0,028	− 0,043
6,0 < D	− 0,033	− 0,052

Carbide grade: EH520

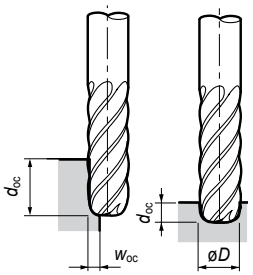
■ Endmills

(mm)

Cat. No.	Stock	øD	ℓ_1	ℓ_2	L	ød
SSEH 4045-R05	●	4,5	0,5	12	50	6
SSEH 4045-R10	●	4,5	1,0	12	50	6
SSEH 4050-R05	●	5,0	0,5	13	60	6
SSEH 4050-R10	●	5,0	1,0	13	60	6
SSEH 4060-R10	●	6,0	1,0	13	60	6
SSEH 4080-R10	●	8,0	1,0	19	80	8
SSEH 4100-R10	●	10,0	1,0	22	90	10
SSEH 4100-R30	●	10,0	3,0	22	90	10
SSEH 4120-R10	●	12,0	1,0	26	90	12
SSEH 4120-R30	●	12,0	3,0	26	90	12
SSEH 4160-R10	●	16,0	1,0	32	115	16
SSEH 4160-R30	●	16,0	3,0	32	115	16

■ Characteristics / Application

1. For stable machining, a more rigid machine is recommended.
2. Wet machining is recommended for stainless steel and heat resistant alloy applications.
3. If cutting noise and vibration are present, please change the cutting conditions accordingly.



● Shoulder Milling

Work Material / Cond.	Stainless Steel		Titanium Alloy		Heat Resistive Steel	
øD (mm)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
4.5	2.300	120	4.600	370	1.600	130
5.0	2.000	130	4.100	410	1.500	150
6.0	1.700	130	3.400	400	1.200	140
8.0	1.300	130	2.600	360	900	130
10.0	1.000	130	2.100	340	700	110
12.0	800	110	1.700	300	600	100
16.0	600	90	1.300	260	500	100
Shoulder cutting d_{oc}	1.5 *D*					
Shoulder cutting w_{oc}	*0.1 D*		*0.05 D*		*0.05 D*	

● Grooving

Work Material / Cond.	Stainless Steel		Titanium Alloy		Heat Resistive Steel	
øD (mm)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
4,5	1.800	50	3.200	250	1.300	110
5,0	1.600	50	2.900	290	1.200	120
6,0	1.400	50	2.400	290	1.000	120
8,0	1.000	50	1.800	250	700	90
10,0	800	50	1.400	230	600	100
12,0	600	50	1.200	210	500	90
16,0	500	40	900	180	400	80
Grooving d_{oc}	0,3 *D*		0,2 *D*		0,15 *D*	

● Shoulder Milling

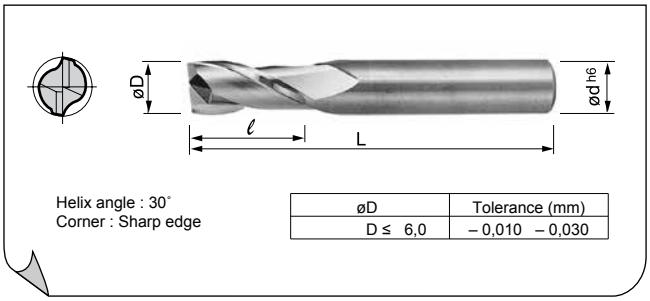
Work Material / Cond.	Stainless Steel		Titanium Alloy		Heat Resistive Steel	
øD (mm)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
4,5	1.800	90	3.500	280	1.400	110
5,0	1.600	100	3.200	320	1.300	130
6,0	1.300	100	2.700	320	1.100	130
8,0	1.000	100	2.000	280	800	110
10,0	800	100	1.600	260	600	100
12,0	700	100	1.300	230	500	90
16,0	500	80	1.000	200	400	80
Shoulder cutting d_{oc}	1,5 *D*					
Shoulder cutting w_{oc}	*0,1 D*		*0,05 D*		*0,05 D*	

● Grooving

Work Material / Cond.	Stainless Steel		Titanium Alloy		Heat Resistive Steel	
øD (mm)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)	Spindle Speed (rpm)	Feed Rate (mm/min)
4,5	1.400	40	2.500	200	1.100	90
5,0	1.300	40	2.200	220	1.000	100
6,0	1.100	40	1.900	230	800	100
8,0	800	40	1.400	200	600	80
10,0	600	40	1.100	180	500	80
12,0	500	40	900	160	400	70
16,0	400	30	700	140	300	60
Grooving d_{oc}	0,3 *D*		0,2 *D*		0,15 *D*	

Solid Carbide Spiral Endmills
SSM 2000 Type (ø0,2~ø4,3)

Carbide grade: A1 (Micrograin)



Helix angle : 30˚
Corner : Sharp edge

øD	Tolerance (mm)
D ≤ 6,0	– 0,010 – 0,030

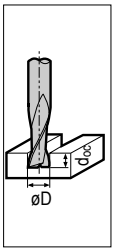
■ Endmills (mm)

	Cat. No.	Stock	øD	ℓ	L	ød
	SSM 2002	●		0,5	40	3
	SSM 2003	●	0,3	1	40	3
	SSM 2004	●	0,4	1	40	3
	SSM 2005	●	0,5	1,5	40	3
	SSM 2006	●	0,6	1,5	40	3
	SSM 2007	●	0,7	1,5	40	3
	SSM 2008	●	0,8	2	40	3
	SSM 2009	●	0,9	2	40	3
	SSM 2010	●	1,0	3	40	
	SSM 2011	❑	1,1		40	
	SSM 2012	❑	1,2		40	
	SSM 2013		1,3		40	
	SSM 2014		1,4		40	
	SSM 2015	●	1,5	5	40	4
	SSM 2016		1,6	5	40	4
	SSM 2017		1,7	5	40	4
	SSM 2018		1,8	5	40	4
	SSM 2019		1,9	5	40	4
	SSM 2020	●	2,0	6	40	4
	SSM 2021		2,1	6	40	4
2	SSM 2022	❑	2,2	6	40	4
	SSM 2023	❑	2,3	6	40	4
	SSM 2024	❑	2,4	6	40	4
	SSM 2025	●	2,5	8	40	4
	SSM 2026		2,6	8	40	4
	SSM 2027	●	2,7	8	40	4
	SSM 2028	❑	2,8	8	40	4
	SSM 2029		2,9	8	40	4
	SSM 2030	●	3,0	8	45	6
	SSM 2031	❑	3,1	8	45	6
	SSM 2032	❑	3,2	8	45	6
	SSM 2033		3,3	8	45	6
	SSM 2034	❑	3,4	8	45	6
	SSM 2035	●	3,5	8	45	6
	SSM 2036		3,6	10	45	6
	SSM 2037		3,7	10	45	6
	SSM 2038	❑	3,8	10	45	6
	SSM 2039	❑	3,9	10	45	6
	SSM 2040	●	4,0	10	45	6
	SSM 2041	❑	4,1	10	45	6
	SSM 2042	❑	4,2	10	45	6
	SSM 2043		4,3	10	45	6

Recommended conditions

(Slotting) øD<ø3 ; d_{oc} =0,5 x øD
øD≥ø3 ; d_{oc} =1,0 x øD

øD \ Material		Carbon steel, Alloy steel (BelowHRC30)	Carbon steel, Alloy steel (BelowHRC40)	Carbon steel, Alloy steel (BelowHRC45)	Cast iron
0,2 ~ 0,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	~ 0,002	~ 0,002	~ 0,001	0,002~0,004
1,0 ~ 2,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,003~0,010	0,003~0,010	0,002~0,005	0,005~0,017
3,0 ~ 4,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,012~0,024	0,012~0,024	0,006~0,011	0,018~0,040

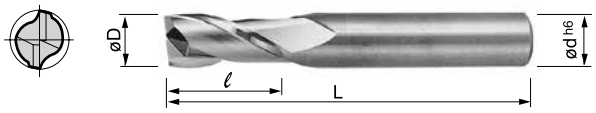


v_c =m/min f_t =mm/tooth

● = Euro stock
❑ = Delivery on request

Solid Carbide Spiral Endmills
SSM 2000 Type (ø4,4~ø8,5)

Carbide grade: A1 (Micrograin)



Helix angle : 30˚
Corner : Sharp edge

øD	Tolerance (mm)
D ≤ 6,0	– 0,010 – 0,030

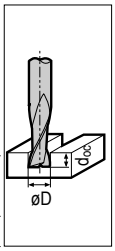
■ Endmills (mm)

	Cat. No.	Stock	øD	ℓ	L	ød
	SSM 2044	❑	4,4	10	45	6
	SSM 2045	●	4,5	10	45	6
	SSM 2046		4,6	12	50	6
	SSM 2047		4,7	12	50	6
	SSM 2048		4,8	12	50	6
	SSM 2049		4,9	12	50	6
	SSM 2050	●	5,0	12	50	6
	SSM 2051	❑	5,1	12	50	6
	SSM 2052		5,2	12	50	
	SSM 2053		5,3		50	
	SSM 2054		5,4	12	50	6
	SSM 2055	●	5,5	12	50	6
	SSM 2056		5,6	12	50	6
	SSM 2057		5,7	12	50	6
	SSM 2058		5,8	12	50	6
	SSM 2059		5,9	12	50	6
	SSM 2060	●	6,0	12	50	6
	SSM 2061		6,1	12	50	6
	SSM 2062	❑	6,2	12	50	6
	SSM 2063	❑	6,3	12	50	6
	SSM 2064		6,4	12		6
2	SSM 2065	●	6,5	12	50	8
	SSM 2066	❑	6,6		55	8
	SSM 2067		6,7	15	55	8
	SSM 2068		6,8	15	55	8
	SSM 2069		6,9	15	55	8
	SSM 2070	●	7,0	15	55	8
	SSM 2071	❑	7,1	15	55	8
	SSM 2072		7,2	15	55	8
	SSM 2073		7,3	15	55	8
	SSM 2074		7,4	15	55	8
	SSM 2075	●	7,5	15	55	8
	SSM 2076		7,6	15	55	8
	SSM 2077		7,7	15	55	8
	SSM 2078		7,8	15	55	8
	SSM 2079		7,9	15	55	8
	SSM 2080	●	8,0	15	55	8
	SSM 2081	❑	8,1	15	55	8
	SSM 2082	❑	8,2	15	55	8
	SSM 2083		8,3	15	55	8
	SSM 2084		8,4	15	55	8
	SSM 2085	●	8,5	15	55	10

Recommended conditions

(Slotting) øD≥ø3 ; d_{oc} =1,0 x øD

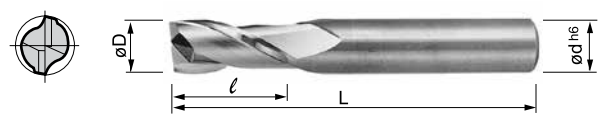
øD \ Material		Carbon steel, Alloy steel (BelowHRC30)	Carbon steel, Alloy steel (BelowHRC40)	Carbon steel, Alloy steel (BelowHRC45)	Cast iron
5 ~ 5,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,012~0,024	0,012~0,024	0,006~0,011	0,018~0,040
6 ~ 8,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,025~0,050	0,025~0,050	0,013~0,025	0,045~0,105



v_c =m/min f_t =mm/tooth

Solid Carbide Spiral Endmills
SSM 2000 Type (ø8,6~ø30)

Carbide grade: A1 (Micrograin)



Helix angle : 30°
Corner : Sharp edge

øD	Tolerance (mm)
6,0 < D ≤ 10,0	– 0,015 – 0,040
10,0 < D	– 0,020 – 0,050

■ Endmills

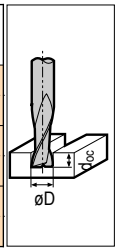
(mm)

	Cat. No.	Stock	øD	ℓ	L	ød
2	SSM 2086	❍	8,6	15	55	10
	SSM 2087		8,7	15	55	10
	SSM 2088		8,8	15	55	10
	SSM 2089		8,9	15	55	10
	SSM 2090	●	9,0	15	55	10
	SSM 2091		9,1	15	55	10
	SSM 2092		9,2	15	55	10
	SSM 2093		9,3	15	55	10
	SSM 2094		9,4	15	55	10
	SSM 2095		9,5	15	55	10
	SSM 2096		9,6	18	65	10
	SSM 2097		9,7	18	65	10
	SSM 2098		9,8	18	65	10
	SSM 2099		9,9	18	65	10
	SSM 2100	●	10,0	18	65	10
	SSM 2105	❑	10,5	18	70	12
	SSM 2110	●	11,0	18	70	12
	SSM 2115	●	11,5	18	70	12
	SSM 2120	●	12,0	18	70	12
	SSM 2125		12,5	20	80	16
	SSM 2130	●	13,0	20	80	16
	SSM 2135		13,5		80	16
	SSM 2140	●	14,0	20	80	16
	SSM 2145		14,5	25	80	16
	SSM 2150	●	15,0	25	80	16
	SSM 2155		15,5	35	90	16
	SSM 2160	●	16,0	35	90	16
	SSM 2165		16,5	35	90	20
	SSM 2170	●	17,0	35	90	20
	SSM 2175		17,5	40	105	20
	SSM 2180	●	18,0	40	105	20
	SSM 2185		18,5	40	105	20
	SSM 2190		19,0	40	105	20
	SSM 2195		19,5	40	105	20
	SSM 2200	●	20,0	40	105	20
	SSM 2210	●	21,0	40	105	25
	SSM 2220	●	22,0	40		25
	SSM 2230	●		45	115	25
	SSM 2240		24,0	45	115	25
	SSM 2250	●		50		25
	SSM 2300			55	130	32

Recommended conditions

(Slotting) øD≥ø3 ; d_{oc} =1,0 x øD

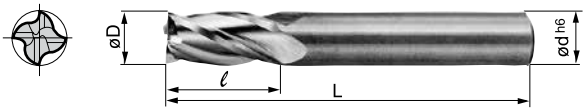
øD \ Material		Carbon steel, Alloy steel (BelowHRC30)	Carbon steel, Alloy steel (BelowHRC40)	Carbon steel, Alloy steel (BelowHRC45)	Cast iron
9 ~ 12,5	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,025~0,050	0,025~0,050	0,013~0,025	0,045~0,105
13 ~ 19,5	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,055~0,085	0,055~0,085	0,030~0,050	0,110~0,170
20 ~ 30	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,095~0,120	0,095~0,120	0,055~0,070	0,185~0,260



v_c =m/min f_t =mm/tooth

Solid Carbide Spiral Endmills
SSM 4000 Type (ø1,5~ø25)

Carbide grade: A1 (Micrograin)



Helix angle : 30°
Corner : Sharp edge

øD	Tolerance (mm)
D ≤ 6,0	– 0,010 – 0,030
6,0 < D ≤ 10,0	– 0,015 – 0,040
10,0 < D	– 0,020 – 0,050

■ Endmills

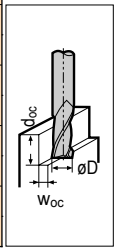
(mm)

	Cat. No.	Stock	øD	ℓ	L	ød
4	SSM 4015	●	1,5	5	40	4
	SSM 4020	●	2,0	6	40	4
	SSM 4025	●	2,5	8	40	4
	SSM 4030	●	3,0	8	45	6
	SSM 4035	●	3,5	8	45	6
	SSM 4040	●	4,0	10	45	6
	SSM 4045	●	4,5	10	45	6
	SSM 4050	●	5,0	12	50	6
	SSM 4055	●	5,5	12	50	6
	SSM 4060	●	6,0	12	50	6
	SSM 4065	●	6,5	12	50	8
	SSM 4070	●	7,0	15	55	8
	SSM 4075	●	7,5	15	55	8
	SSM 4080	●	8,0	15	55	8
	SSM 4085	●	8,5	15	55	10
	SSM 4090	●	9,0	15	55	10
	SSM 4095	●	9,5	15	55	10
	SSM 4100	●	10,0	18	65	10
	SSM 4105		10,5	18	65	12
	SSM 4110	●	11,0	18	70	12
	SSM 4120	●	12,0	18	70	12
	SSM 4130		13,0	20	80	16
	SSM 4140	●	14,0	20	80	16
	SSM 4150	●	15,0	25	80	16
	SSM 4160	●	16,0	35	90	16
	SSM 4170	❑	17,0	35	90	20
	SSM 4180	●	18,0	40	105	20
	SSM 4190		19,0	40	105	20
	SSM 4200	●	20,0	40	105	20
	SSM 4210		21,0	40	105	25
	SSM 4220		22,0	40	105	25
	SSM 4230		23,0	45	115	25
	SSM 4240		24,0	45	115	25
	SSM 4250	●	25,0	50	120	25

Recommended conditions

(Shoulder processing) d_{oc} =1,5 x øD
w_{oc} =0,1 x øD

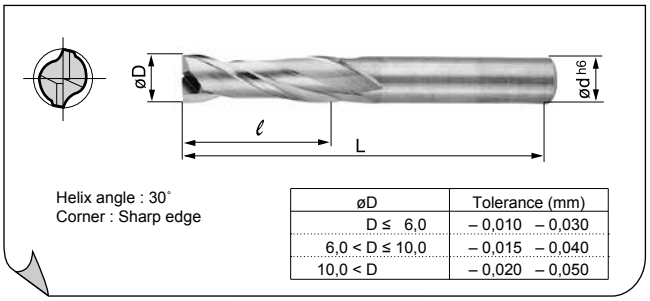
øD \ Material		Carbon steel, Alloy steel (BelowHRC30)	Carbon steel, Alloy steel (BelowHRC40)	Carbon steel, Alloy steel (BelowHRC45)	Cast iron
1 ~ 2,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,004~0,017	0,004~0,017	0,002~0,008	0,008~0,020
3 ~ 5,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,018~0,036	0,018~0,036	0,009~0,018	0,027~0,060
6 ~ 12,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,038~0,070	0,038~0,070	0,019~0,035	0,065~0,157
13 ~ 19,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,075~0,125	0,075~0,125	0,040~0,075	0,160~0,250
20 ~	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,135~0,170	0,135~0,170	0,085~0,110	0,257~0,390



v_c =m/min f_t =mm/tooth

Long Spiral Endmills
LSM 2000 Type

Carbide grade: A1 (Micrograin)



Helix angle : 30˚
Corner : Sharp edge

øD	Tolerance (mm)
D ≤ 6,0	– 0,010 – 0,030
6,0 < D ≤ 10,0	– 0,015 – 0,040
10,0 < D	– 0,020 – 0,050

Endmills

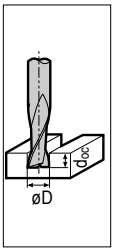
(mm)

	Cat. No.	Stock	øD	ℓ	L	ød
2	**LSM 2030**	●	3,0	12	50	6
	LSM 2035	●	3,5	12	50	6
	LSM 2040	●	4,0	15	50	6
	LSM 2045	●	4,5	15	50	6
	LSM 2050	●	5,0	18	55	6
	LSM 2055	●	5,5	18	55	6
	LSM 2060	●	6,0	18	55	6
	LSM 2065	●	6,5	18	55	8
	LSM 2070	●	7,0	25	65	8
	LSM 2075	●	7,5	25	65	8
	LSM 2080	●	8,0	25	65	8
	LSM 2085	●	8,5	25	65	10
	LSM 2090	●	9,0	25	65	10
	LSM 2095	❑	9,5	25	65	10
	LSM 2100	●	10,0	30	75	10
	LSM 2105		10,5	30	80	12
	LSM 2110	●	11,0	30	80	12
	LSM 2120	●	12,0	30	80	12
	LSM 2130	●	13,0	35	95	16
	LSM 2140	●	14,0	40	95	16
	LSM 2150	●	15,0	40	95	16
	LSM 2160	●	16,0	50	105	16
	LSM 2170		17,0	50	105	20
	LSM 2180	●	18,0	50	115	20
	LSM 2190		19,0	55	120	20
	LSM 2200	●	20,0	55	120	20
	LSM 2210		21,0	60	125	25
	LSM 2220		22,0	60	135	25
	LSM 2230		23,0	60	135	25
	LSM 2240		24,0	65	140	25
	LSM 2250	❑	25,0	65	140	25

Recommended conditions

(Slotting) øD≥ø3 ; d_{oc} =1,0 x øD

øD		Material: Carbon steel, Alloy steel (BelowHRC30)	Carbon steel, Alloy steel (BelowHRC40)	Carbon steel, Alloy steel (BelowHRC45)	Cast iron
3 ~ 5,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,009~0,018	0,009~0,018	0,005~0,008	0,014~0,030
6 ~ 12,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,019~0,038	0,019~0,038	0,009~0,019	0,034~0,079
13 ~ 19,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,041~0,064	0,041~0,064	0,023~0,038	0,083~0,128
20 ~	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,071~0,090	0,071~0,090	0,041~0,052	0,139~0,195

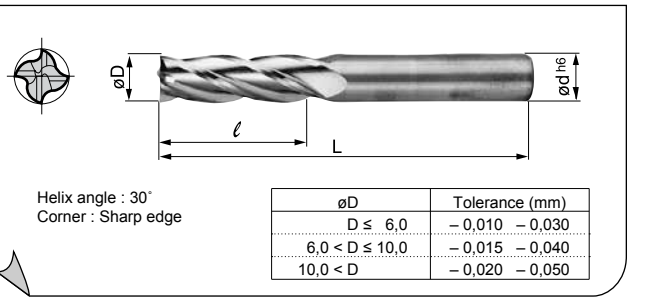


v_c =m/min f_t =mm/tooth

● = Euro stock
❑ = Delivery on request

Long Spiral Endmills
LSM 4000 Type

Carbide grade: A1 (Micrograin)



Helix angle : 30˚
Corner : Sharp edge

øD	Tolerance (mm)
D ≤ 6,0	– 0,010 – 0,030
6,0 < D ≤ 10,0	– 0,015 – 0,040
10,0 < D	– 0,020 – 0,050

Endmills

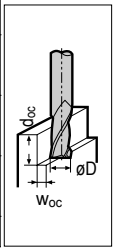
(mm)

	Cat. No.	Stock	øD	ℓ	L	ød
2	**LSM 4030**	●	3,0	12	50	6
	LSM 4035	●	3,5	12	50	6
	LSM 4040	●	4,0	15	50	6
	LSM 4045	❑	4,5	15	50	6
	LSM 4050	●	5,0	18	55	6
	LSM 4055	●	5,5	18	55	6
	LSM 4060	●	6,0	18	55	6
	LSM 4065	●	6,5		55	8
	LSM 4070	●	7,0	25	65	8
	LSM 4075	●	7,5	25	65	8
	LSM 4080	●	8,0	25	65	8
	LSM 4085	●	8,5	25	65	10
	LSM 4090	●	9,0	25	65	10
	LSM 4095	❑	9,5	25	65	10
	LSM 4100	●	10,0	30	75	10
	LSM 4105		10,5	30	80	12
	LSM 4110	●	11,0	30	80	12
	LSM 4120	●	12,0	30	80	12
	LSM 4130	●	13,0	35	95	16
	LSM 4140	●	14,0	40	95	16
	LSM 4150	●	15,0	40	95	16
	LSM 4160	●	16,0	50	105	16
	LSM 4170		17,0	50	105	20
	LSM 4180	●	18,0	50	115	20
	LSM 4190		19,0	55	120	20
	LSM 4200	●	20,0	55	120	20
	LSM 4210		21,0	60	125	25
	LSM 4220		22,0	60	135	25
	LSM 4230		23,0	60	135	25
	LSM 4240		24,0	65	140	25
	LSM 4250	●	25,0	65	140	25

Recommended conditions

(Shoulder processing) d_{oc} =1,5 x øD
w_{oc} =0,1 x øD

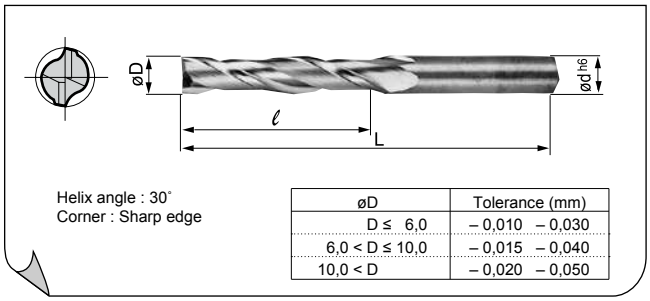
øD		Material: Carbon steel, Alloy steel (BelowHRC30)	Carbon steel, Alloy steel (BelowHRC40)	Carbon steel, Alloy steel (BelowHRC45)	Cast iron
3 ~ 5,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,014~0,027	0,014~0,027	0,007~0,014	0,020~0,045
6 ~ 12,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,028~0,053	0,028~0,053	0,014~0,026	0,048~0,118
13 ~ 19,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,056~0,094	0,056~0,094	0,030~0,056	0,120~0,188
20 ~	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,101~0,127	0,101~0,127	0,064~0,082	0,193~0,292



v_c =m/min f_t =mm/tooth

Extra Long Spiral Endmills
ELSM 2000 Type

Carbide grade: A1 (Micrograin)



Helix angle : 30°
Corner : Sharp edge

øD	Tolerance (mm)
D ≤ 6,0	– 0,010 – 0,030
6,0 < D ≤ 10,0	– 0,015 – 0,040
10,0 < D	– 0,020 – 0,050

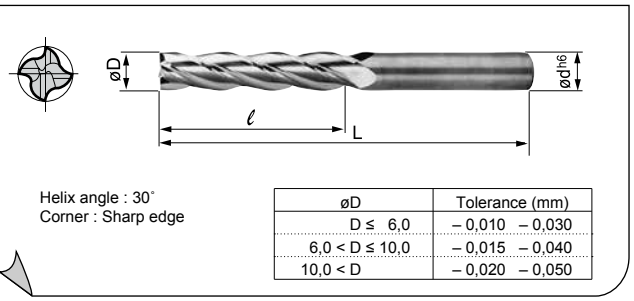
■ Endmills

(mm)

	Cat. No.	Stock	øD	ℓ	L	ød
2	**ELSM 2030**	●	3,0	20	55	6
	ELSM 2040	●	4,0	25	60	6
	ELSM 2050	●	5,0	30	65	6
	ELSM 2060	●	6,0	30	65	6
	ELSM 2070	●	7,0	40	85	8
	ELSM 2080	●	8,0	40	85	8
	ELSM 2090	●	9,0	40	85	10
	ELSM 2100	●	10,0	50	100	10
	ELSM 2110	●	11,0	50	100	12
	ELSM 2120	●	12,0	50	100	12
	ELSM 2130		13,0	70	140	16
	ELSM 2140	●	14,0	70	140	16
	ELSM 2150	❑	15,0	70	140	16
	ELSM 2160	❑	16,0	70	140	16
	ELSM 2180	❑	18,0	80	160	20
	ELSM 2200	●	20,0	85	165	20
	ELSM 2220		22,0	95	180	25
	ELSM 2250	❑	25,0	100	185	25

Extra Long Spiral Endmills
ELSM 4000 Type

Carbide grade: A1 (Micrograin)



Helix angle : 30°
Corner : Sharp edge

øD	Tolerance (mm)
D ≤ 6,0	– 0,010 – 0,030
6,0 < D ≤ 10,0	– 0,015 – 0,040
10,0 < D	– 0,020 – 0,050

■ Endmills

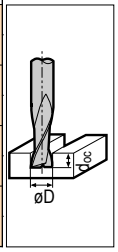
(mm)

	Cat. No.	Stock	øD	ℓ	L	ød
4	**ELSM 4030**	●	3,0	20	55	6
	ELSM 4040	●	4,0	25	60	6
	ELSM 4050	●	5,0	30	65	6
	ELSM 4060	●	6,0	30	65	6
	ELSM 4070	●	7,0	40	85	8
	ELSM 4080	●	8,0	40	85	8
	ELSM 4090	●	9,0	40	85	10
	ELSM 4100	●	10,0	50	100	10
	ELSM 4110		11,0	50	100	12
	ELSM 4120	●	12,0	50	100	12
	ELSM 4130		13,0	70	140	16
	ELSM 4140	●	14,0	70	140	16
	ELSM 4150		15,0	70	140	16
	ELSM 4160	●	16,0	70	140	16
	ELSM 4170		17,0	80	160	20
	ELSM 4180	●	18,0	80	160	20
	ELSM 4190		19,0	85	165	20
	ELSM 4200	●	20,0	85	165	20
	ELSM 4210		21,0	95	180	25
	ELSM 4220		22,0	95	180	25
	ELSM 4230		23,0	95	180	25
	ELSM 4240		24,0	100	180	25
	ELSM 4250	●	25,0	100	180	25

Recommended conditions

(Slotting) øD≥ø3 ; d_{oc} =1,0 x øD

øD		Material: Carbon steel, Alloy steel (BelowHRC30)	Carbon steel, Alloy steel (BelowHRC40)	Carbon steel, Alloy steel (BelowHRC45)	Cast iron
3 ~ 5,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,006~0,012	0,006~0,012	0,003~0,006	0,009~0,020
6 ~ 12,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,013~0,025	0,013~0,025	0,006~0,013	0,023~0,053
13 ~ 19,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,028~0,043	0,028~0,043	0,015~0,025	0,055~0,085
20 ~	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,048~0,060	0,048~0,060	0,027~0,035	0,092~0,130

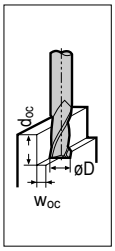


v_c =m/min f_t =mm/tooth

Recommended conditions

(Shoulder processing) d_{oc} =1,5 x øD
w_{oc} =0,05 x øD

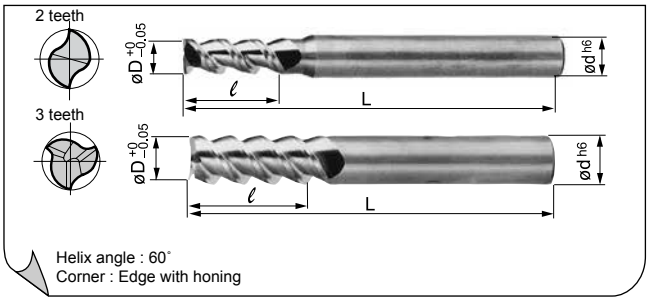
øD		Material: Carbon steel, Alloy steel (BelowHRC30)	Carbon steel, Alloy steel (BelowHRC40)	Carbon steel, Alloy steel (BelowHRC45)	Cast iron
3 ~ 5,9	v_c	40--60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,009~0,018	0,009~0,018	0,005~0,009	0,014~0,030
6 ~ 12,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,019~0,035	0,019~0,035	0,010~0,018	0,033~0,079
13 ~ 19,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,038~0,063	0,038~0,063	0,020~0,038	0,080~0,125
20 ~	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,067~0,085	0,067~0,085	0,042~0,055	0,128~0,195



v_c =m/min f_t =mm/tooth

Fast Helix Spiral Endmills
HSM 2000/3000/4000 Type

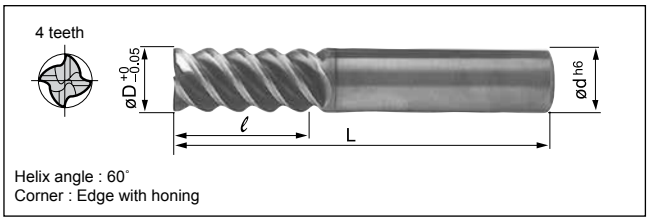
Carbide grade: A1 (Micrograin)



Endmills

(mm)

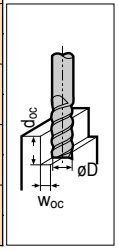
	Cat. No.	Stock	øD	ℓ	L	ød
2	**HSM 2020**		2,0	6	40	4
	HSM 2030		3,0	8	45	6
	HSM 2040		4,0	10	45	6
	HSM 2050		5,0	12	50	6
3	**HSM 3030**		3,0	12	45	6
	HSM 3040		4,0	12	45	6
	HSM 3045		4,5	12	45	6
	HSM 3050	❑	5,0	12	50	6
	HSM 3060	❑	6,0	12	50	6
	HSM 3070		7,0	18	60	8
	HSM 3080		8,0	18	60	8
	HSM 3090		9,0	20	65	10
	HSM 3100	❑	10,0	25	70	10
	HSM 3110		11,0	25	75	12
	HSM 3120	❑	12,0	30	75	12
	HSM 3130		13,0	30	80	16
	HSM 3140	❑	14,0	30	90	16
	HSM 3150		15,0	30	95	16
	HSM 3160		16,0	35	95	16
	HSM 3180		18,0	40	110	20
	HSM 3200		20,0	40	110	20
4	**HSM 4200**		20,0	40	110	20
	HSM 4320		32,0	55	130	32



Recommended conditions

(Shoulder processing) d_{oc} =1,5 x øD
w_{oc} =0,1 x øD

øD \ Material		Carbon steel, Alloy steel (BelowHRC30)	Carbon steel, Alloy steel (BelowHRC40)	Carbon steel, Alloy steel (BelowHRC45)	Cast iron
1 ~ 2,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,009~0,024	0,009~0,024	0,004~0,011	0,018~0,040
3 ~ 5,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,040~0,050	0,040~0,050	0,020~0,025	0,060~0,070
6 ~ 12,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,055~0,110	0,055~0,110	0,028~0,055	0,080~0,220
13 ~ 19,9	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,120~0,180	0,120~0,180	0,060~0,090	0,250~0,350
20 ~	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,216~0,245	0,216~0,245	0,127~0,132	0,321~0,546

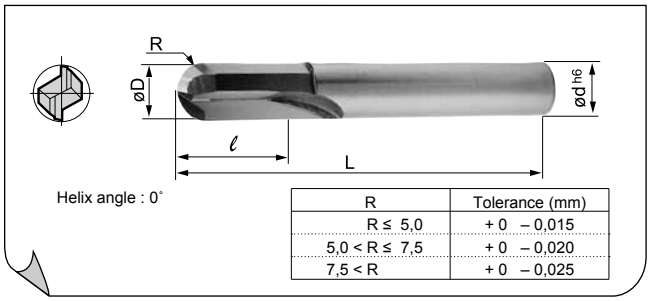


v_c =m/min f_t =mm/tooth

▲ = To be replaced by new item
❑ = Delivery on request

Straight Flute Ball Endmills
BSM 2000 Type

Carbide grade: A1 (Micrograin)



Helix angle : 0˚

R	Tolerance (mm)
R ≤ 5,0	+ 0 – 0,015
5,0 < R ≤ 7,5	+ 0 – 0,020
7,5 < R	+ 0 – 0,025

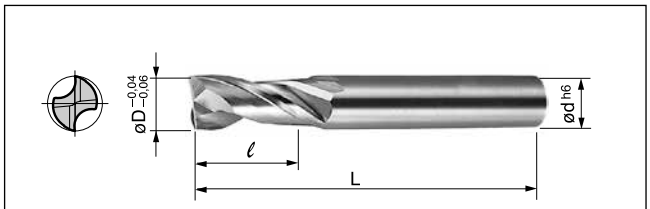
■ Endmills

(mm)

	Cat. No.	Stock	R	øD	ℓ	L	ød
2	**BSM 2010**		0,5	1,0	4	40	4
	BSM 2020	▲	1,0	2,0	7	40	4
	BSM 2030		1,5	3,0	9	45	6
	BSM 2040	▲	2,0	4,0	15	45	6
	BSM 2050	▲	2,5	5,0	15	50	6
	BSM 2060	▲	3,0	6,0	20	50	6
	BSM 2080	▲	4,0	8,0	20	60	8
	BSM 2100	▲	5,0	10,0	20	70	10
	BSM 2120	▲	6,0	12,0	25	75	12
	BSM 2140		7,0	14,0	25	90	16
	BSM 2160		8,0	16,0	35	110	16
	BSM 2200		10,0	20,0	35	110	20

Spiral Endmills for Non-Ferrous Cutting
ASM 2000 Type

Carbide grade: H1 (Micrograin)



Helix angle : 30˚
Corner : Sharp edge

■ Endmills

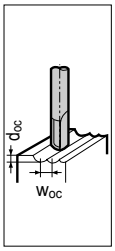
(mm)

	Cat. No.	Stock	øD	ℓ	L	ød
2	**ASM 2020**	❑	2,0	6	40	4
	ASM 2030	❑	3,0	10	45	6
	ASM 2040	❑	4,0	12	45	6
	ASM 2050	❑	5,0	15	50	6
	ASM 2060	❑	6,0	15	50	6
	ASM 2080	❑	8,0	18	60	8
	ASM 2100	❑	10,0	22	71	10
	ASM 2120	❑	12,0	25	75	12
	ASM 2160		16,0	32	90	16

Recommended conditions

d_{oc} =0,3 x øD, (Below R1,0 ; 0,2 x øD)
w_{oc} =Max0,7 x øD, (Below R1,0 ; 0,6 x øD)

R \ Material		Carbon steel, Alloy steel (BelowHRC30)	Carbon steel, Alloy steel (BelowHRC40)	Carbon steel, Alloy steel (BelowHRC45)	Cast iron
R0,5 ~ R1,25	v_c	40--60	30-**40**-50	20--40	40-**50**-60
	f_t	0,004~0,010	0,004~0,010	0,002~0,005	0,008~0,015
R1,5 ~ R2,5	v_c	40-**50**-60	30--50	20-**30**-40	40--60
	f_t	0,013~0,025	0,013~0,025	0,007~0,013	0,017~0,042
R3 ~ R6	v_c	40-**50**-60	30--50	20-**30**-40	40--60
	f_t	0,030~0,050	0,030~0,050	0,017~0,033	0,056~0,136
R6,5 ~ R9,5	v_c	40-**50**-60	30--50	20--40	40-**50**-60
	f_t	0,070~0,100	0,070~0,100	0,040~0,057	0,167~0,238
R10 ~	v_c	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f_t	0,118~0,167	0,118~0,167	0,085~0,095	0,250~0,350

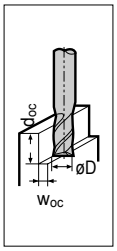


v_c =m/min f_t =mm/tooth

Recommended conditions

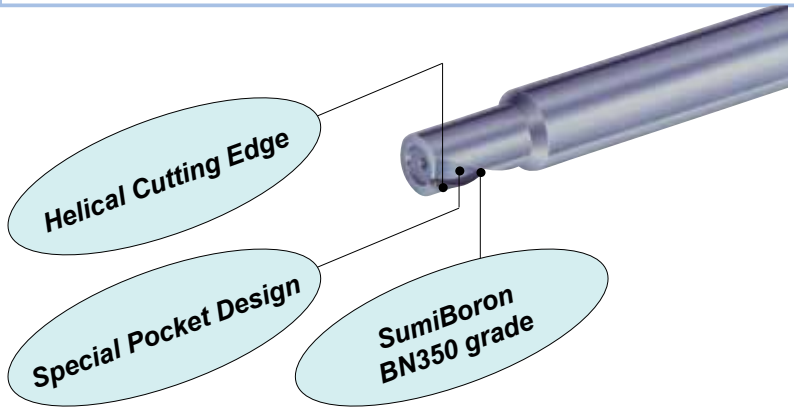
(Shoulder processing) d_{oc} =1,5 x øD
w_{oc} =0,1 x øD

øD \ Material		Al-alloy	Cast iron
1 ~ 2,5	v_c	100-**200**-300	100-**120**-150
	f_t	0,004~0,017	0,008~0,020
3 ~ 5	v_c	100-**200**-300	100-**120**-150
	f_t	0,018~0,036	0,027~0,060
6 ~ 12	v_c	100-**200**-300	100-**120**-150
	f_t	0,038~0,070	0,065~0,157
14 ~ 16	v_c	100-**200**-300	100-**120**-150
	f_t	0,075~0,125	0,160~0,250

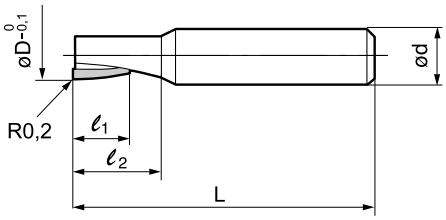


v_c =m/min f_t =mm/tooth





■ Endmills BNES Type with 1 Spiral Flute

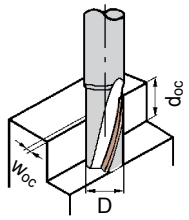


Helix angle : 15°
right-hand cut, right-hand helix

Cat. No.	Stock	Dimensions (mm)				
	BN350	øD	ød	ℓ_1	ℓ_2	L
BNES 1060	❑	6,0	10	7,0	11	60
BNES 1080	❑	8,0	10	10,0	14	70
BNES 1100	❑	10,0	12	12,0	17	75
BNES 1120	❑	12,0	12	14,0	20	80
BNES 1140	❑	14,0	16	16,0	21,5	80
BNES 1160	❑	16,0	16	18,0	24	80

■ Recommended Cutting Conditions

Cutting speed: v_c (m/min), Spindle revolutions: n (rpm), Feed per tooth: f_t (mm/tooth), Feed speed: v_f (mm/min)

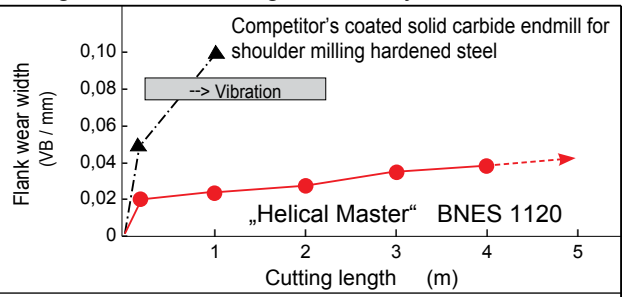
Tooling example	ø D	Hardened steel (H_RC 50 ~ 57)			Hardened steel (H_RC 58 ~ 65)		
		v_c = 100 ~ 170 m/min			v_c = 80 ~ 150 m/min		
	ø 6 ~ 8	$w_{oc} \leq$ 0,1 mm	n = 4000 ~ 9000	v_f (mm/min) = 240 ~ 540	$w_{oc} \leq$ 0,08 mm	n = 3200 ~ 8000	v_f (mm/min) = 150 ~ 370
	ø 10 ~ 12	$w_{oc} \leq$ 0,15 mm	n = 2700 ~ 5400	v_f (mm/min) = 180 ~ 360	$w_{oc} \leq$ 0,12 mm	n = 2100 ~ 4800	v_f (mm/min) 120 ~ 270
	ø 14 ~ 16	$w_{oc} \leq$ 0,2 mm	n = 2000 ~ 3800	v_f (mm/min) = 140 ~ 260	$w_{oc} \leq$ 0,15 mm	n = 1600 ~ 3400	v_f (mm/min) = 110 ~ 230

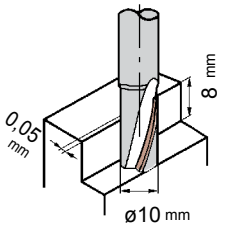
Depth of cut : $d_{oc} \leq$ D

Recommendation: Dry cutting (Air coolant)
Down-cut milling
Minimise the overhang
Use a rigid machine

■ Performance

● Long Tool Life and High Efficiency





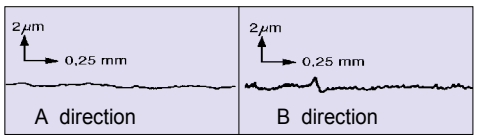
Work material: X155CrVMo12-1
Hardness: H_RC 60

Cutting data:
v_c = 100 m/min (**Helical Master**)
v_c = 40 m/min (Competitor's coated solid carbide endmill)
v_f = 186 mm/min

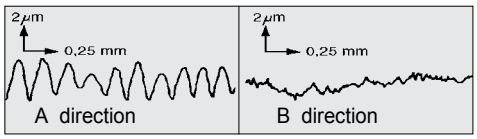
Down-cut milling
Dry cutting

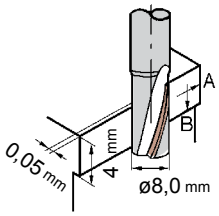
● Excellent Surface Roughness

"**Helical Master**" **BNES 1080** ø 8,0



Conventional straight flute CBN endmill, ø 8,0



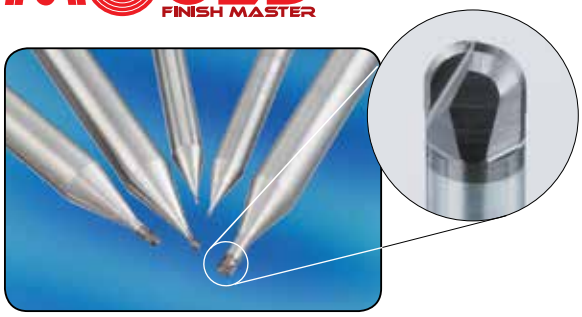


Work material: 15Cr3
Hardness: H_RC 55~58
Cutting data: v_c = 130 m/min
v_f = 310 mm/min

Down-cut milling
Dry cutting

● = Euro stock
❑ = Delivery on request

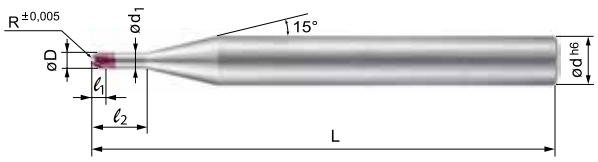
SUMIBORON "MOULD Finish Master" BNBP



Characteristics / Application

- High precision machining of hardened steels < HRC70 with long tool life
- Super tough grade SUMIBORON BN350 prevents chipping of the cutting edge
- R accuracy : ±0,005mm

Endmills



※ Endmill Identification

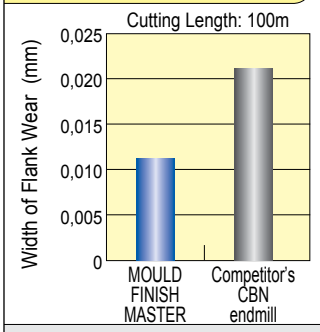
BNBP 2 R020 - 012 4

- Shank Diam.
- Neck length (ℓ_2)
- Radius of ball nose
- Number of teeth

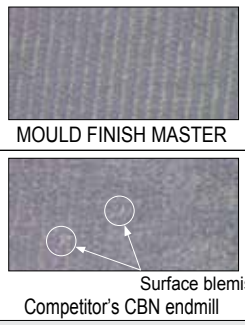
	Cat. No.	Stock	Dimensions (mm)						
		BN350	R	øD	L	ød1	ød	ℓ1	ℓ2
4,0 mm (Shank Diam.)	**BNBP 2 R020-012 4**	●	0,2	0,4	50	0,37	4	0,3	1,2
	BNBP 2 R030-015 4	●	0,3	0,6	50	0,57	4	0,4	1,5
	BNBP 2 R050-025 4	●	0,5	1,0	50	0,97	4	0,6	2,5
	BNBP 2 R075-040 4	●	0,75	1,5	50	1,47	4	0,9	4,0
	BNBP 2 R100-055 4	●	1,0	2,0	50	1,97	4	1,4	5,5
6,0 mm (Shank Diam.)	**BNBP 2 R020-012 6**	●	0,2	0,4	50	0,37	6	0,3	1,2
	BNBP 2 R030-015 6	●	0,3	0,6	50	0,57	6	0,4	1,5
	BNBP 2 R050-025 6	●	0,5	1,0	50	0,97	6	0,6	2,5
	BNBP 2 R075-040 6	●	0,75	1,5	50	1,47	6	0,9	4,0
	BNBP 2 R100-055 6	●	1,0	2,0	50	1,97	6	1,4	5,5

Performance

Wear Resistance

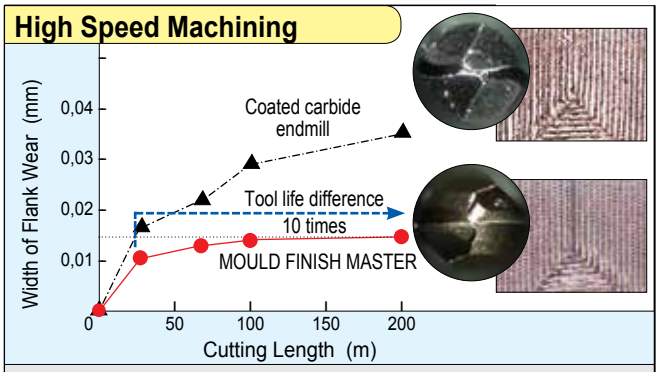


Machined Surface



R1,0 Ball endmill, Work material: X155CrVMo12-1 (H_RC60)
Cutting data: n = 20.000 rpm, f_t = 0,05 mm/tooth (v_f = 2.000mm/min)
d_{oc} = 0,05 mm, w_{oc} = 0,05 mm, Air blast

High Speed Machining



R1,0 Ball endmill, Work material: X155CrVMo12-1 (H_RC60)
Cutting data: n = 40.000 rpm, f_t = 0,05 mm/tooth (v_f = 4.000mm/min)
d_{oc} = 0,05 mm, w_{oc} = 0,05 mm, Oil mist

- Excellent surface finish compared with competitor's CBN and coated carbide endmills

Recommended Cutting Conditions

Spindle revolutions: n (rpm), Feed rate per tooth: f_t (mm/tooth), Depth of cut: d_{oc} (mm), Wide of cut: w_{oc} (mm)

Material / Cutting data / Radius (mm)	Pre-hardened steel, Die steel (~ HRC52)				Die steel (~ HRC62)				High speed tool steel (~ HRC70)			
	n (rpm)	f_t (mm/tooth)	d_{oc} (mm)	W_{oc} (mm)	n (rpm)	f_t (mm/tooth)	d_{oc} (mm)	W_{oc} (mm)	n (rpm)	f_t (mm/tooth)	d_{oc} (mm)	W_{oc} (mm)
R 0,2	20.000~50.000	0,02	0,03	0,03	20.000~50.000	0,02	0,01	0,02	20.000~50.000	0,015	0,01	0,02
R 0,3	20.000~50.000	0,02	0,03	0,03	20.000~50.000	0,02	0,01	0,02	20.000~50.000	0,015	0,01	0,02
R 0,5	20.000~50.000	0,03	0,05	0,05	20.000~50.000	0,03	0,03	0,04	20.000~50.000	0,02	0,02	0,03
R 0,75	20.000~50.000	0,04	0,08	0,1	20.000~50.000	0,04	0,05	0,05	20.000~50.000	0,03	0,02	0,05
R 1,0	20.000~50.000	0,05	0,1	0,1	17.000~50.000	0,05	0,05	0,05	17.000~50.000	0,03	0,03	0,05



Important Notes

(1) For stable machining, a more rigid machine is recommended.
(2) Air blast or oil mist coolant is recommended.
(3) Shorten overhang as much as possible.

Multi-Drills

K

K1 ~ K64





Selection Guide	**MULTI-DRILLs**	K 2 - 5
Solid Type Drills	**SDP …** U3/5/7-**HAK**	K 6 -11
	MDW … GS 2/4	K12-15
	MDW … HGS 3/5	K16-17
	MDS … S/M **K-HAK**	K18-19
	MDS … S/M **K**	K20-23
	MDS … S/M **G**	K20-23
Deep Hole Drills	**MDW**	K24-25
for Steels	**MDW … XHT S**	K26
for Aluminium	**MDW … XHT A**	K27
Pilot Hole Drills	**MDW … PHT**	K27
AURORA COAT Drills	**MDW … NHGS**	K28~29
MINI-Drills	**MLDH …** L/P	K30~31
	MDUS / MDSS	K32
SUMIDIA Coated Drills	MDS … **SDC**	K33
Brazed Type Drills	**KDS**	K35
Series	**KDS … MAK**	K36~37
	KDS … LAK	K38~39
	KDS … DAK	K40~41
	KDS … FA	K42
Replaceable Head Type Drills	**SMD**	K43
Drill Holder	**SMDH** …(D)	K44/K49
Drill Head for Steels	**SMDT** …D **MTL**	K45
for Stainless Steels	**SMDT** …D **MEL**	K46~47
Large Holes	**SMD** New	K48
Large Holes	**SMDT**…..**MTL**…. New	K49
Insert Type Drills	**WDX** (2D, 3D, 4D, 5D)	K50~59
Eccentric Sleeve	**WAS** New	K56
Plunge Drills	**PDL** (2D, 3D)	K60~62
Multi-Function Mills	**PCT** (3D, 5D)	K60~62
Straight Flute Type **SUMIDIA Drills**	**DAL / DDL / DML**	K63~64

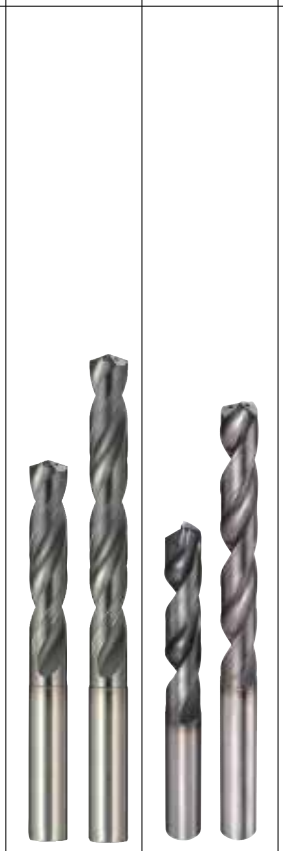
Multi-Drill Series



General Features

MultiDrill series is Sumitomo's original brand of high performance drills that have a special cutting edge design coupled with an advance carbide substrate.
The series has a comprehensive selection of diameters and drill lengths to cover a wide range of work materials and require-ments, providing high efficiency, high precision and cost effectiveness.

Solid Carbide Type Multi-Drills Selection

	SDP ...	**MDW ...**		**MDS ...**		**MDW ... ○○○**			**MLDH**	**MDUS / MDSS**	MDS ...
Type	...U3/5/7 **-HAK** (DIN)	**GS** 2/4	**HGS** 3/5	S/M **K-HAK** (DIN)	... S/M **G**	... **PHT**	... **XHT** S/A	... **NHGS**	... P / L	–	... **SDC**
Page	⇨ K 6~11	⇨ K12~17		⇨ K18~19	⇨ K20~23	⇨ K24~27		⇨ K28~29	⇨ K30~31	⇨ K32	⇨ K33
					 Pilot drill				 Pilot drill		
Application	P M K S			K N		P M K N		N	P M K	P M K H	N
Form	m7 drill DIN type	h8 drill		m7 drill DIN type	h8 drill, straight	Extra long		Super Multi-Drill	Long Micro Drill	Mini Multi-Drill	Diamond Coated
Length (The ratio to øD)	3D / 5D / 7D	2/4D	3/5D	3D / 5D	2,5D / 4D	3D	10D ~ 30D	3D / 5D / 10D	5 / 12/20/30 D	10D	3D
Coolant holes	Yes	No	Yes	Yes	No	Yes		Yes	Yes	No	No
Coating	AlCrTiN	DEX (TiAlCr/TiSi)		TiAlN	–	TiAlN	–	DLC	TiAlN	TiAlN / ZX	SUMIDIA
Diameter range	ø 3,0 ~ ø16,0	ø 2,0 ~ ø16,0	ø 4,0 ~ ø16,0	ø 4,0 ~ ø12,0	ø 2,0 ~ ø14,0	ø 4,0 ~ ø 8,0	ø 3,0 ~ ø 12,0	ø 3,0 ~ ø 16,0	ø 0,8 ~ ø 2,0	ø 0,03 ~ ø 1,0	ø 2,0 ~ ø 10,0

Advantages



- Unique curved flute design has proven to enhance chip formation and removal, resulting in better hole accuracy.
- High speed and high efficient drilling is made possible with the combination of a special substrate with an advance PVD coating. (10x tool life of HSS drills, 5x the efficiency)
- Wide selection range (Diameter: 0,03 ~ 65mm, Drilling depths L/D: 2 ~ 30)

Brazed Carbide Type and Insert Type Multi-Drills Selection

	KDS ... ○○○ ⇨ K35				SMD ... ⇨ K43,K48	WDX ...○○	PDL ...○○	PCT ...○○	SUMIDIA (PCD)
Type	MAK	LAK	DAK	FA	SMDT ...D MTL ⇨ K45	New WAS ....-.. ⇨ K56			DAL/DDL/DML
Page	⇨ K36~37	⇨ K38~39	⇨ K40~41	⇨ K42	SMDT ... MTL New ⇨ K49	⇨ K50~59	⇨ K60~62	⇨ K60~62	⇨ K63~64
					SMDT ...D MEL ⇨ K46~47				
					SMDH ...M-3/5/8 ⇨ K44				
					SMDH ...M / L / D New ⇨ K49				
									
Application	P M K S			K N	P M K	P M K N			N
Form	h7 drill			h8 drill	SMDT type carbide head	Indexable insert drill	Straight type insert drill	Insert mill	Straight type, Step type
Length (The ratio to øD)	3D	5D	7D	10D	3D / 5D / 8D	2D / 3D / 4D / 5D	2D / 3D	3D / 5D	3D / 5D
Coolant holes	Yes			Yes	Yes	Yes			No
Coating	TiAlN			–	TiAlN	WDXT type insert			–
Diameter range	ø 9,5 ~ ø 40,5			ø 8,0 ~ ø 30,5	ø 12,0 ~ ø 42,5 New	ø 13,0 ~ ø 65,0	ø 16,0 ~ ø 40,0		ø 5,0 ~ ø 12,0

Selection Guide

● According to Drill Types / Applications

Application	General ⟷ Special		
Solid Type "Super Multi-Drill" **MDS / MDW** Type	m7 DIN Type "Super Multi-Drill" **SDP...U HAK Type** AlCrTiN coated general purpose drill with coolant holes øD : 3,0 ~ 16mm L/D: 3, 5, 7 ⇨ K6 ~ 11	"Super Multi-Drill" **MDW...GS Type** DEX (TiAlCr/TiSi) coated general purpose drill without coolant holes øD : 2,0 ~ 16mm L/D: ~ 2, ~ 4 ⇨ K14 ~ 15	"Super Multi-Drill" **MDW...HGS Type** DEX (TiAlCr/TiSi) coated general purpose drill with coolant holes øD : 4,0 ~ 16mm L/D: ~ 3, ~ 5 ⇨ K16 ~17
	m7 DIN Type "Super Multi-Drill" **MDS...K-HAK Type** TiAlN coated general purpose drill with coolant holes øD : 2,0 ~ 12mm L/D: ~ 2, ~ 4 ⇨ K18 ~ 19	"Super Multi-Drill" **MDS...G Type** For Cast Iron & Aluminum øD : 2,8 ~ 20mm L/D: ~ 3 ⇨ K20 ~ 23	"Super Multi-Drill" **MDS...D Type** Hardened Steel Exotic Metals øD : 1,0 ~ 16,1mm L/D: ~ 3 (Stock in Japan)
Brazed Type "Super Multi-Drill" **KDS** Type	"Super Multi-Drill" **KDS... MAK Type** General Purpose Drill øD : 12 ~ 26mm L/D: ~ 3 ⇨ K36 ~ 37	Long Type "Super Multi-Drill" **KDS... LAK Type** Deep Hole Drilling øD : 12 ~ 26mm L/D: ~ 5 ⇨ K38 ~ 39	—
	—	Long Type "Super Multi-Drill" **KDS... DAK Type** Good Chip Removal øD : 9 ~ 22mm L/D: ~ 7 ⇨ K40 ~ 41	Extra Long Typ "Super Multi-Drill" **KDS... FA Type** For Cast Irons and Aluminium Alloys Delivery on request øD : 9 ~ 22mm L/D: ~ 7 ⇨ K42

■ Recommended Cutting Conditions by Work Materials

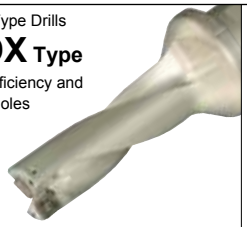
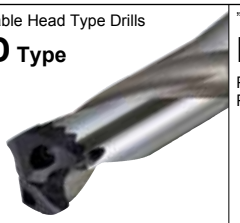
Drill \ Work		Steel	Stainless Steel	Cast Iron	Non-ferrous Metalls
Solid Type	SDP...U HAK MDW...GS/HGS	50 – 120 (0,35) 0,2 – (0,35)	15 – 70 0,1 – 0,2	50 – 110 (0,35) 0,2 – (0,35)	—
	MDS...G	—	—	25 – 80 (0,4) 0,25 – ②	80 – 200 (0,45) 0,25 – ②
Brazed Type	KDS...AK (MAK/LAK/DAK)	50 – 90 (0,35) 0,15 – (0,35)	35 – 50 0,15 – 0,25	60 – 100 (0,35) 0,2 – (0,35)	—
	KDS...FA	—	—	30 – 70 (0,5) 0,2 – (0,5)	60 – 150 (0,5) 0,2 – (0,5)

Cutting speed v_c (m/min)
Feed f (mm/rev)

● According to Drill Types / Applications

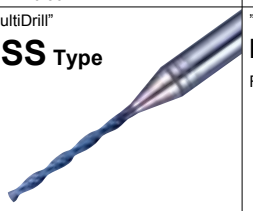
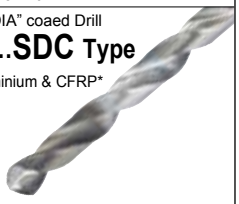
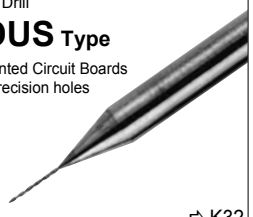
Application	General ⟷ Special

Indexable Drills

Insert Type Drills	Replaceable Head Type Drills	"Multi-Function" Types
WDX Type High Efficiency and Deep Holes  øD : 13,0 ~ 65,0mm L/D: 2, 3, 4, 5 ⇨ K50 ~ 59	**SMD Type**  øD : 12,0~ 42,5mm L/D: 3, 5, 8 ⇨ K43 ~ 49	**PDL & PCT** Plunge Drills and Plunge Mills  øD : 16,0 ~ 40,0mm L/D: 2, 3, 5 ⇨ K60 ~ 62

Application	Deep Hole	Very Small Hole	Precision Hole

Special Purpose Drills

"Super Long Multi-Drill"	"Long Micro Drill"	AURORA-Coat Drill
MDW...XHT Type New General Purpose Deep Hole Drill  øD :4,0 ~ 12,0mm L/D: 10/15/20/25/30 ⇨ K24 ~ 27	**MLDH... P/L Type** "P" type for pilot hole  øD : 0,8 ~ 2,0mm L/D: 5/12/20/30 ⇨ K30 ~ 31	**MDW...NHGS Type** For Aluminium Alloy  øD : 3,0 ~ 16,0mm L/D: 3 / 5 / 10 ⇨ K28 ~ 29
—	"Mini-MultiDrill" **MDSS Type**  øD : 0,20 ~ 1,00mm L/D: 10 ⇨ K32	"SUMI-DIA" coaed Drill **MDS...SDC Type** For Aluminium & CFRP*  CFRP* (Carbon FibreReinforced Plastic) øD : 2 ~ 10mm L/D: ~ 3 ⇨ K33
—	"Micro Drill" **MDUS Type** For Printed Circuit Boards High precision holes  øD : 0,05 ~ 0,19mm L/D: ~ 8 ⇨ K32	PCD Brazed Drill **SumiDia Drill**  øD : 5 ~ 12mm L/D: ~ 3 ⇨ K63 ~ 64

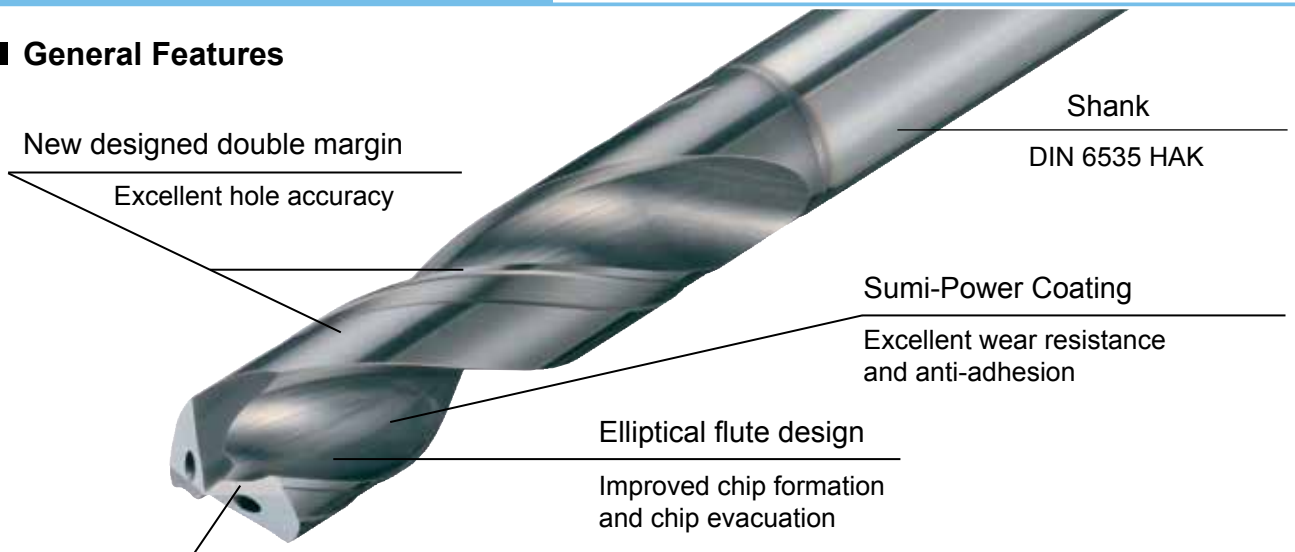
■ Recommended Cutting Conditions by Work Materials

Drill \ Work	Steel	Stainless Steel	Cast Iron	Non-ferrous Metalls
SMD (ø20)	50 ▬ 120 0,12 ⊢ 0,35	50 ▬ 90 0,1 ⊢ 0,25	50 ▬ 100 0,2 ⊢ 0,45 ②	100 ▬ 180 0,2 ⊢ 0,4 ②
WDX (ø18)	100 ▬ 220 0,15 ⊢ 0,25	80 ▬ 180 0,06 ⊢ 0,18	120 ▬ 200 0,1 ⊢ 0,32	100 ▬ 200 0,1 ⊢ 0,25
MDW...XHT (ø5)	80 ▬ 120 0,15 ⊢ 0,25	30 ▬ 60 0,08 ⊢ 0,15	50 ▬ 90 0,15 ⊢ 0,3	80 ▬ 160 0,12 ⊢ 0,35
SumiDia Drill	—	—	—	80 ▬ 200 0,05 ⊢ 0,2

▬ Cutting speed v_c (m/min)
⊢ Feed f (mm/rev)

SDP Type (DIN)

General Features



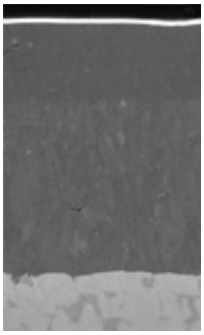


Stock Size

Ø3,0 ~ Ø12,0
Increment 0,1mm

Ø12,1 ~ Ø16,0
Standard diameter

Coating Structure



Improved anti-adhesion AlCrTiN lubricant layer coating with high Al content improves friction condition.

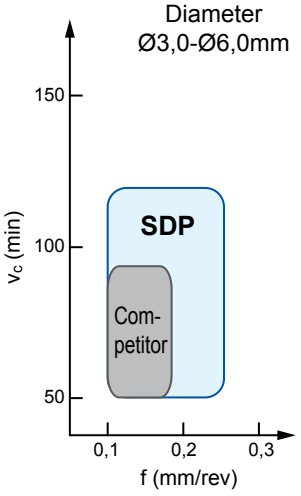
High wear resistance
Tough and hard
AlCrTiN super multilayer

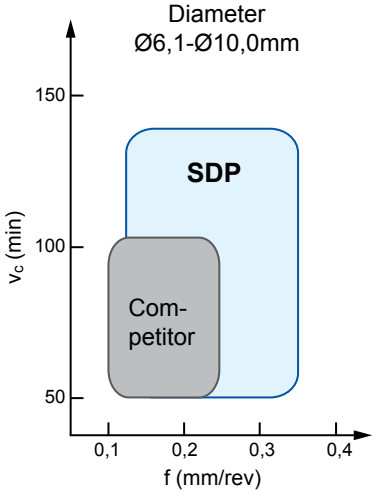
Substrate

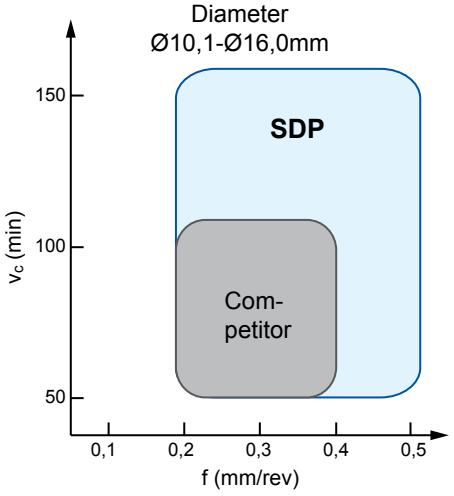
Advantages

- The specific and optimum solution for a wide range of application conditions
- Top performance parameters, maximum feed and stable long tool life
- Double margin design for high-precision holes
- Good balance of high wear resistance and toughness
- Curved cutting edge - ideal for removing chips
- Reliable and high productivity performance

Application Range







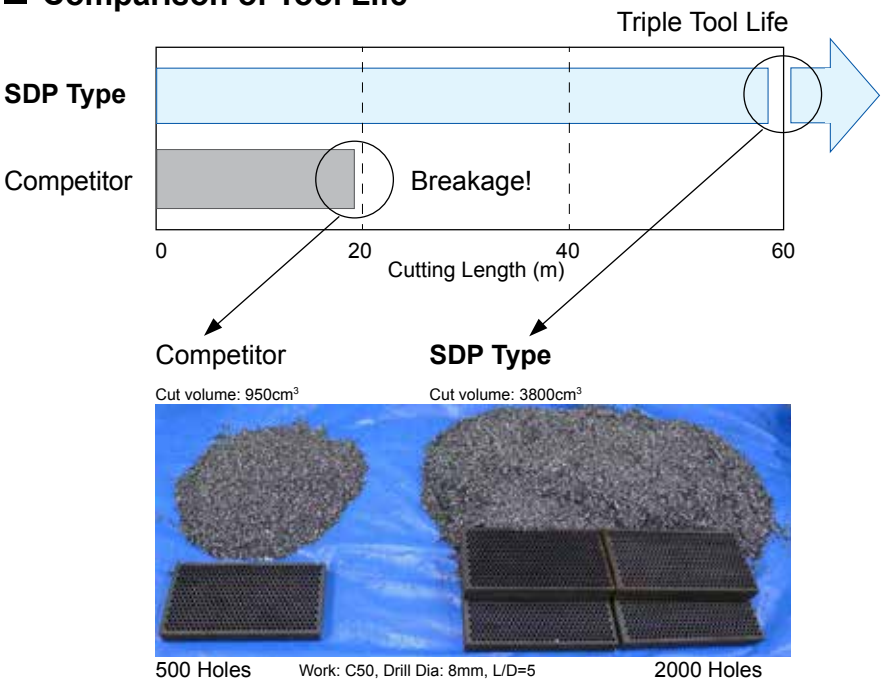
Maximum Feed Rate Result

Feed Rate (mm/rev)	0,30	0,40	0,50	0,55	0,60	0,65	0,70	0,75	0,80
SDP Type	OK	OK	OK	OK	OK	OK	OK	OK	
Competitor	OK	Breakage!							

Internal test conditions

Drill:	Ø 4, L/D=5
Work Material:	Carbon Steel (C50)
Cutting Data:	v_c=80m/rev, a_p=18mm

Comparison of Tool Life

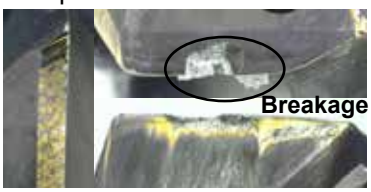


Drill:	Ø 8, L/D=5
Work Material:	Carbon Steel (C50)
Cutting Data:	v_c=80m/min, f=0,15mm/rev, a_p=38mm, Through hole, Internal coolant

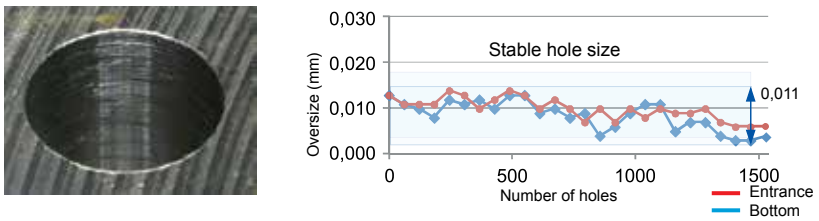
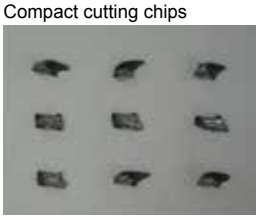
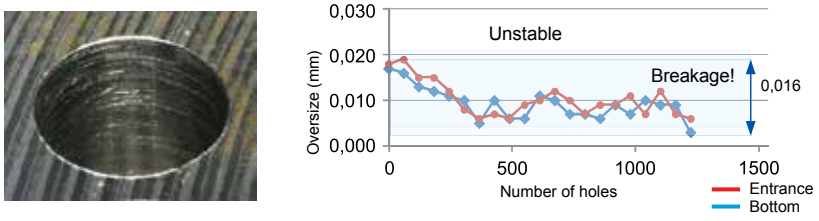
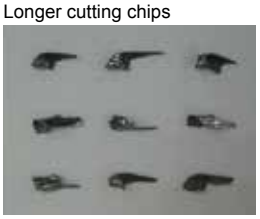
SDP Type



Competitor

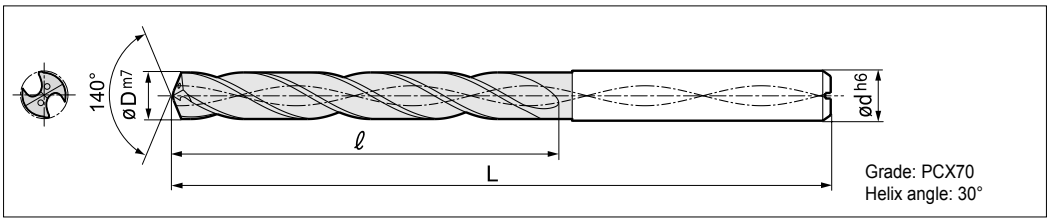


Excellent Hole Accuracy

	Hole Accuracy	Chip Shape
SDP Type		Compact cutting chips 
Competitor		Longer cutting chips 

Drill:	Ø 8, L/D=5
Workpiece:	Carbon Steel (C50)
Cutting Data:	v_c=80m/min, f=0,25mm/rev, a_p=24mm, Blind-hole, Internal coolant

■ Solid Carbide Drill with Internal Coolant Supply, ØD: 3,0 ~ 7,5mm, 3D / 5D /7D

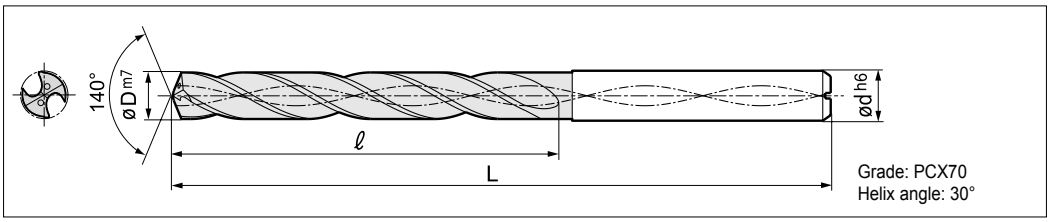


ØD (mm)	Shank Ød (mm)	Cat. No. (L/D) 3, 5, 7	3D Type			5D Type			7D Type		
			Stock	Dimensions (mm)		Stock	Dimensions (mm)		Stock	Dimensions (mm)	
			3	L	ℓ	5	L	ℓ	7	L	ℓ
3,0	6	SDP 0300 U □ HAK	●	62	17	●	66	24	●	70	29
3,1		SDP 0310 U □ HAK	●			●			●		
3,2		SDP 0320 U □ HAK	●			●			●		
3,25		SDP 0325 U □ HAK	●			●			●		
3,3		SDP 0330 U □ HAK	●			●			●		
3,4		SDP 0340 U □ HAK	●			●			●	75	33,5
3,5		SDP 0350 U □ HAK	●			●			●		
3,6		SDP 0360 U □ HAK	●			●			●		
3,7		SDP 0370 U □ HAK	●			●			●		
3,8		SDP 0380 U □ HAK	●		21	●	74	33	●		35,5
3,9		SDP 0390 U □ HAK	●			●			●		
4,0		SDP 0400 U □ HAK	●			●			●		
4,1		SDP 0410 U □ HAK	●			●			●		
4,2		SDP 0420 U □ HAK	●			●			●		
4,3		SDP 0430 U □ HAK	●	66		●			●	85	44
4,4		SDP 0440 U □ HAK	●			●			●		
4,5		SDP 0450 U □ HAK	●			●			●		
4,6		SDP 0460 U □ HAK	●			●			●		
4,65		SDP 0465 U □ HAK	●			●			●		
4,7		SDP 0470 U □ HAK	●			●			●		
4,8		SDP 0480 U □ HAK	●		25	●	82	41	●	90	49
4,9		SDP 0490 U □ HAK	●			●			●		
5,0		SDP 0500 U □ HAK	●			●			●		
5,1		SDP 0510 U □ HAK	●			●			●		
5,2		SDP 0520 U □ HAK	●			●			●		
5,3		SDP 0530 U □ HAK	●			●			●		
5,4		SDP 0540 U □ HAK	●			●			●	97	56
5,5		SDP 0550 U □ HAK	●			●			●		
5,55		SDP 0555 U □ HAK	●			●			●		
5,6		SDP 0560 U □ HAK	●			●			●		
5,7		SDP 0570 U □ HAK	●			●			●		
5,8		SDP 0580 U □ HAK	●			●			●		
5,9		SDP 0590 U □ HAK	●			●			●		
6,0		SDP 0600 U □ HAK	●			●			●		
6,1	8	SDP 0610 U □ HAK	●	79	31	●	91	50	●	106	65
6,2		SDP 0620 U □ HAK	●			●			●		
6,3		SDP 0630 U □ HAK	●			●			●		
6,4		SDP 0640 U □ HAK	●			●			●		
6,5		SDP 0650 U □ HAK	●			●			●		
6,6		SDP 0660 U □ HAK	●			●			●		
6,7		SDP 0670 U □ HAK	●			●			●		
6,8		SDP 0680 U □ HAK	●			●			●		
6,9		SDP 0690 U □ HAK	●			●			●	116	75
7,0		SDP 0700 U □ HAK	●			●			●		
7,1		SDP 0710 U □ HAK	●		37	●			●		
7,2		SDP 0720 U □ HAK	●			●			●		
7,3		SDP 0730 U □ HAK	●			●			●		
7,4		SDP 0740 U □ HAK	●			●			●		
7,5		SDP 0750 U □ HAK	●			●			●		

※ Remarks:
❑ Non-Stock Items will be required minimum order quantity for 30 pcs.

● = Euro stock
❑ = Delivery on request

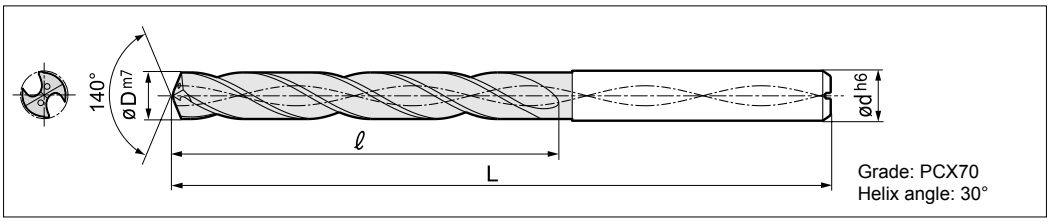
■ Solid Carbide Drill with Internal Coolant Supply, ØD: 7,6 ~ 12,5mm, 3D / 5D / 7D



ØD (mm)	Shank Ød (mm)	Cat. No. (L/D) 3, 5, 7	3D Type			5D Type			7D Type		
			Stock	Dimensions (mm)		Stock	Dimensions (mm)		Stock	Dimensions (mm)	
			3	L	ℓ	5	L	ℓ	7	L	ℓ
7,6	8	SDP 0760 U □ HAK	●	79	37	●	91	50	●	116	75
7,7		SDP 0770 U □ HAK	●			●			●		
7,8		SDP 0780 U □ HAK	●			●			●		
7,9		SDP 0790 U □ HAK	●			●			●		
8,0		SDP 0800 U □ HAK	●			●			●		
8,1	10	SDP 0810 U □ HAK	●	89	43	●	103	57	●	131	85
8,2		SDP 0820 U □ HAK	●			●			●		
8,3		SDP 0830 U □ HAK	●			●			❑		
8,4		SDP 0840 U □ HAK	●			●			●		
8,5		SDP 0850 U □ HAK	●			●			●		
8,6		SDP 0860 U □ HAK	●			●			●		
8,7		SDP 0870 U □ HAK	●			●			●		
8,8		SDP 0880 U □ HAK	●			●			●		
8,9		SDP 0890 U □ HAK	●			●			❑		
9,0		SDP 0900 U □ HAK	●			●			●		
9,1		SDP 0910 U □ HAK	●			●			●	139	93
9,2		SDP 0920 U □ HAK	●			●			●		
9,25		SDP 0925 U □ HAK	●			●			❑		
9,3		SDP 0930 U □ HAK	●			●			●		
9,4		SDP 0940 U □ HAK	●			●			●		
9,5		SDP 0950 U □ HAK	●			●			●		
9,6		SDP 0960 U □ HAK	●			●			❑		
9,7		SDP 0970 U □ HAK	●			●			●		
9,8		SDP 0980 U □ HAK	●			●			●		
9,9		SDP 0990 U □ HAK	●			●			●		
10,0		SDP 1000 U □ HAK	●			●			●		
10,1	12	SDP 1010 U □ HAK	●	102	51	●	118	67	❑	155	104
10,2		SDP 1020 U □ HAK	●			●			●		
10,3		SDP 1030 U □ HAK	●			●			❑		
10,4		SDP 1040 U □ HAK	●			●			❑		
10,5		SDP 1050 U □ HAK	●			●			●		
10,6		SDP 1060 U □ HAK	●			●			❑		
10,7		SDP 1070 U □ HAK	●			●			❑		
10,8		SDP 1080 U □ HAK	●			●			●		
10,9		SDP 1090 U □ HAK	●			●			❑		
11,0		SDP 1100 U □ HAK	●			●			●		
11,1		SDP 1110 U □ HAK	●			●			❑	163	112
11,2		SDP 1120 U □ HAK	●			●			●		
11,3		SDP 1130 U □ HAK	●			●			❑		
11,4		SDP 1140 U □ HAK	●			●			❑		
11,5		SDP 1150 U □ HAK	●			●			●		
11,6		SDP 1160 U □ HAK	●			●			❑		
11,7		SDP 1170 U □ HAK	●			●			❑		
11,8		SDP 1180 U □ HAK	●			●			●		
11,9		SDP 1190 U □ HAK	●			●			❑		
12,0		SDP 1200 U □ HAK	●			●			●		
12,1	14	SDP 1210 U □ HAK	❑	107	56	❑	124	73	❑	182	131
12,2		SDP 1220 U □ HAK	●			●			●		
12,3		SDP 1230 U □ HAK	❑			❑			❑		
12,4		SDP 1240 U □ HAK	❑			❑			❑		
12,5		SDP 1250 U □ HAK	●			●			●		

※ Remarks:
❑ Non-Stock Items will be required minimum order quantity for 30 pcs.

■ Solid Carbide Drill with Internal Coolant Supply, ØD: 12,6 ~ 16,0mm, 3D / 5D / 7D



ØD (mm)	Shank Ød (mm)	Cat. No. (L/D) 3, 5, 7	3D Type			5D Type			7D Type		
			Stock	Dimensions (mm)		Stock	Dimensions (mm)		Stock	Dimensions (mm)	
			3	L	ℓ	5	L	ℓ	7	L	ℓ
12,6	14	SDP 1260 U □ HAK	❑	107	56	❑	124	73	❑	182	131
12,7		SDP 1270 U □ HAK	❑			❑			❑		
12,8		SDP 1280 U □ HAK	❑			❑			❑		
12,9		SDP 1290 U □ HAK	❑			❑			❑		
13,0		SDP 1300 U □ HAK	●			●			●		
13,1		SDP 1310 U □ HAK	❑			❑			❑		
13,2		SDP 1320 U □ HAK	❑			❑			❑		
13,3		SDP 1330 U □ HAK	❑			❑			❑		
13,4		SDP 1340 U □ HAK	❑			❑			❑		
13,5		SDP 1350 U □ HAK	●			●			●		
13,6		SDP 1360 U □ HAK	❑			❑			❑		
13,7		SDP 1370 U □ HAK	●			●			●		
13,8		SDP 1380 U □ HAK	❑			❑			❑		
13,9		SDP 1390 U □ HAK	❑			❑			❑		
14,0		SDP 1400 U □ HAK	●			●			●		
14,1	16	SDP 1410 U □ HAK	❑	115	60	❑	133	78	❑	204	149
14,2		SDP 1420 U □ HAK	●			●			●		
14,3		SDP 1430 U □ HAK	❑			❑			❑		
14,4		SDP 1440 U □ HAK	❑			❑			❑		
14,5		SDP 1450 U □ HAK	●			●			●		
14,6		SDP 1460 U □ HAK	❑			❑			❑		
14,7		SDP 1470 U □ HAK	●			●			●		
14,8		SDP 1480 U □ HAK	❑			❑			❑		
14,9		SDP 1490 U □ HAK	❑			❑			❑		
15,0		SDP 1500 U □ HAK	●			●			●		
15,1		SDP 1510 U □ HAK	❑			❑			❑		
15,2		SDP 1520 U □ HAK	●			●			●		
15,3		SDP 1530 U □ HAK	❑			❑			❑		
15,4		SDP 1540 U □ HAK	❑			❑			❑		
15,5		SDP 1550 U □ HAK	●			●			●		
15,6		SDP 1560 U □ HAK	❑			❑			❑		
15,7		SDP 1570 U □ HAK	●			●			●		
15,8		SDP 1580 U □ HAK	❑			❑			❑		
15,9		SDP 1590 U □ HAK	❑			❑			❑		
16,0		SDP 1600 U □ HAK	●			●			●		

※ Remarks:
❑ Non-Stock Items will be required minimum order quantity for 30 pcs.

● = Euro stock
❑ = Delivery on request

Recommended Cutting Conditions

Material Group						SDP_____U_HAK PCX70					
ISO 513	Work Material	Type/ Structure	R_m N/mm²	Hardness HB30	Fitness	ØD: 3,0 - 6,0		ØD: 6,1 - 10,0		ØD: 10,1 - 16,0	
						v_c=m/min	Feed rate (mm/rev)	v_c=m/min	Feed rate (mm/rev)	v_c=m/min	Feed rate (mm/rev)
P	Carbon steel Cast steel	free cutting steel construction steel case-hardened steel heat-treatable steel spring steel	420	125	◎	50 - **80** - 120	0,15 - **0,20** - 0,31	70 - **110** - 140	0,20 - **0,25** - 0,42	80 - **120** - 160	0,25 - **0,30** - 0,53
			650	190	◎	50 - **80** - 120	0,15 - **0,20** - 0,31	70 - **110** - 140	0,20 - **0,25** - 0,42	80 - **120** - 160	0,25 - **0,30** - 0,53
			850	250	◎	50 - **80** - 120	0,15 - **0,20** - 0,31	70 - **110** - 140	0,20 - **0,25** - 0,42	80 - **120** - 160	0,25 - **0,30** - 0,53
			750	270	◎	50 - **80** - 120	0,15 - **0,20** - 0,31	70 - **110** - 140	0,20 - **0,25** - 0,42	80 - **120** - 160	0,25 - **0,30** - 0,50
			1000	300	◎	10 - **20** - 30	0,05 - **0,06** - 0,11	15 - **22** - 30	0,08 - **0,09** - 0,14	20 - **28** - 35	0,08 - **0,09** - 0,16
	Low alloy steel Cast steel	case-hardened steel heat-treatable steel bearing steel nitriding steel cold work steel	600	180	◎	50 - **70** - 90	0,10 - **0,14** - 0,24	60 - **80** - 110	0,15 - **0,20** - 0,32	70 - **100** - 120	0,20 - **0,25** - 0,40
			930	275	◎	45 - **65** - 85	0,10 - **0,14** - 0,24	60 - **80** - 110	0,15 - **0,22** - 0,34	65 - **95** - 120	0,20 - **0,25** - 0,37
			1000	300	○	40 - **60** - 80	0,10 - **0,15** - 0,26	60 - **80** - 110	0,15 - **0,20** - 0,32	60 - **90** - 120	0,20 - **0,25** - 0,37
			1200	350	◎	35 - **55** - 75	0,10 - **0,15** - 0,26	55 - **75** - 110	0,15 - **0,22** - 0,32	55 - **80** - 110	0,20 - **0,27** - 0,38
	High alloy steel	tool steel hot work steel	680	200	○	30 - **40** - 50	0,10 - **0,15** - 0,25	30 - **40** - 50	0,12 - **0,20** - 0,28	30 - **40** - 50	0,12 - **0,20** - 0,32
			1100	325	○	20 - **30** - 40	0,10 - **0,12** - 0,23	20 - **30** - 40	0,12 - **0,15** - 0,27	20 - **30** - 40	0,14 - **0,18** - 0,32
M	Stainless steel Cast steel	martensitic/ferritic	680	200	○	40 - **55** - 70	0,08 - **0,10** - 0,21	40 - **60** - 75	0,10 - **0,12** - 0,25	50 - **70** - 80	0,10 - **0,12** - 0,25
		martensitic	820	240	⊙	30 - **45** - 60	0,08 - **0,10** - 0,20	40 - **60** - 70	0,10 - **0,12** - 0,24	50 - **60** - 80	0,10 - **0,12** - 0,24
		austenitic	600	180	⊙	30 - **45** - 60	0,08 - **0,10** - 0,20	40 - **60** - 70	0,10 - **0,12** - 0,24	50 - **60** - 80	0,10 - **0,12** - 0,24
		Duplex	740	230	⊙	30 - **45** - 60	0,06 - **0,08** - 0,18	40 - **60** - 70	0,08 - **0,10** - 0,23	50 - **60** - 80	0,10 - **0,10** - 0,23
K	Cast iron GG	ferritic/pearlitic		180	◎	50 - **70** - 90	0,15 - **0,20** - 0,36	60 - **80** - 100	0,20 - **0,25** - 0,40	70 - **100** - 120	0,25 - **0,30** - 0,42
		pearlitic		260	◎	40 - **60** - 80	0,15 - **0,20** - 0,36	50 - **70** - 90	0,20 - **0,25** - 0,40	60 - **80** - 100	0,25 - **0,30** - 0,42
	Cast iron GGG	ferritic		160	◎	50 - **70** - 90	0,15 - **0,18** - 0,31	60 - **80** - 100	0,20 - **0,25** - 0,40	70 - **100** - 120	0,25 - **0,30** - 0,42
		pearlitic		250	◎	40 - **60** - 80	0,15 - **0,18** - 0,31	50 - **70** - 90	0,20 - **0,25** - 0,40	70 - **80** - 100	0,25 - **0,30** - 0,42
S	Heat resisting alloys	Fe-based			○	10 - **20** - 30	0,08 - **0,09** - 0,13	15 - **22** - 32	0,08 - **0,10** - 0,15	20 - **28** - 35	0,10 - **0,12** - 0,19
		Ni / Co-based			○	10 - **20** - 30	0,08 - **0,09** - 0,13	15 - **22** - 32	0,08 - **0,10** - 0,15	20 - **28** - 35	0,10 - **0,12** - 0,19
	Titanium Titanium alloys	pure Titanium	430								
		Ti-Basis			○	10 - **20** - 30	0,05 - **0,06** - 0,12	15 - **22** - 32	0,08 - **0,09** - 0,17	20 - **28** - 35	0,08 - **0,09** - 0,17
N	Aluminium Al-wrought alloys	pure aluminium									
		wrought alloys									
	Aluminium Cast alloys	Si ≤ 12%									
		Si ≥ 12%			⊙	70 - **90** - 100	0,15 - **0,20** - 0,25	80 - **100** - 120	0,20 - **0,25** - 0,30	100 - **120** - 140	0,25 - **0,30** - 0,35
		Al - Mg alloys									
	Zinc die-cast	Zn alloys									
	Copper alloys	Copper									
		Brass			○	80 - **100** - 120	0,15 - **0,20** - 0,25	110 - **130** - 180	0,20 - **0,25** - 0,30	160 - **180** - 200	0,25 - **0,30** - 0,35
		Bronze									
H	Hardened steel	45 HRC			○	10 - **20** - 30	0,08 - **0,09** - 0,10	15 - **22** - 32	0,08 - **0,10** - 0,12	20 - **28** - 35	0,12 - **0,15** - 0,20
		55 HRC									
		60 HRC									
		> 60 HRC									

◎ Preferred choice ○ Suitable ⊙ Possible

SDP-Identification

SDP **0800** **U** **3** **HAK** PCX70

- **SDP**: **S**umi-**D**rill **P**ower Type
- **0800**: Drill Diameter 8,0mm
- **U**: Universal
- **3**: Drilling Depth 3D/5D/7D
- **HAK**: DIN 6535 Form HAK
- PCX70: Grade

DEX Coating

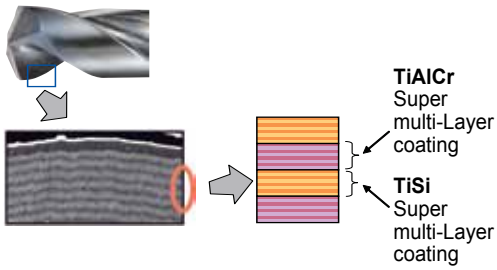


General Features

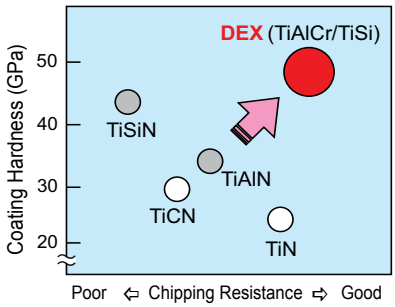
- Sumitomo Electric Hardmetal's next-generation drill coating utilises nano-coating technology to provide more than double the tool life of conventional coatings.
- Silicon and chrome improve usure, heat, and adhesion resistance.
- New super multi-layered structure offers significantly improved chip resistance (coating strength).

Characteristics

- Coating Design
  World's first combined super multi-layered coating is made from alternate layers of super multilayered substrates.



- Characteristics of Films



DEX Coat Application Examples

- MultiDrill GS Type Drilling Examples

Comparison of Usure Resistance

Edge Usure Comparison for 70m Drilling

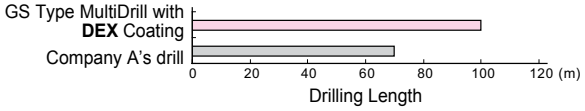
Shoulder and rake face feature improved usure resistance enabling long tool life.

DEX Coating MultiDrill GS Type



Concurrent A Dril





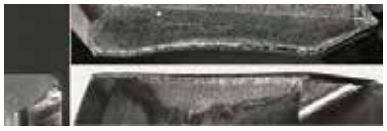
Tool:	MDW 0800 GS4
Work Material:	C50 (HB200)
Cutting Conditions:	v_c =70m/min, f=0,25mm/rev, d_{oc} =32mm External coolant (Water soluble)

Comparison of Adhesion Resistance

Edge Usure Comparison for 100m Drilling

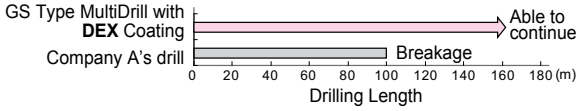
Offers significantly improved fracture resistance to counter problems caused by shoulder and flute adhesion in soft steel drilling.

DEX Coating MultiDrill GS Type



Competitor B Dril



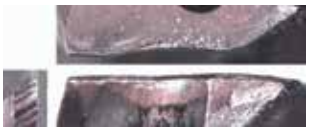


Tool:	MDW 0600 GS4
Work Material:	15CrMo5 (HB120)
Cutting Conditions:	v_c =60m/min, f=0,18mm/rev, d_{oc} =18mm External coolant (Water soluble)

- Long MultiDrill XHT Type Drilling Examples

Reduced margin usure during deep hole MQL drilling increases number of regrinds.

DEX Coating



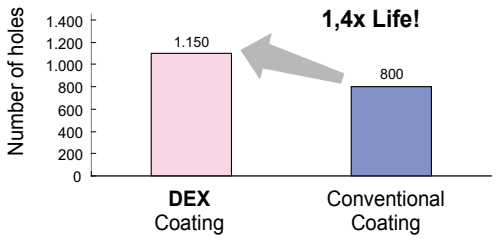
Conventional Coating



Tool:	MDW 0497 XHT20 (ø4,97 L/D=29)
Work Material:	42CrMo4 (HB275) Crank Shaft
Cutting Conditions:	v_c=70m/min, f=0,23mm/rev, d_{oc} =75mm MQL

- MultiDrill SMD Type Drilling Examples

Offers longer tool life with SEC MultiDrills as well.



Tool:	SMDH 210 M (ø21,0)
Work Material:	36Mn5 (HB350) Construction Mashine Componemt
Cutting Conditions:	v_c=60m/min, f=0,25mm/rev, d_{oc} =25mm Water soluble Coolant

SUPER MULTI-DRILLS
GS / HGS Type



General Features

Super MultiDrill GS and HGS types are solid carbide drills that employ a new flute design and wide chip pocket to achieve excellent chip management and evacuation.
DEX coating enables stable and long tool life over a wide range of work materials and applications.

Characteristics and Applications

- **Long tool life**
  New cutting edge design and special DEX coating provide long tool life with a wide variety of work materials.
- **Stable chip evacuation**
  New flute shape significantly improves chip management and evacuation.
- **Quiet cutting and stable cutting resistance**
  Stable drilling with little wobble even in small machine applications.
- **Environmentally-friendly**
  Compatible with the MQL (Minimum Quantity Lubrication) system.

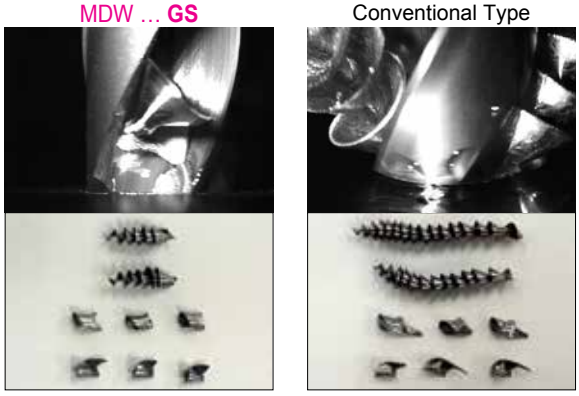
Series

Coolant Supply	Type	Diameter Range (mm)	Hole Depth (L/D)
External (GS Type)	MDW □□□□GS2	ø2,0~ø16,0	~ 2
	MDW □□□□GS4		~ 4
Internal (HGS Type)	MDW □□□□HGS3	ø4,0~ø16,0	~ 3
	MDW □□□□HGS5		~ 5

Performance

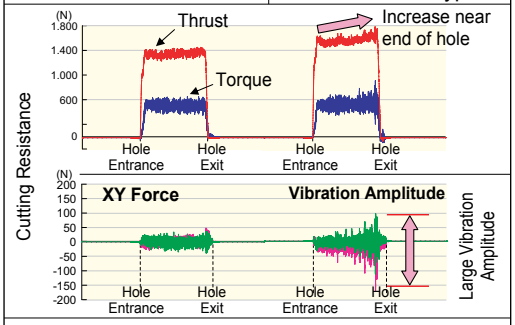
Chip Management

MDW … GS | Conventional Type



Performance Comparison

MDW … GS | Conventional Type



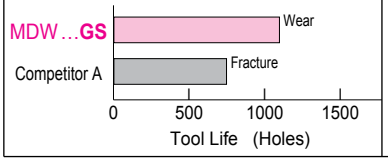
GS type provides stable drill behaviour throughout the drilling process.

Tool: MDW 0800 GS4
Work Material: C50 (HB200)
Cutting Conditions: v_c=80m/min, f=0,25mm/rev, d_{oc}=24mm
External Coolant (Water Soluble)

Application Examples

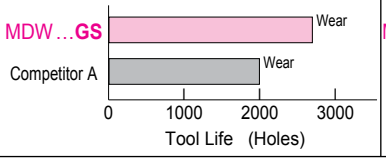
● Automotive Component
C43 (HB250)

Drill: MDW 0970 GS4 (ø9,7mm)
Cutting Data: v_c = 80 m/min, f = 0,25 mm/rev
d_{oc} = 25 mm
External Coolant (Water Soluble)



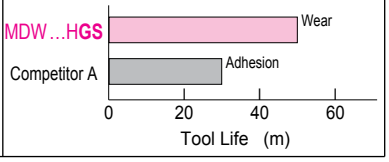
● Boron Steel Machine Component
(HRC30)

Drill: MDW 0980 GS2 (ø9,8mm)
Cutting Data: v_c = 70 m/min, f = 0,15 mm/rev
d_{oc} = 7 mm
External Coolant (Water Soluble)



● Machine Component
USt.42-2

Drill: MDW 0800 HGS8 (ø8,0mm)
Cutting Data: v_c = 80 m/min, f = 0,25 mm/rev
d_{oc} = 64 mm
Internal Coolant (Water Soluble)

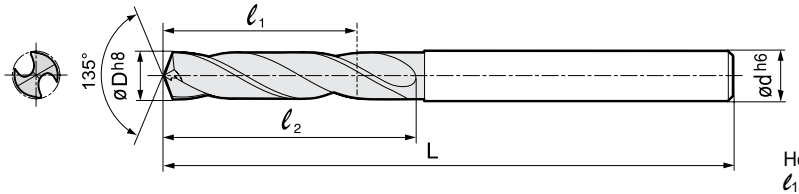


MDW ... GS Type

Without Coolant Holes (2D/4D)

"Super Multi-Layer" DEX (TiAlCr/TiSi) Coated Solid Carbide Drills





Helix angle: 30°
ℓ_1 = Effective drilling length

● Diameter ø2,0~6,0mm

(mm)

Dimensions		Cat. No.	Short Type (2D)				Long Type (4D)			
			Stock	Dimensions			Stock	Dimensions		
øD	ød	2, 4 ↘	2	L	ℓ_1	ℓ_2	4	L	ℓ_1	ℓ_2
2,0	3,0	**MDW 0200 GS□**	○	45,4	6,0	8,4	○	49,4	13,0	15,4
2,1		**MDW 0210 GS□**	○				○			
2,2		**MDW 0220 GS□**	○				○			
2,3		**MDW 0230 GS□**	○		7,3	10,5	○		14,5	17,5
2,4		**MDW 0240 GS□**	○				○			
2,5		**MDW 0250 GS□**	○	45,6			○	49,6		
2,6	3,0	**MDW 0260 GS□**	○				○			
2,7		**MDW 0270 GS□**	○				○			
2,8		**MDW 0280 GS□**	○		9,8	13,6	○		16,0	19,6
2,9		**MDW 0290 GS□**	○				○			
3,0		**MDW 0300 GS□**	○				○			
3,1		**MDW 0310 GS□**	○				○			
3,2		**MDW 0320 GS□**	○				○			
3,3		**MDW 0330 GS□**	○		15,5	19,7	○		20,5	24,7
3,4		**MDW 0340 GS□**	○				○			
3,5		**MDW 0350 GS□**	○	54,8			○	60,8		
3,6	4,0	**MDW 0360 GS□**	○				○			
3,7		**MDW 0370 GS□**	○				○			
3,8		**MDW 0380 GS□**	○		17,0	21,8	○		23,0	27,8
3,9		**MDW 0390 GS□**	○				○			
4,0		**MDW 0400 GS□**	○				○			
4,1		**MDW 0410 GS□**	○				○			
4,2		**MDW 0420 GS□**	○				○			
4,3		**MDW 0430 GS□**	○		18,5	23,9	○		25,5	31,9
4,4		**MDW 0440 GS□**	○				○			
4,5		**MDW 0450 GS□**	○	62,0			○	77,0		
4,6	5,0	**MDW 0460 GS□**	○				○			
4,7		**MDW 0470 GS□**	○				○			
4,8		**MDW 0480 GS□**	○		20,0	26,0	○		33,0	39,0
4,9		**MDW 0490 GS□**	○				○			
5,0		**MDW 0500 GS□**	○				○			
5,1		**MDW 0510 GS□**	○				○			
5,2		**MDW 0520 GS□**	○				○			
5,3		**MDW 0530 GS□**	○		19,5	26,1	○		33,5	40,1
5,4		**MDW 0540 GS□**	○				○			
5,5		**MDW 0550 GS□**	○	66,2			○	82,2		
5,6	6,0	**MDW 0560 GS□**	○				○			
5,7		**MDW 0570 GS□**	○				○			
5,8		**MDW 0580 GS□**	○		21,0	28,2	○		35,0	42,2
5,9		**MDW 0590 GS□**	○				○			
6,0		**MDW 0600 GS□**	○				○			

● Diameter ø6,1~10,0mm

(mm)

Dimensions		Cat. No.	Short Type (2D)				Long Type (4D)			
			Stock	Dimensions			Stock	Dimensions		
øD	ød	2, 4 ↘	2	L	ℓ_1	ℓ_2	4	L	ℓ_1	ℓ_2
6,1		**MDW 0610 GS□**	○				○			
6,2		**MDW 0620 GS□**	○				○			
6,3		**MDW 0630 GS□**	○		24,5	32,3	○		35,5	43,3
6,4		**MDW 0640 GS□**	○				○			
6,5	7,0	**MDW 0650 GS□**	○	74,5			○	84,3		
6,6		**MDW 0660 GS□**	○				○			
6,7		**MDW 0670 GS□**	○				○			
6,8		**MDW 0680 GS□**	○		26,1	34,5	○		36,1	44,5
6,9		**MDW 0690 GS□**	○				○			
7,0		**MDW 0700 GS□**	○				○			
7,1		**MDW 0710 GS□**	○				○			
7,2		**MDW 0720 GS□**	○				○			
7,3		**MDW 0730 GS□**	○		25,6	34,6	○		37,6	46,6
7,4		**MDW 0740 GS□**	○				○			
7,5	8,0	**MDW 0750 GS□**	○	79,7			○	91,7		
7,6		**MDW 0760 GS□**	○				○			
7,7		**MDW 0770 GS□**	○				○			
7,8		**MDW 0780 GS□**	○		28,1	37,7	○		40,1	49,7
7,9		**MDW 0790 GS□**	○				○			
8,0		**MDW 0800 GS□**	○				○			
8,1		**MDW 0810 GS□**	○				○			
8,2		**MDW 0820 GS□**	○				○			
8,3		**MDW 0830 GS□**	○		27,4	37,8	○		34,4	54,8
8,4		**MDW 0840 GS□**	○				○			
8,5	9,0	**MDW 0850 GS□**	○	83,9			○	99,9		
8,6		**MDW 0860 GS□**	○				○			
8,7		**MDW 0870 GS□**	○				○			
8,8		**MDW 0880 GS□**	○		29,1	39,9	○		46,1	56,9
8,9		**MDW 0890 GS□**	○				○			
9,0		**MDW 0900 GS□**	○				○			
9,1		**MDW 0910 GS□**	○				○			
9,2		**MDW 0920 GS□**	○				○			
9,3		**MDW 0930 GS□**	○		28,6	40,0	○		48,6	60,0
9,4		**MDW 0940 GS□**	○				○			
9,5	10,0	**MDW 0950 GS□**	○	89,0			○	107,0		
9,6		**MDW 0960 GS□**	○				○			
9,7		**MDW 0970 GS□**	○				○			
9,8		**MDW 0980 GS□**	○		30,0	42,0	○		50,0	62,0
9,9		**MDW 0990 GS□**	○				○			
10,0		**MDW 1000 GS□**	○				○			

■ Recommended Cutting Conditions for Multi-Drills GS Type

Diameter (mm)		Soft Steels (~ HB200)	General Steels (~ HB300)	Stainless Steels (~ HB200)	Grey Cast Irons	Ductile Cast Irons
~ ø 3	v_c	30 – **50** – 70	30 – **45** – 60	10 – **30** – 40	40 – **70** – 90	35 – **55** – 75
	f	0,12 – 0,20	0,10 – 0,20	0,06 – 0,12	0,15 – 0,30	0,12 – 0,20
~ ø 5	v_c	40 – **70** – 100	40 – **60** – 80	15 – **40** – 55	40 – **70** – 90	40 – **60** – 80
	f	0,15 – 0,25	0,15 – 0,25	0,08 – 0,15	0,15 – 0,30	0,15 – 0,25
~ ø10	v_c	50 – **80** – 130	50 – **70** – 110	15 – **45** – 60	50 – **80** – 120	50 – **70** – 100
	f	0,20 – 0,35	0,20 – 0,35	0,10 – 0,20	0,20 – 0,35	0,20 – 0,35
~ ø16	v_c	60 – **90** – 140	60 – **80** – 120	20 – **50** – 60	60 – **90** – 120	50 – **70** – 100
	f	0,25 – 0,35	0,25 – 0,35	0,10 – 0,20	0,25 – 0,35	0,25 – 0,35

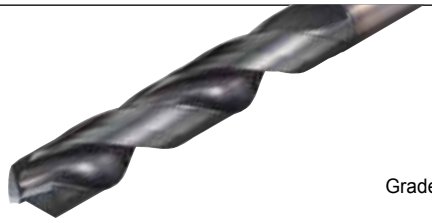
(v_c : Cutting Speed (m/min), f : Feed Rate (mm/rev)) (Min – **Standard** – Max)

○ = Japan stock

MDW ... GS Type

GS Type for General Purpose Drilling of Steels

● GS Type



Grade: ACX70

● Diameter ø10,1~13,0mm

(mm)

Dimensions		Cat. No.	Short Type (2D)				Long Type (4D)			
			Stock	Dimensions			Stock	Dimensions		
øD	ød	2, 4 ↘	2	L	ℓ_1	ℓ_2	4	L	ℓ_1	ℓ_2
10,1	11,0	MDW 1010 GS□	❍	95,3	30,6	43,2	❍	116,2	55,6	68,2
10,2		MDW 1020 GS□	❍				❍			
10,3		MDW 1030 GS□	❍				❍			
10,4		MDW 1040 GS□	❍				❍			
10,5		MDW 1050 GS□	❍				❍			
10,6		MDW 1060 GS□	❍		34,1	47,3	❍		57,1	70,3
10,7		MDW 1070 GS□	❍				❍			
10,8		MDW 1080 GS□	❍				❍			
10,9		MDW 1090 GS□	❍				❍			
11,0		MDW 1100 GS□	❍				❍			
11,1	12,0	MDW 1110 GS□	❍	102,5	33,6	47,4	❍	123,5	59,6	73,4
11,2		MDW 1120 GS□	❍				❍			
11,3		MDW 1130 GS□	❍				❍			
11,4		MDW 1140 GS□	❍				❍			
11,5		MDW 1150 GS□	❍				❍			
11,6		MDW 1160 GS□	❍		35,1	49,5	❍		61,1	75,5
11,7		MDW 1170 GS□	❍				❍			
11,8		MDW 1180 GS□	❍				❍			
11,9		MDW 1190 GS□	❍				❍			
12,0		MDW 1200 GS□	❍				❍			
12,1	13,0	MDW 1210 GS□	❍	102,7	34,6	49,6	❍	139,7	63,6	78,6
12,2		MDW 1220 GS□	❍				❍			
12,3		MDW 1230 GS□	❍				❍			
12,4		MDW 1240 GS□	❍				❍			
12,5		MDW 1250 GS□	❍				❍			
12,6		MDW 1260 GS□	❍		36,1	51,7	❍		65,1	80,7
12,7		MDW 1270 GS□	❍				❍			
12,8		MDW 1280 GS□	❍				❍			
12,9		MDW 1290 GS□	❍				❍			
13,0		MDW 1300 GS□	❍				❍			

● Diameter ø13,1~16,0mm

(mm)

Dimensions		Cat. No.	Short Type (2D)				Long Type (4D)			
			Stock	Dimensions			Stock	Dimensions		
øD	ød	2, 4 ↘	2	L	ℓ_1	ℓ_2	4	L	ℓ_1	ℓ_2
13,1	14,0	MDW 1310 GS□	❑	107,9	36,6	52,8	❍	149,9	70,2	86,8
13,2		MDW 1320 GS□	❑				❍			
13,3		MDW 1330 GS□	❑				❍			
13,4		MDW 1340 GS□	❑				❍			
13,5		MDW 1350 GS□	❑				❍			
13,6		MDW 1360 GS□	❑		38,1	54,9	❍		72,1	88,9
13,7		MDW 1370 GS□	❑				❍			
13,8		MDW 1380 GS□	❑				❍			
13,9		MDW 1390 GS□	❑				❍			
14,0		MDW 1400 GS□	❑				❍			
14,1	15,0	MDW 1410 GS□	❑	111,1	37,6	55,0	❍	156,1	74,6	92,0
14,2		MDW 1420 GS□	❑				❍			
14,3		MDW 1430 GS□	❑				❍			
14,4		MDW 1440 GS□	❑				❍			
14,5		MDW 1450 GS□	❑				❍			
14,6		MDW 1460 GS□	❑		38,1	56,1	❍		76,1	94,1
14,7		MDW 1470 GS□	❑				❍			
14,8		MDW 1480 GS□	❑				❍			
14,9		MDW 1490 GS□	❑				❍			
15,0		MDW 1500 GS□	❑				❍			
15,1	16,0	MDW 1510 GS□	❑	115,5	37,6	56,2	❍	169,3	78,6	97,2
15,2		MDW 1520 GS□	❑				❍			
15,3		MDW 1530 GS□	❑				❍			
15,4		MDW 1540 GS□	❑				❍			
15,5		MDW 1550 GS□	❑				❍			
15,6		MDW 1560 GS□	❑		39,1	58,3	❍		80,1	99,3
15,7		MDW 1570 GS□	❑				❍			
15,8		MDW 1580 GS□	❑				❍			
15,9		MDW 1590 GS□	❑				❍			
16,0		MDW 1600 GS□	❑				❍			

■ How to Order

Non-Stock Items will be required minimum order quantity for 6 pcs.
Please specify the Cat. No. For example, if the diameter of the drill is 10,2 mm, please indicate as follow.

E.g., **MDW 1020 GS 2/4,** ACX70 (Grade)

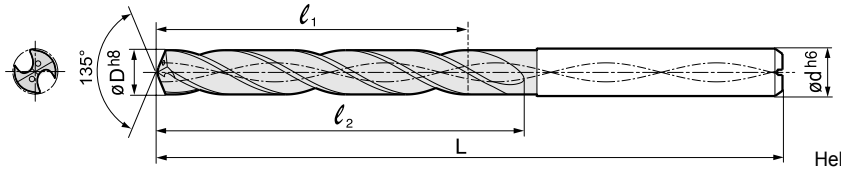
- MDW: SUPER MULTI-DRILLs
- 1020: Drill diameter **10,2** mm
- GS: **GS** type MULTI-DRILLs
- 2/4: Drilling depth (The ratio to øD): ~2 / ~4

MDW ... HGS Type

With Coolant Holes (3D/5D)

"Super Multi-Layer" DEX (TiAlCr/TiSi) Coated Solid Carbide Drills





Helix angle: 30°
ℓ_1 = Effective drilling length

● Diameter ø4,0~7,0mm

(mm)

Dimensions		Cat. No.	Short Type (3D)				Long Type (5D)			
			Stock	Dimensions			Stock	Dimensions		
øD	ød	3, 5 ↘	3	L	ℓ_1	ℓ_2	5	L	ℓ_1	ℓ_2
4,0	4,0	MDW 0400 HGS□	❍	72,8	18,5	23,3	❍	86,8	32,0	36,8
4,1	5,0	MDW 0410 HGS□	❍	81,0	20,5	25,9	❍	99,0	35,5	40,9
4,2		MDW 0420 HGS□	❍				❍			
4,3		MDW 0430 HGS□	❍				❍			
4,4		MDW 0440 HGS□	❍				❍			
4,5		MDW 0450 HGS□	❍		22,5	28,5	❍		39,0	45,0
4,6		MDW 0460 HGS□	❍				❍			
4,7		MDW 0470 HGS□	❍				❍			
4,8		MDW 0480 HGS□	❍				❍			
4,9		MDW 0490 HGS□	❍				❍			
5,0		MDW 0500 HGS□	❍				❍			
5,1	6,0	MDW 0510 HGS□	❍	83,2	22,0	28,6	❍	101,2	38,5	45,1
5,2		MDW 0520 HGS□	❍				❍			
5,3		MDW 0530 HGS□	❍				❍			
5,4		MDW 0540 HGS□	❍				❍			
5,5		MDW 0550 HGS□	❍				❍			
5,6		MDW 0560 HGS□	❍		24,0	31,2	❍		42,0	49,2
5,7		MDW 0570 HGS□	❍				❍			
5,8		MDW 0580 HGS□	❍				❍			
5,9		MDW 0590 HGS□	❍				❍			
6,0		MDW 0600 HGS□	❍				❍			
6,1	7,0	MDW 0610 HGS□	❍	89,5	26,0	33,8	❍	110,5	45,5	53,3
6,2		MDW 0620 HGS□	❍				❍			
6,3		MDW 0630 HGS□	❍				❍			
6,4		MDW 0640 HGS□	❍				❍			
6,5		MDW 0650 HGS□	❍				❍			
6,6		MDW 0660 HGS□	❍		28,1	36,5	❍		49,1	57,5
6,7		MDW 0670 HGS□	❍				❍			
6,8		MDW 0680 HGS□	❍				❍			
6,9		MDW 0690 HGS□	❍				❍			
7,0		MDW 0700 HGS□	❍				❍			

● Diameter ø7,1~10,0mm

(mm)

Dimensions		Cat. No.	Short Type (3D)				Long Type (5D)			
			Stock	Dimensions			Stock	Dimensions		
øD	ød	3, 5 ↘	3	L	ℓ_1	ℓ_2	5	L	ℓ_1	ℓ_2
7,1	8,0	MDW 0710 HGS□	❍	95,7	30,1	39,1	❍	119,7	52,6	61,6
7,2		MDW 0720 HGS□	❍				❍			
7,3		MDW 0730 HGS□	❍				❍			
7,4		MDW 0740 HGS□	❍				❍			
7,5		MDW 0750 HGS□	❍				❍			
7,6		MDW 0760 HGS□	❍		32,1	41,7	❍		56,1	65,7
7,7		MDW 0770 HGS□	❍				❍			
7,8		MDW 0780 HGS□	❍				❍			
7,9		MDW 0790 HGS□	❍				❍			
8,0		MDW 0800 HGS□	❍				❍			
8,1	10,0	MDW 0810 HGS□	❍	101,9	34,1	44,3	❍	128,9	59,6	69,8
8,2		MDW 0820 HGS□	❍				❍			
8,3		MDW 0830 HGS□	❍				❍			
8,4		MDW 0840 HGS□	❍				❍			
8,5		MDW 0850 HGS□	❍				❍			
8,6		MDW 0860 HGS□	❍		36,1	46,9	❍		63,1	73,9
8,7		MDW 0870 HGS□	❍				❍			
8,8		MDW 0880 HGS□	❍				❍			
8,9		MDW 0890 HGS□	❍				❍			
9,0		MDW 0900 HGS□	❍				❍			
9,1	10,0	MDW 0910 HGS□	❍	108,0	38,1	49,5	❍	138,0	66,6	78,0
9,2		MDW 0920 HGS□	❍				❍			
9,3		MDW 0930 HGS□	❍				❍			
9,4		MDW 0940 HGS□	❍				❍			
9,5		MDW 0950 HGS□	❍				❍			
9,6		MDW 0960 HGS□	❍		40,0	52,0	❍		70,0	82,0
9,7		MDW 0970 HGS□	❍				❍			
9,8		MDW 0980 HGS□	❍				❍			
9,9		MDW 0990 HGS□	❍				❍			
10,0		MDW 1000 HGS□	❍				❍			

■ Recommended Cutting Conditions for Multi-Drills HGS Type

Diameter (mm)		Steels		Hardened Steels		Stainless Steels	Grey Cast Irons	Ductile Cast Irons	Titanium Alloys	Inconel
		(~ HB200)	(~ HB300)	(~ HRC45)	(~ HRC60)	(~ HB200)			(Ti-6Al-4V)	(Inconel 718)
~ ø 5	v_c	50 – **80** – 120	50 – **75** – 100	20 – **30** – 40	10 – **15** – 20	30 – **45** – 60	50 – **70** – 90	40 – **60** – 80	20 – **30** – 40	10 – **20** – 30
	f	0,15 – 0,25	0,15 – 0,25	0,08 – 0,10	0,05 – 0,08	0,08 – 0,15	0,15 – 0,30	0,15 – 0,25	0,08 – 0,10	0,05 – 0,08
~ ø10	v_c	70 – **120** – 150	70 – **100** – 120	20 – **30** – 40	10 – **15** – 20	40 – **60** – 80	40 – **60** – 100	50 – **70** – 90	25 – **30** – 40	15 – **25** – 30
	f	0,20 – 0,35	0,20 – 0,35	0,10 – 0,15	0,06 – 0,10	0,10 – 0,20	0,20 – 0,35	0,20 – 0,35	0,08 – 0,12	0,08 – 0,10
~ ø16	v_c	80 – **130** – 160	80 – **110** – 140	20 – **30** – 40	10 – **15** – 20	50 – **65** – 80	70 – **90** – 120	40 – **60** – 100	25 – **35** – 40	20 – **30**– 35
	f	0,25 – 0,35	0,25 – 0,35	0,10 – 0,15	0,08 – 0,12	0,10 – 0,20	0,25 – 0,35	0,25 – 0,35	0,10 – 0,15	0,08 – 0,10

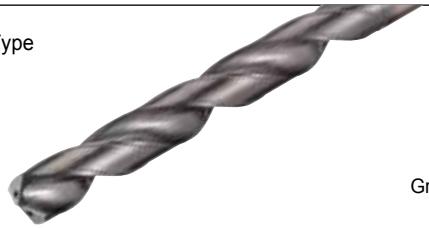
(v_c : Cutting Speed (m/min), f : Feed Rate (mm/rev)) (Min – **Standard** – Max)

❍ = Japan stock

MDW ... HGS Type

HGS Type for General Purpose Drilling of Steels

● HGS Type



Grade: ACX70

● Diameter ø10,1~13,0mm

(mm)

Dimensions		Cat. No.	Short Type (3D)				Long Type (5D)			
			Stock	Dimensions			Stock	Dimensions		
øD	ød	3, 5 ↘	3	L	ℓ_1	ℓ_2	5	L	ℓ_1	ℓ_2
10,1	11,0	MDW 1010 HGS□	❍	168,3	42,1	54,7	❍	151,3	73,6	86,2
10,2		MDW 1020 HGS□	❍				❍			
10,3		MDW 1030 HGS□	❍				❍			
10,4		MDW 1040 HGS□	❍				❍			
10,5		MDW 1050 HGS□	❍				❍			
10,6		MDW 1060 HGS□	❍		44,1	57,3	❍		77,1	90,3
10,7		MDW 1070 HGS□	❍				❍			
10,8		MDW 1080 HGS□	❍				❍			
10,9		MDW 1090 HGS□	❍				❍			
11,0		MDW 1100 HGS□	❍				❍			
11,1	12,0	MDW 1110 HGS□	❍	124,5	46,1	59,9	❍	160,5	80,6	94,4
11,2		MDW 1120 HGS□	❍				❍			
11,3		MDW 1130 HGS□	❍				❍			
11,4		MDW 1140 HGS□	❍				❍			
11,5		MDW 1150 HGS□	❍				❍			
11,6		MDW 1160 HGS□	❍		48,1	62,5	❍		84,1	98,5
11,7		MDW 1170 HGS□	❍				❍			
11,8		MDW 1180 HGS□	❍				❍			
11,9		MDW 1190 HGS□	❍				❍			
12,0		MDW 1200 HGS□	❍				❍			
12,1	13,0	MDW 1210 HGS□	❍	130,7	50,1	65,1	❍	169,7	87,6	102,6
12,2		MDW 1220 HGS□	❍				❍			
12,3		MDW 1230 HGS□	❍				❍			
12,4		MDW 1240 HGS□	❍				❍			
12,5		MDW 1250 HGS□	❍				❍			
12,6		MDW 1260 HGS□	❍		52,1	67,7	❍		91,1	106,7
12,7		MDW 1270 HGS□	❍				❍			
12,8		MDW 1280 HGS□	❍				❍			
12,9		MDW 1290 HGS□	❍				❍			
13,0		MDW 1300 HGS□	❍				❍			

● Diameter ø13,1~16,0mm

(mm)

Dimensions		Cat. No.	Short Type (3D)				Long Type (5D)			
			Stock	Dimensions			Stock	Dimensions		
øD	ød	3, 5 ↘	3	L	ℓ_1	ℓ_2	5	L	ℓ_1	ℓ_2
13,1	14,0	MDW 1310 HGS□	❍	136,9	54,6	70,8	❍	178,9	94,6	110,8
13,2		MDW 1320 HGS□	❍				❍			
13,3		MDW 1330 HGS□	❍				❍			
13,4		MDW 1340 HGS□	❍				❍			
13,5		MDW 1350 HGS□	❍				❍			
13,6		MDW 1360 HGS□	❍		56,1	72,9	❍		98,1	114,9
13,7		MDW 1370 HGS□	❍				❍			
13,8		MDW 1380 HGS□	❍				❍			
13,9		MDW 1390 HGS□	❍				❍			
14,0		MDW 1400 HGS□	❍				❍			
14,1	15,0	MDW 1410 HGS□	❍	141,1	58,1	75,5	❍	188,1	101,6	119,0
14,2		MDW 1420 HGS□	❍				❍			
14,3		MDW 1430 HGS□	❍				❍			
14,4		MDW 1440 HGS□	❍				❍			
14,5		MDW 1450 HGS□	❍				❍			
14,6		MDW 1460 HGS□	❍		60,1	78,1	❍		105,1	123,1
14,7		MDW 1470 HGS□	❍				❍			
14,8		MDW 1480 HGS□	❍				❍			
14,9		MDW 1490 HGS□	❍				❍			
15,0		MDW 1500 HGS□	❍				❍			
15,1	16,0	MDW 1510 HGS□	❍	149,3	62,1	80,7	❍	197,3	108,6	127,2
15,2		MDW 1520 HGS□	❍				❍			
15,3		MDW 1530 HGS□	❍				❍			
15,4		MDW 1540 HGS□	❍				❍			
15,5		MDW 1550 HGS□	❍				❍			
15,6		MDW 1560 HGS□	❍		64,1	83,3	❍		112,1	131,3
15,7		MDW 1570 HGS□	❍				❍			
15,8		MDW 1580 HGS□	❍				❍			
15,9		MDW 1590 HGS□	❍				❍			
16,0		MDW 1600 HGS□	❍				❍			

■ How to Order

Non-Stock Items will be required minimum order quantity for 6 pcs.
Please specify the Cat. No. For example, if the diameter of the drill is 10,2 mm, please indicate as follow.

E.g., **MDW 1020 HGS 3/5**, ACX70 (Grade)

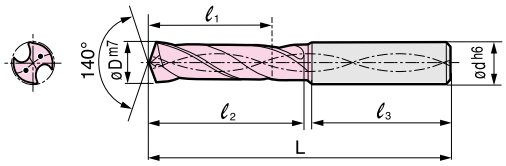
- MDW: SUPER MULTI-DRILLs
- 1020: Drill diameter **10,2** mm
- HGS: **HGS** type MULTI-DRILLs with coolant holes
- 3/5: Drilling depth (The ratio to øD): ~3 / ~5

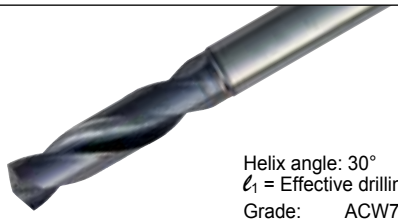
MDS ... SK-HAK Type

Short Type

TiAlN Coated Solid Carbide Drills to DIN6537 (ø-Tolerance: m7)







Helix angle: 30°
ℓ_1 = Effective drilling length
Grade: ACW70

●Diameter ø4,0~8,0mm

Dimensions (mm)			Cat. No.	DIN 6537 K (Short Type)			
øD (mm)	Shank			Stock	Dimensions (mm)		
	ød	ℓ_3		SK-HAK	L	ℓ_1	ℓ_2
4,0	6	36	MDS 040 SKHAK	●	66	17	24
4,1			MDS 041 SKHAK	●			
4,2			MDS 042 SKHAK	●			
4,3			MDS 043 SKHAK				
4,4			MDS 044 SKHAK				
4,5			MDS 045 SKHAK	●			
4,6			MDS 046 SKHAK				
4,7			MDS 047 SKHAK				
4,8	6	36	MDS 048 SKHAK		66	20	28
4,9			MDS 049 SKHAK				
5,0			MDS 050 SKHAK	●			
5,1			MDS 051 SKHAK	●			
5,2			MDS 052 SKHAK				
5,3			MDS 053 SKHAK				
5,4			MDS 054 SKHAK				
5,5			MDS 055 SKHAK	●			
5,6			MDS 056 SKHAK				
5,7			MDS 057 SKHAK				
5,8			MDS 058 SKHAK				
5,9			MDS 059 SKHAK				
6,0			MDS 060 SKHAK	●			
6,1	8	36	MDS 061 SKHAK		79	24	34
6,2			MDS 062 SKHAK				
6,3			MDS 063 SKHAK				
6,4			MDS 064 SKHAK				
6,5			MDS 065 SKHAK	●			
6,6			MDS 066 SKHAK				
6,7			MDS 067 SKHAK				
6,8			MDS 068 SKHAK	●			
6,9			MDS 069 SKHAK				
7,0			MDS 070 SKHAK	●			
7,1	8	36	MDS 071 SKHAK		79	29	41
7,2			MDS 072 SKHAK				
7,3			MDS 073 SKHAK				
7,4			MDS 074 SKHAK				
7,5			MDS 075 SKHAK	●			
7,6			MDS 076 SKHAK				
7,7			MDS 077 SKHAK				
7,8			MDS 078 SKHAK				
7,9			MDS 079 SKHAK				
8,0			MDS 080 SKHAK	●			

●Diameter ø8,1~12,0mm

Dimensions (mm)			Cat. No.	DIN 6537 K (Short Type)			
øD (mm)	Shank			Stock	Dimensions (mm)		
	ød	ℓ_3		SK-HAK	L	ℓ_1	ℓ_2
8,1	10	40	MDS 081 SKHAK		89	35	47
8,2			MDS 082 SKHAK				
8,3			MDS 083 SKHAK				
8,4			MDS 084 SKHAK				
8,5			MDS 085 SKHAK	●			
8,6			MDS 086 SKHAK				
8,7			MDS 087 SKHAK				
8,8			MDS 088 SKHAK				
8,9			MDS 089 SKHAK				
9,0			MDS 090 SKHAK	●			
9,1	10	40	MDS 091 SKHAK		89	35	47
9,2			MDS 092 SKHAK				
9,3			MDS 093 SKHAK				
9,4			MDS 094 SKHAK				
9,5			MDS 095 SKHAK	●			
9,6			MDS 096 SKHAK				
9,7			MDS 097 SKHAK				
9,8			MDS 098 SKHAK				
9,9			MDS 099 SKHAK				
10,0			MDS 100 SKHAK	●			
10,1	12	45	MDS 101 SKHAK		102	40	55
10,2			MDS 102 SKHAK	●			
10,3			MDS 103 SKHAK				
10,4			MDS 104 SKHAK				
10,5			MDS 105 SKHAK	●			
10,6			MDS 106 SKHAK				
10,7			MDS 107 SKHAK				
10,8			MDS 108 SKHAK				
10,9			MDS 109 SKHAK				
11,0			MDS 110 SKHAK	●			
11,1	12	45	MDS 111 SKHAK		102	40	55
11,2			MDS 112 SKHAK				
11,3			MDS 113 SKHAK				
11,4			MDS 114 SKHAK				
11,5			MDS 115 SKHAK	●			
11,6			MDS 116 SKHAK				
11,7			MDS 117 SKHAK				
11,8			MDS 118 SKHAK				
11,9			MDS 119 SKHAK				
12,0			MDS 120 SKHAK	●			

■ Recommended Cutting Conditions for K-HAK Type Multi-Drills

Diameter (mm)		Steels (< HB200)	Steels (HB200~300)	Alloy Steels (> HB300)	Hardened Steels (HRC45)	Stainless Steels (< HB200)	Ductile Cast Irons	Grey Cast Irons	Titanium Alloys (Ti-6Al-4V)	Inconel (Inconel 718)
~ ø 5	v_c	50 – **80** – 120	50 – **75** – 100	40 – **65** – 80	20 – **35** – 50	30 – **45** – 60	40 – **60** – 100	80 – **100** – 120	20 – **30** – 40	10 – **20** – 30
	f	0,15 – 0,25	0,15 – 0,25	0,10 – 0,20	0,08 – 0,10	0,10 – 0,20	0,15 – 0,25	0,15 – 0,30	0,08 – 0,10	0,05 – 0,08
~ ø10	v_c	50 – **120** – 140	70 – **110** – 140	40 – **70** – 80	30 – **40** –60	50 – **70** – 90	70 – **90** – 120	100 – **130** – 140	25 – **30** – 40	15 – **25** – 30
	f	0,20 – 0,35	0,20 – 0,35	0,10 – 0,25	0,10 – 0,15	0,10 – 0,25	0,20 – 0,35	0,20 – 0,35	0,08 – 0,12	0,08 – 0,10
~ ø16	v_c	90 – **140** – 170	80 – **120** – 150	40 – **80** – 100	30 – **45** – 60	50 – **80** – 110	80 – **100** – 130	100 – **150** – 160	25 – **35** – 40	20 – **30**– 35
	f	0,25 – 0,35	0,25 – 0,35	0,15 – 0,30	0,12 – 0,20	0,15 – 0,30	0,25 – 0,35	0,25 – 0,40	0,10 – 0,15	0,08 – 0,10
~ ø20	v_c	100 – **150** – 180	80 – **130** – 160	50 – **90** – 120	30 – **45** – 60	50 – **80** – 110	80 – **110** – 140	100 – **150** – 160	25 – **35** – 40	20 – **30** – 35
	f	0,30 – 0,40	0,25 – 0,40	0,15 – 0,30	0,15 – 0,25	0,15 – 0,30	0,25 – 0,40	0,25 – 0,40	0,10 – 0,15	0,08 – 0,10

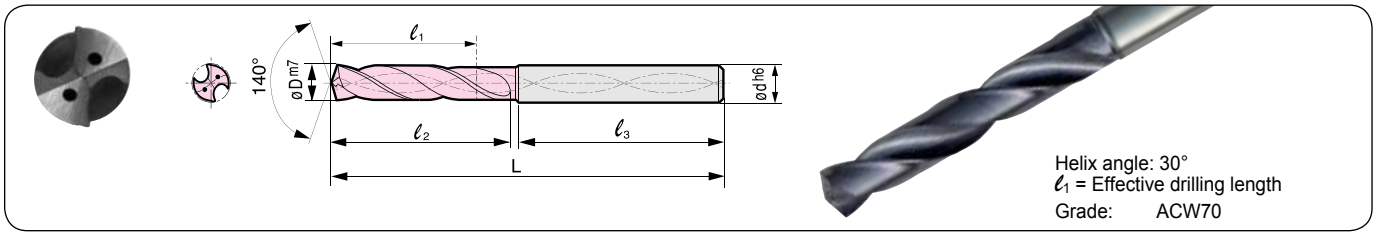
(v_c : Cutting Speed (m/min), f : Feed Rate (mm/rev)) (Min – **Standard** – Max)

● = Euro stock

MDS ... MK-HAK Type

Long Type

TiAlN Coated Solid Carbide Drills to DIN6537 (ø-Tolerance: m7)



Helix angle: 30°
ℓ_1 = Effective drilling length
Grade: ACW70

●Diameter ø4,0~8,0mm

Dimensions (mm)			Cat. No.	DIN 6537 L (Long Type)			
	Shank			Stock	Dimensions (mm)		
øD (mm)	ød	ℓ_3		MK-HAK	L	ℓ_1	ℓ_2
4,0	6	36	MDS 040 MKHAK	●	74	29	36
4,1			MDS 041 MKHAK				
4,2			MDS 042 MKHAK	●			
4,3			MDS 043 MKHAK				
4,4			MDS 044 MKHAK				
4,5			MDS 045 MKHAK	●			
4,6			MDS 046 MKHAK				
4,7			MDS 047 MKHAK				
4,8	6	36	MDS 048 MKHAK		82	35	44
4,9			MDS 049 MKHAK				
5,0			MDS 050 MKHAK	●			
5,1			MDS 051 MKHAK				
5,2			MDS 052 MKHAK				
5,3			MDS 053 MKHAK				
5,4			MDS 054 MKHAK				
5,5			MDS 055 MKHAK	●			
5,6			MDS 056 MKHAK				
5,7			MDS 057 MKHAK				
5,8			MDS 058 MKHAK				
5,9			MDS 059 MKHAK				
6,0			MDS 060 MKHAK	●			
6,1	8	36	MDS 061 MKHAK		91	43	53
6,2			MDS 062 MKHAK				
6,3			MDS 063 MKHAK				
6,4			MDS 064 MKHAK				
6,5			MDS 065 MKHAK	●			
6,6			MDS 066 MKHAK				
6,7			MDS 067 MKHAK				
6,8			MDS 068 MKHAK	●			
6,9			MDS 069 MKHAK				
7,0			MDS 070 MKHAK	●			
7,1	8	36	MDS 071 MKHAK		91	43	53
7,2			MDS 072 MKHAK				
7,3			MDS 073 MKHAK				
7,4			MDS 074 MKHAK				
7,5			MDS 075 MKHAK				
7,6			MDS 076 MKHAK				
7,7			MDS 077 MKHAK				
7,8			MDS 078 MKHAK				
7,9			MDS 079 MKHAK				
8,0			MDS 080 MKHAK	●			

●Diameter ø8,1~12,0mm

Dimensions (mm)			Cat. No.	DIN 6537 L (Long Type)			
	Shank			Stock	Dimensions (mm)		
øD (mm)	ød	ℓ_3		MK-HAK	L	ℓ_1	ℓ_2
8,1	10	40	MDS 081 MKHAK		103	49	61
8,2			MDS 082 MKHAK				
8,3			MDS 083 MKHAK				
8,4			MDS 084 MKHAK				
8,5			MDS 085 MKHAK	●			
8,6			MDS 086 MKHAK				
8,7			MDS 087 MKHAK				
8,8			MDS 088 MKHAK				
8,9			MDS 089 MKHAK				
9,0			MDS 090 MKHAK	●			
9,1			MDS 091 MKHAK		103	49	61
9,2			MDS 092 MKHAK				
9,3			MDS 093 MKHAK				
9,4			MDS 094 MKHAK				
9,5			MDS 095 MKHAK	●			
9,6			MDS 096 MKHAK				
9,7			MDS 097 MKHAK				
9,8			MDS 098 MKHAK				
9,9			MDS 099 MKHAK				
10,0			MDS 100 MKHAK	●			
10,1	12	45	MDS 101 MKHAK		118	56	71
10,2			MDS 102 MKHAK	●			
10,3			MDS 103 MKHAK				
10,4			MDS 104 MKHAK				
10,5			MDS 105 MKHAK	●			
10,6			MDS 106 MKHAK				
10,7			MDS 107 MKHAK				
10,8			MDS 108 MKHAK				
10,9			MDS 109 MKHAK				
11,0			MDS 110 MKHAK	●			
11,1			MDS 111 MKHAK		118	56	71
11,2			MDS 112 MKHAK				
11,3			MDS 113 MKHAK				
11,4			MDS 114 MKHAK				
11,5			MDS 115 MKHAK	●			
11,6			MDS 116 MKHAK				
11,7			MDS 117 MKHAK				
11,8			MDS 118 MKHAK				
11,9			MDS 119 MKHAK				
12,0			MDS 120 MKHAK	●			

■ How to Order

Non-Stock Items will be required minimum order quantity for 6 pcs.
Please specify the Cat. No.
For example, if the diameter of the drill is 10,2 mm, please indicate as follow.

E.g., **MDS 102 MK-HAK**, ACW70 (Grade)

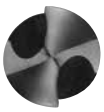
- **MDS**: **M**ulti-**D**rill **S**olid type
- **102**: Drill diameter **10,2** mm
- **MK-HAK**: Cylindrical shank and spiral coolant holes to: DIN6535 Form HAK
  - S : 3 ~ 3,5 D
  - M : ~ 5 D

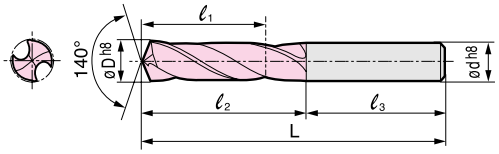


MDS ... SK/SG Type

Short Type

Cylindrical Solid Carbide Drills without Coolant Holes





Helix angle: 30°
ℓ_1 = Effective drilling length

●Diameter ø2,0~6,0mm

Dimensions (mm)			Cat. No.	Short Type				
				Stock		Dimensions (mm)		
øD	Shank							
	ød	ℓ_3	SK, SG ↘	SK	SG	L	ℓ_1	ℓ_2
2,0	2,0	30	**MDS 020 □□**			42	9,5	12
2,1	2,1		**MDS 021 □□**					
2,2	2,2	30	**MDS 022 □□**			43	10,2	13
2,3	2,3		**MDS 023 □□**					
2,4	2,4	30	**MDS 024 □□**			44	10,9	14
2,5	2,5		**MDS 025 □□**	▲				
2,6	2,6		**MDS 026 □□**	▲				
2,7	2,7	30	**MDS 027 □□**			46	12,4	16
2,8	2,8		**MDS 028 □□**	▲				
2,9	2,9		**MDS 029 □□**					
3,0	3,0		**MDS 030 □□**	▲	▲			
3,1	3,1	31	**MDS 031 □□**			49	14,0	18
3,2	3,2		**MDS 032 □□**					
3,3	3,3		**MDS 033 □□**					
3,4	3,4	32	**MDS 034 □□**	▲		52	15,6	20
3,5	3,5		**MDS 035 □□**	▲	▲			
3,6	3,6		**MDS 036 □□**					
3,7	3,7		**MDS 037 □□**					
3,8	3,8	33	**MDS 038 □□**			55	17,0	22
3,9	3,9		**MDS 039 □□**					
4,0	4,0		**MDS 040 □□**	▲	▲			
4,1	4,1		**MDS 041 □□**					
4,2	4,2		**MDS 042 □□**	▲				
4,3	4,3	34	**MDS 043 □□**			58	18,4	24
4,4	4,4		**MDS 044 □□**					
4,5	4,5		**MDS 045 □□**	▲	▲			
4,6	4,6		**MDS 046 □□**					
4,7	4,7		**MDS 047 □□**					
4,8	4,8	36	**MDS 048 □□**			62	19,6	26
4,9	4,9		**MDS 049 □□**					
5,0	5,0		**MDS 050 □□**	▲	▲			
5,1	5,1		**MDS 051 □□**	▲				
5,2	5,2		**MDS 052 □□**	▲	▲			
5,3	5,3		**MDS 053 □□**					
5,4	5,4	36	**MDS 054 □□**			66	22,8	30
5,5	5,5		**MDS 055 □□**	▲				
5,6	5,6		**MDS 056 □□**					
5,7	5,7		**MDS 057 □□**					
5,8	5,8		**MDS 058 □□**					
5,9	5,9		**MDS 059 □□**					
6,0	6,0		**MDS 060 □□**	▲	▲			

●Diameter ø6,1~10,0mm

Dimensions (mm)			Cat. No.	Short Type				
				Stock		Dimensions (mm)		
øD	Shank							
	ød	ℓ_3	SK, SG ↘	SK	SG	L	ℓ_1	ℓ_2
6,1	6,1	39	**MDS 061 □□**			70	23,0	31
6,2	6,2		**MDS 062 □□**					
6,3	6,3		**MDS 063 □□**					
6,4	6,4		**MDS 064 □□**					
6,5	6,5		**MDS 065 □□**	▲	▲			
6,6	6,6		**MDS 066 □□**					
6,7	6,7		**MDS 067 □□**					
6,8	6,8	40	**MDS 068 □□**	▲	▲	74	25,0	34
6,9	6,9		**MDS 069 □□**					
7,0	7,0		**MDS 070 □□**	▲	▲			
7,1	7,1		**MDS 071 □□**					
7,2	7,2		**MDS 072 □□**					
7,3	7,3		**MDS 073 □□**					
7,4	7,4		**MDS 074 □□**					
7,5	7,5		**MDS 075 □□**	▲				
7,6	7,6	42	**MDS 076 □□**			79	26,8	37
7,7	7,7		**MDS 077 □□**					
7,8	7,8		**MDS 078 □□**					
7,9	7,9		**MDS 079 □□**					
8,0	8,0		**MDS 080 □□**	▲	▲			
8,1	8,1		**MDS 081 □□**					
8,2	8,2		**MDS 082 □□**					
8,3	8,3		**MDS 083 □□**					
8,4	8,4		**MDS 084 □□**					
8,5	8,5		**MDS 085 □□**	▲	▲			
8,6	8,6	44	**MDS 086 □□**			84	28,6	40
8,7	8,7		**MDS 087 □□**					
8,8	8,8		**MDS 088 □□**					
8,9	8,9		**MDS 089 □□**					
9,0	9,0		**MDS 090 □□**	▲	▲			
9,1	9,1		**MDS 091 □□**					
9,2	9,2		**MDS 092 □□**					
9,3	9,3		**MDS 093 □□**					
9,4	9,4		**MDS 094 □□**					
9,5	9,5		**MDS 095 □□**	▲				
9,6	9,6	46	**MDS 096 □□**			89	30,3	43
9,7	9,7		**MDS 097 □□**					
9,8	9,8		**MDS 098 □□**					
9,9	9,9		**MDS 099 □□**					
10,0	10,0		**MDS 100 □□**	▲	▲			

■ Recommended Cutting Conditions for K Type Multi-Drills

Diameter (mm)		Soft Steels (under HB250)	General Steels, Alloy Steels	Die Steels (about HB250)	Stainless Steels (< HB200)	Ductile Cast Irons	Grey Cast Irons
~ ø 5	v_c	40 – **60** – 80	40 – **60** – 80	15 – **30** – 45	15 – **40** – 55	40 – **60** – 80	40 – **70** – 90
	f	0,15 – 0,25	0,15 – 0,25	0,10 – 0,20	0,08 – 0,15	0,15 – 0,25	0,15 – 0,30
~ ø10	v_c	50 – **70** – 120	50 – **70** – 110	20 – **40** – 50	15 – **45** – 60	50 – **70** – 100	50 – **80** – 120
	f	0,20 – 0,35	0,20 – 0,35	0,10 – 0,20	0,10 – 0,20	0,20 – 0,35	0,20 – 0,35
~ ø15	v_c	60 – **80** – 120	50 – **70** – 120	20 – **40** – 60	20 – **50** – 70	50 – **70** – 100	60 – **90** – 120
	f	0,25 – 0,35	0,25 – 0,35	0,15 – 0,25	0,10 – 0,20	0,25 – 0,35	0,25 – 0,35
~ ø20	v_c	60 – **90** – 120	60 – **80** – 120	30 – **40** – 60	20 – **50** – 70	60 – **80** – 100	60 – **90** – 120
	f	0,30 – 0,40	0,25 – 0,40	0,15 – 0,25	0,10 – 0,20	0,25 – 0,40	0,25 – 0,45

(v_c : Cutting Speed (m/min), f : Feed Rate (mm/rev)) (Min – **Standard** – Max)

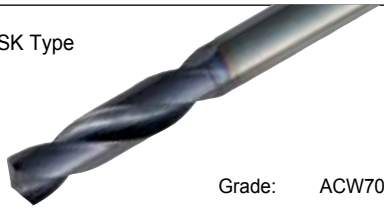


▲ = To be replaced by new item

MDS ... SK/SG Type

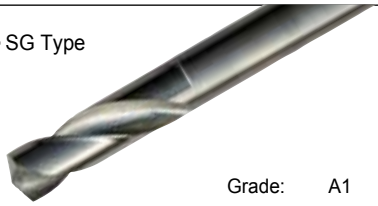
K Type: Coated Multi-Drill for General Purpose Drilling of Steels
G Type: Uncoated Multi-Drill for Cast Irons and Aluminium Alloys

● SK Type



Grade: ACW70

● SG Type



Grade: A1

●Diameter ø10,1~12,0mm

Dimensions (mm)			Cat. No.	Short Type				
	Shank			Stock		Dimensions (mm)		
øD	ød	ℓ_3	SK, SG	SK	SG	L	ℓ_1	ℓ_2
10,1	10,1	46	MDS 101 □□	▲		89	30,3	43
10,2	10,2		MDS 102 □□					
10,3	10,3		MDS 103 □□					
10,4	10,4		MDS 104 □□					
10,5	10,5		MDS 105 □□	▲				
10,6	10,6		MDS 106 □□					
10,7	10,7	48	MDS 107 □□			95	32,8	47
10,8	10,8		MDS 108 □□					
10,9	10,9		MDS 109 □□					
11,0	11,0		MDS 110 □□	▲	▲			
11,1	11,1		MDS 111 □□					
11,2	11,2		MDS 112 □□					
11,3	11,3		MDS 113 □□					
11,4	11,4		MDS 114 □□					
11,5	11,5		MDS 115 □□	▲				
11,6	11,6		MDS 116 □□					
11,7	11,7		MDS 117 □□					
11,8	11,8		MDS 118 □□					
11,9	11,9	51	MDS 119 □□			102	35,2	51
12,0	12,0		MDS 120 □□	▲	▲			

●Diameter ø12,1~14,0mm

Dimensions (mm)			Cat. No.	Short Type				
	Shank			Stock		Dimensions (mm)		
øD	ød	ℓ_3	SK, SG	SK	SG	L	ℓ_1	ℓ_2
12,1	12,1	51	MDS 121 □□			102	35,2	51
12,2	12,2		MDS 122 □□					
12,3	12,3		MDS 123 □□					
12,4	12,4		MDS 124 □□					
12,5	12,5		MDS 125 □□					
12,6	12,6		MDS 126 □□					
12,7	12,7		MDS 127 □□					
12,8	12,8		MDS 128 □□					
12,9	12,9		MDS 129 □□					
13,0	13,0		MDS 130 □□					
13,1	13,1		MDS 131 □□					
13,2	13,2		MDS 132 □□					
13,3	13,3	53	MDS 133 □□			107	37,2	54
13,4	13,4		MDS 134 □□					
13,5	13,5		MDS 135 □□					
13,6	13,6		MDS 136 □□					
13,7	13,7		MDS 137 □□					
13,8	13,8		MDS 138 □□					
13,9	13,9		MDS 139 □□					
14,0	14,0		MDS 140 □□					

■ How to Order

Non-Stock Items will be required minimum order quantity for 6 pcs.
Please specify the Cat. No. For example, if the diameter of the drill is 10,2 mm, please indicate as follow.

E.g., **MDS** **102** **SK** ACW70 (Grade)

- **M**ulti-**D**rill **S**olid type
- Drill diameter **10,2** mm
- **K** : K-Type drill
- **G** : G-Type drill
- **S** : 2,5 ~ 3D

■ Recommended Cutting Conditions for G Type Multi-Drills

(v_c : Cutting Speed (m/min), f : Feed Rate (mm/rev)) (Min – **Standard** – Max)

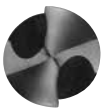
Diameter (mm)		Ductile Cast Irons	Grey Cast Irons	Aluminium Alloys
~ ø 6	v_c	25 – **50** – 70	25 – **55** – 80	80 – **120** – 200
	f	0,15 – 0,2 – 0,25	0,2 – 0,25 – 0,3	0,2 – 0,3 – 0,4
~ ø10	v_c	25 – **50** – 70	25 – **55** – 80	80 – **120** – 200
	f	0,2 – 0,3 – 0,35	0,25 – 0,35 – 0,4	0,25 – 0,35 – 0,45
~ ø14	v_c	25 – **50** – 70	25 – **55** – 80	80 – **120** – 200
	f	0,2 – 0,35 – 0,4	0,25 – 0,4 – 0,5	0,25 – 0,45 – 0,6
~ ø20	v_c	25 – **50** – 70	25 – **55** – 80	80 – **120** – 200
	f	0,2 – 0,4 – 0,5	0,25 – 0,4 – 0,6	0,25 – 0,45 – 0,7

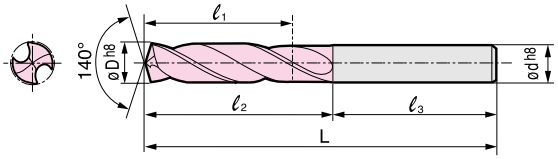


MDS ... MK/MG Type

Long Type

Cylindrical Solid Carbide Drills without Coolant Holes





Helix angle: 30°
ℓ_1 = Effective drilling length

●Diameter ø2,0~6,0mm

Dimensions (mm)			Cat. No.	Long Type				
	Shank			Stock		Dimensions (mm)		
øD	ød	ℓ_3	MK, MG	MK	MG	L	ℓ_1	ℓ_2
2,0	2,0	30	MDS 020 □□			45,4	12,9	15,4
2,1	2,1		MDS 021 □□					
2,2	2,2	30	MDS 022 □□			46,4	13,6	16,4
2,3	2,3		MDS 023 □□					
2,4	2,4	30	MDS 024 □□			47,5	14,4	17,5
2,5	2,5		MDS 025 □□					
2,6	2,6		MDS 026 □□					
2,7	2,7	30	MDS 027 □□			49,5	15,9	19,5
2,8	2,8		MDS 028 □□					
2,9	2,9		MDS 029 □□					
3,0	3,0		MDS 030 □□					
3,1	3,1	31	MDS 031 □□			52,6	17,6	21,6
3,2	3,2		MDS 032 □□					
3,3	3,3		MDS 033 □□					
3,4	3,4	32	MDS 034 □□			56,7	20,3	24,7
3,5	3,5		MDS 035 □□					
3,6	3,6		MDS 036 □□					
3,7	3,7		MDS 037 □□					
3,8	3,8	33	MDS 038 □□			60,8	22,8	27,8
3,9	3,9		MDS 039 □□					
4,0	4,0		MDS 040 □□					
4,1	4,1		MDS 041 □□					
4,2	4,2		MDS 042 □□					
4,3	4,3	34	MDS 043 □□			65,9	26,3	31,9
4,4	4,4		MDS 044 □□					
4,5	4,5		MDS 045 □□					
4,6	4,6		MDS 046 □□					
4,7	4,7		MDS 047 □□					
4,8	4,8	36	MDS 048 □□			69,9	28,0	33,9
4,9	4,9		MDS 049 □□					
5,0	5,0	38	MDS 050 □□	▲	▲	77,0	32,4	39,0
5,1	5,1		MDS 051 □□	▲				
5,2	5,2		MDS 052 □□					
5,3	5,3		MDS 053 □□					
5,4	5,4		MDS 054 □□					
5,5	5,5		MDS 055 □□	▲	▲			
5,6	5,6	40	MDS 056 □□			82,1	34,9	42,1
5,7	5,7		MDS 057 □□					
5,8	5,8		MDS 058 □□					
5,9	5,9		MDS 059 □□					
6,0	6,0		MDS 060 □□	▲	▲			

●Diameter ø6,1~10,0mm

Dimensions (mm)			Cat. No.	Long Type				
	Shank			Stock		Dimensions (mm)		
øD	ød	ℓ_3	MK, MG	MK	MG	L	ℓ_1	ℓ_2
6,1	6,1	40	MDS 061 □□			82,1	34,9	42,1
6,2	6,2		MDS 062 □□					
6,3	6,3		MDS 063 □□					
6,4	6,4		MDS 064 □□					
6,5	6,5		MDS 065 □□	▲	▲			
6,6	6,6	40	MDS 066 □□			84,2	35,8	44,2
6,7	6,7		MDS 067 □□					
6,8	6,8		MDS 068 □□	▲	▲			
6,9	6,9		MDS 069 □□					
7,0	7,0		MDS 070 □□	▲	▲			
7,1	7,1	41	MDS 071 □□			88,3	37,3	46,3
7,2	7,2		MDS 072 □□					
7,3	7,3		MDS 073 □□					
7,4	7,4		MDS 074 □□					
7,5	7,5		MDS 075 □□	▲	▲			
7,6	7,6	42	MDS 076 □□			91,4	39,8	49,4
7,7	7,7		MDS 077 □□					
7,8	7,8		MDS 078 □□					
7,9	7,9		MDS 079 □□					
8,0	8,0		MDS 080 □□	▲	▲			
8,1	8,1	43	MDS 081 □□			97,5	44,3	54,5
8,2	8,2		MDS 082 □□					
8,3	8,3		MDS 083 □□					
8,4	8,4		MDS 084 □□					
8,5	8,5		MDS 085 □□	▲	▲			
8,6	8,6	43	MDS 086 □□			99,6	45,8	56,6
8,7	8,7		MDS 087 □□					
8,8	8,8		MDS 088 □□					
8,9	8,9		MDS 089 □□					
9,0	9,0		MDS 090 □□	▲	▲			
9,1	9,1	44	MDS 091 □□			103,7	48,3	59,7
9,2	9,2		MDS 092 □□					
9,3	9,3		MDS 093 □□					
9,4	9,4		MDS 094 □□					
9,5	9,5		MDS 095 □□	▲	▲			
9,6	9,6	45	MDS 096 □□			106,8	49,8	61,8
9,7	9,7		MDS 097 □□					
9,8	9,8		MDS 098 □□					
9,9	9,9		MDS 099 □□					
10,0	10,0		MDS 100 □□	▲	▲			

■ How to Order

Non-Stock Items will be required minimum order quantity for 6 pcs.
Please specify the Cat. No. For example, if the diameter of the drill is 10,2 mm, please indicate as follow.

E.g., **MDS 102 MK** , ACW70 (Grade)

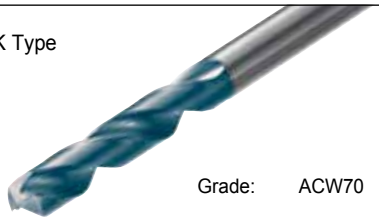
- **MDS**: **M**ulti-**D**rill **S**olid type
- **102**: Drill diameter **10,2** mm
- **MK**: **K** : K-Type drill; **G** : G-Type drill; **M** : ~ 4D

▲ = To be replaced by new item

MDS ... MK/MG Type

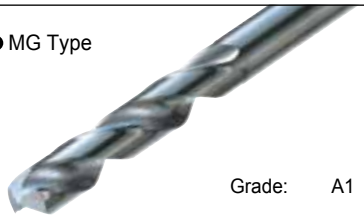
K Type: Coated Multi-Drill for General Purpose Drilling of Steels
G Type: Uncoated Multi-Drill for Cast Irons and Aluminium Alloys

● MK Type



Grade: ACW70

● MG Type



Grade: A1

●Diameter ø10,1~12,0mm

Dimensions (mm)			Cat. No.	Long Type				
	Schaft			Stock		Dimensions (mm)		
øD	ød	ℓ_3	MK, MG	MK	MG	L	ℓ_1	ℓ_2
10,1	10,1		**MDS 101** □□					
10,2	10,2		**MDS 102** □□			113,9	55,3	67,9
10,3	10,3	46	**MDS 103** □□					
10,4	10,4		**MDS 104** □□					
10,5	10,5		**MDS 105** □□	▲				
10,6	10,6		**MDS 106** □□					
10,7	10,7		**MDS 107** □□			116,0	56,8	70,0
10,8	10,8	46	**MDS 108** □□					
10,9	10,9		**MDS 109** □□					
11,0	11,0		**MDS 110** □□	▲	▲			
11,1	11,1		**MDS 111** □□					
11,2	11,2		**MDS 112** □□			120,2	59,4	73,2
11,3	11,3	47	**MDS 113** □□					
11,4	11,4		**MDS 114** □□					
11,5	11,5		**MDS 115** □□	▲	▲			
11,6	11,6		**MDS 116** □□					
11,7	11,7		**MDS 117** □□			123,2	60,8	75,2
11,8	11,8	48	**MDS 118** □□					
11,9	11,9		**MDS 119** □□					
12,0	12,0		**MDS 120** □□	▲	▲			

●Diameter ø12,1~14,0mm

Dimensions (mm)			Cat. No.	Long Type				
	Schaft			Stock		Dimensions (mm)		
øD	ød	ℓ_3	MK, MG	MK	MG	L	ℓ_1	ℓ_2
12,1	12,1		**MDS 121** □□					
12,2	12,2		**MDS 122** □□			137,3	73,3	78,3
12,3	12,3	59	**MDS 123** □□					
12,4	12,4		**MDS 124** □□					
12,5	12,5		**MDS 125** □□					
12,6	12,6		**MDS 126** □□					
12,7	12,7		**MDS 127** □□			139,4	84,8	80,4
12,8	12,8	59	**MDS 128** □□					
12,9	12,9		**MDS 129** □□					
13,0	13,0		**MDS 130** □□					
13,1	13,1		**MDS 131** □□					
13,2	13,2		**MDS 132** □□			146,5	70,3	86,5
13,3	13,3	60	**MDS 133** □□					
13,4	13,4		**MDS 134** □□					
13,5	13,5		**MDS 135** □□					
13,6	13,6		**MDS 136** □□					
13,7	13,7		**MDS 137** □□			149,6	71,8	88,6
13,8	13,8	61	**MDS 138** □□					
13,9	13,9		**MDS 139** □□					
14,0	14,0		**MDS 140** □□					

■ Recommended Cutting Conditions for K Type Multi-Drills

(v_c : Cutting Speed (m/min), f : Feed Rate (mm/rev)) (Min – **Standard** – Max)

Diameter (mm)		Soft Steels (under HB250)	General Steels, Alloy Steels	Die Steels (about HB250)	Stainless Steels	Ductile Cast Irons	Grey Cast Irons
~ ø 5	v_c	40 – **60** – 80	40 – **60** – 80	15 – **30** – 45	15 – **40** – 55	40 – **60** – 80	40 – **70** – 90
	f	0,15 – 0,25	0,15 – 0,25	0,10 – 0,20	0,08 – 0,15	0,15 – 0,25	0,15 – 0,30
~ ø10	v_c	50 – **70** – 120	50 – **70** – 110	20 – **40** – 50	15 – **45** – 60	50 – **70** – 100	50 – **80** – 120
	f	0,20 – 0,35	0,20 – 0,35	0,10 – 0,20	0,10 – 0,20	0,20 – 0,35	0,20 – 0,35
~ ø15	v_c	60 – **80** – 120	50 – **70** – 120	20 – **40** – 60	20 – **50** – 70	50 – **70** – 100	60 – **90** – 120
	f	0,25 – 0,35	0,25 – 0,35	0,15 – 0,25	0,10 – 0,20	0,25 – 0,35	0,25 – 0,35
~ ø20	v_c	60 – **90** – 120	60 – **80** – 120	30 – **40** – 60	20 – **50** – 70	60 – **80** – 100	60 – **90** – 120
	f	0,30 – 0,40	0,25 – 0,40	0,15 – 0,25	0,10 – 0,20	0,25 – 0,40	0,25 – 0,45



■ Recommended Cutting Conditions for G Type Multi-Drills

(v_c : Cutting Speed (m/min), f : Feed Rate (mm/rev)) (Min – **Standard** – Max)

Diameter (mm)		Ductile Cast Irons	Grey Cast Irons	Aluminium Alloys
~ ø 6	v_c	25 – **50** – 70	25 – **55** – 80	80 – **120** – 200
	f	0,15 – 0,2 – 0,25	0,2 – 0,25 – 0,3	0,2 – 0,3 – 0,4
~ ø10	v_c	25 – **50** – 70	25 – **55** – 80	80 – **120** – 200
	f	0,2 – 0,3 – 0,35	0,25 – 0,35 – 0,4	0,25 – 0,35 – 0,45
~ ø14	v_c	25 – **50** – 70	25 – **55** – 80	80 – **120** – 200
	f	0,2 – 0,35 – 0,4	0,25 – 0,4 – 0,5	0,25 – 0,45 – 0,6
~ ø20	v_c	25 – **50** – 70	25 – **55** – 80	80 – **120** – 200
	f	0,2 – 0,4 – 0,5	0,25 – 0,4 – 0,6	0,25 – 0,45 – 0,7





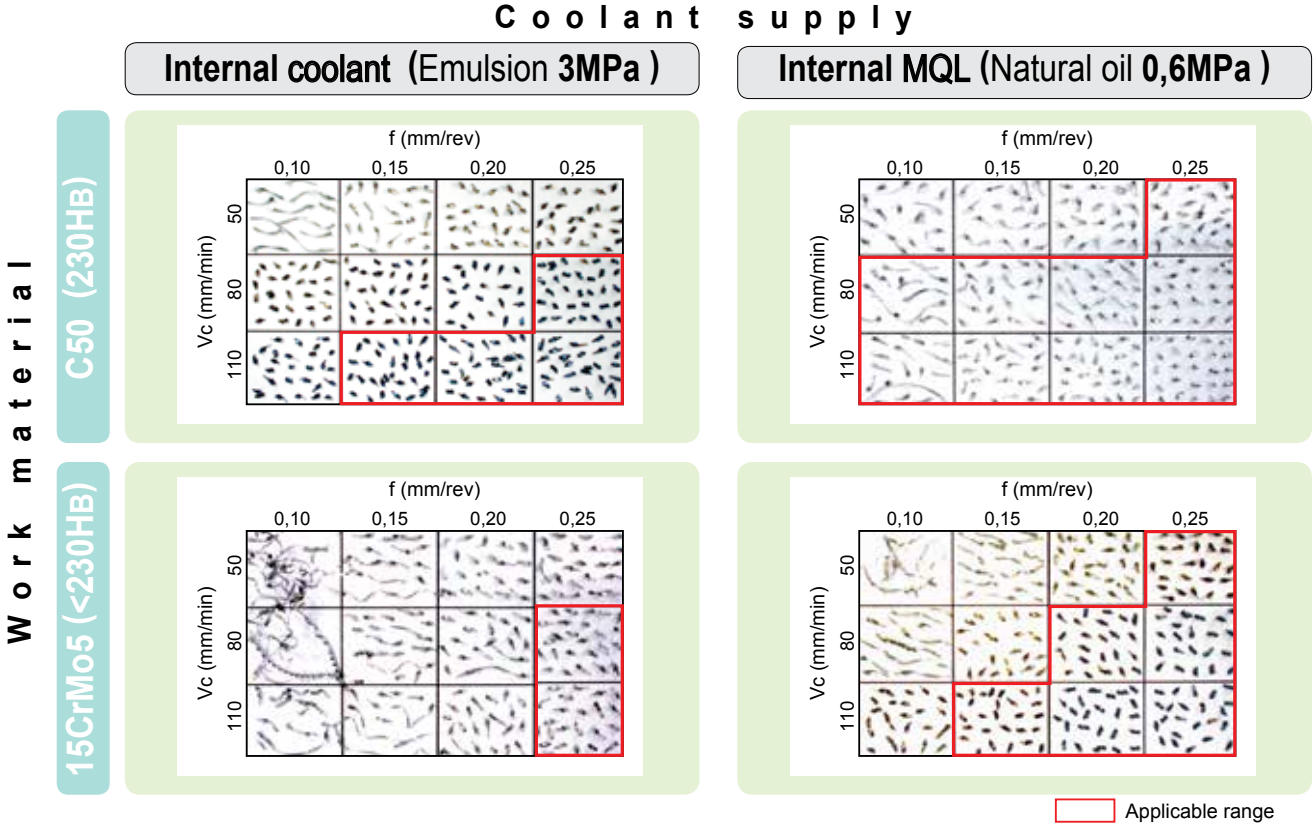
Features

- Drills faster than conventional high speed drills and gun drills
- Drilling depths up to 30xD
- Unique flute design efficiently removes chips
- Solid carbide construction provides excellent finished hole geometry
- Low cutting forces - suitable for low powered machine spindles
- Eco-friendly - uses MQL (minimum quantity lubrication) systems

Chip Form Examples Using Alternative Coolant Methods

MQL chips well across a wider range of cutting conditions
MQL works well even when drilling soft steels

MQL - optimised chip evacuation



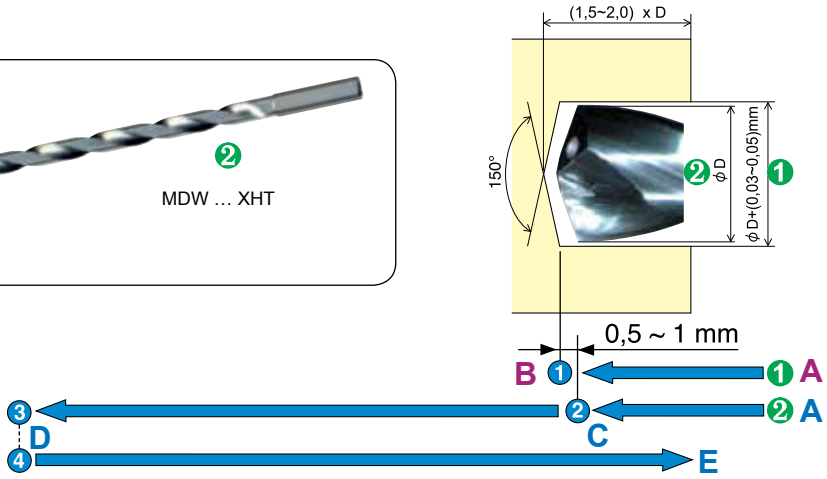
Recommended Cutting Conditions

Vc: Cutting speed (m/min), f: Feed Rate (mm/rev)

Drill Ø (mm) \ Work material		General Steel (~ HB300)	Alloy Steel (~ HRC45)	Stainless Steel (~ HB200)	Grey Cast Iron (GG25)	Ductile Cast Iron (GGG45)	Aluminium Alloy –
~ 5	Vc	70 ~ 90	50 ~ 70	30 ~ 50	50 ~ 90	50 ~ 90	80 ~ 160
	f	0,08 ~ 0,12	0,06 ~ 0,15	0,06 ~ 0,12	0,15 ~ 0,25	0,15 ~ 0,2	0,08 ~ 0,3
~ 6	Vc	80 ~ 120	60 ~ 80	30 ~ 60	50 ~ 90	50 ~ 90	80 ~ 160
	f	0,1 ~ 0,17	0,12 ~ 0,25	0,08 ~ 0,15	0,15 ~ 0,3	0,15 ~ 0,25	0,12 ~ 0,35
~ 8	Vc	80 ~ 120	70 ~ 90	40 ~ 80	60 ~ 100	50 ~ 90	80 ~ 180
	f	0,12 ~ 0,25	0,12 ~ 0,25	0,1 ~ 0,2	0,2 ~ 0,35	0,15 ~ 0,25	0,15 ~ 0,4
~ 10	Vc	80 ~ 120	70 ~ 90	40 ~ 80	60 ~ 100	80 ~ 120	80 ~ 180
	f	0,15 ~ 0,3	0,12 ~ 0,25	0,1 ~ 0,2	0,2 ~ 0,35	0,15 ~ 0,3	0,2 ~ 0,5
~ 12	Vc	80 ~ 120	70 ~ 90	40 ~ 80	60 ~ 100	80 ~ 120	80 ~ 180
	f	0,15 ~ 0,3	0,12 ~ 0,25	0,1 ~ 0,2	0,2 ~ 0,35	0,15 ~ 0,3	0,2 ~ 0,45

Recommended Tooling Strategy





1 A ⇨ B: Preperation of pilot hole with MDW ...PHT type
v_c= 50-80m/min, f= 0,15-0,25mm/rev, d_{oc}:1-2xD

2 A ⇨ C: Entering into pilot hole with long Multi-Drill (MDW ....XHT type)
N= 500 rpm, v_f =2000mm/min
At **C** the drill should stay (about. 3 sec.) and increase speed to set recommended cutting conditions.

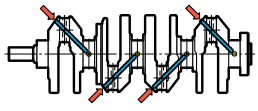
3 C ⇨ D: Deep hole drilling
After reaching required number of revolution operation can be started taking into consideration mentioned recommendation for the feed rates. At cross holes and irregular or angled surfaces feed should be reduced.

4 D ⇨ E: After hole drilling
Decrease spindle rotation to N=500~700rpm and pull back with high feed rate F= 2000 mm/min.

Application Examples

Work piece: Crank shaft (C45E, 1.1191)

Machine
Machine: Horizontal M/C
Coolant: MQL (Synthesized ester)
Air pressure 0,9MPa
Supplying rate 20cc/h



Process and cutting condition

1) Pilot hole (ø5,75 x 12mm, Top angle of drill: 150°)
v_c = 80m/min, f = 0,2mm/rev.
2) Deep hole (ø5,70 x 83mm x 4 holes, XHT type)
v_c =100m/min, f = 0,15mm/rev. F = **873**mm/min

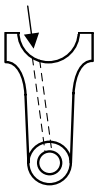
Tool life 200pcs



Cutting edge after 66,4m drilling

Work piece: Connecting rod (C53,1.1213)

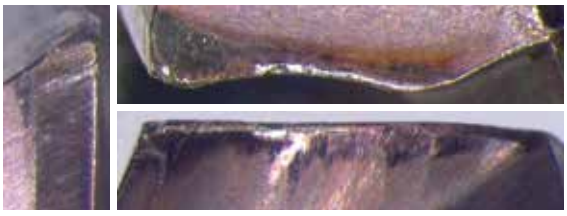
Machine
Machine: Vertical M/C (BT40)
Coolant: Internal cooling (Emulsion)
Pump pressure 2,0MPa



Process and cutting condition

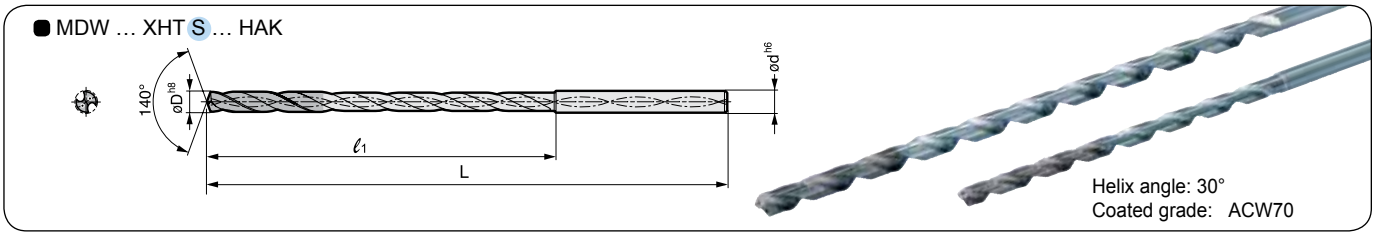
1) Pilot hole (ø5,85 x 10mm, Top angle of drill: 175°)
v_c = 80m/min, f = 0,05 → 0,15mm/rev.
2) Deep hole (ø5,80 x 130mm, XHT type)
v_c = 90m/min, f = 0,20mm/rev. F = **988**mm/min

Tool life 300pcs



Cutting edge after 39,0m drilling

* Current tooling (with ø5,8 x130mm gun drill)
v_c = 100m/min, f = 0,03mm/rev. F = **164**mm/min.
(Tool life 120pcs)



P ●MDW...XHT S Type for Deep Hole Drilling Steels

(mm)

Dimensions		Cat. No.	For 10 x D			For 15 x D			For 20 x D			For 25 x D			For 30 x D		
			Stock	Dimensions		Stock	Dimensions		Stock	Dimensions		Stock	Dimensions		Stock	Dimensions	
øD (mm)	ød (mm)	10, 15, 20, 25, 30 ↘	10	L	ℓ_1	15	L	ℓ_1	20	L	ℓ_1	25	L	ℓ_1	30	L	ℓ_1
3,0	4,0	MDW 030 XHT S□□HAK	●	79	48	●	94	66	●	109	81	●	124	96	●	139	111
3,5		MDW 035 XHT S□□HAK	●	82	53	●	100	72	●	117	89	●	135	107	●	152	124
4,0		MDW 040 XHT S□□HAK	●	87	58	●	107	78	●	127	97	●	147	117	●	167	137
4,5	5,0	MDW 045 XHT S□□HAK	●	95	63	●	118	86	●	140	108	●	163	130,5	●	184	153
5,0		MDW 050 XHT S□□HAK5 (*)	●	98	68	●	123	93	●	148	118	●	173	133	●	198	168
5,0	6,0	MDW 050 XHT S□□HAK	●	106	68	●	131	93	●	156	118	●	181	133	●	206	168
5,5		MDW 055 XHT S□□HAK	●	113	73	●	141	101	●	168	128	●	196	155,5	●	223	183
6,0		MDW 060 XHT S□□HAK	●	118	78	●	148	108	●	178	138	●	208	168	●	238	198
6,5	8,0	MDW 065 XHT S□□HAK	●	125	87	●	158	120	●	190	148	●	223	180,5	●	255	213
6,8		MDW 068 XHT S□□HAK	●	130	90	●	164	124	●	198	158	●	236	192	●	266	226
7,0		MDW 070 XHT S□□HAK	●	131	92	●	166	127	●	201	162	●	236	197	●	271	232
7,5		MDW 075 XHT S□□HAK	●	136	97	●	174	135	●	211	172	●	249	209,5	●	286	247
8,0		MDW 080 XHT S□□HAK	●	141	102	●	181	142	●	221	182	●	261	222	●	301	262
8,5	10,0	MDW 085 XHT S□□HAK	●	154	110	●	197	153	●	239	195	●	282	238	●	324	280
9,0		MDW 090 XHT S□□HAK	●	159	115	●	204	160	●	249	205	●	294	250	●	339	295
9,5		MDW 095 XHT S□□HAK	●	164	120	●	212	168	●	259	215	●	305	263	●	354	310
10,0		MDW 100 XHT S□□HAK	●	167	125	●	217	175	●	267	225	●	317	275	●	367	325
10,5	12,0	MDW 105 XHT S□□HAK	●	181	131	●	234	184	●	286	236	●	339	289	—	—	—
11,0		MDW 110 XHT S□□HAK	●	186	136	●	241	191	●	296	246	●	351	301	—	—	—
11,5		MDW 115 XHT S□□HAK	●	190	141	●	248	199	●	305	256	●	363	314	—	—	—
12,0		MDW 120 XHT S□□HAK	●	195	146	●	255	206	●	315	266	●	375	326	—	—	—

✎ All Long Drill series include an allowance to accomodate regrinding!
✎ TiAlN coated carbide grade: ACW70
(*) Cat. No. description: Drill-ø: 5mm, shank-ø: 5 mm, (Eg. for 20xD: MDW 050 XHT S20 HAK5)

■ How to Order

Non stock items – minimum order 6 pieces
Always specify the catalogue number and drill diameter as shown
- eg drill diameter 5,0mm = MDW 050

E.g.,

MDW 050 X H T S 30 HAK, ACW70 (Grade)

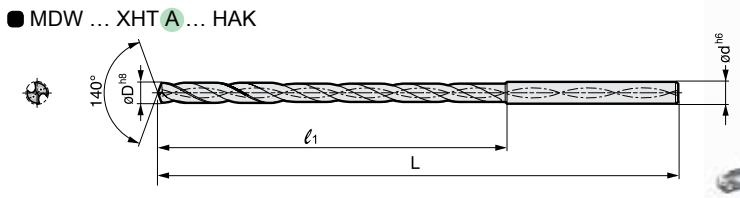
- Super MULTI-DRILL
- øD=5,0 mm
- Extra long type
- with spiral coolant holes
- Cutting edges for steel with double margin
- Special shape of clearance face
- Drilling depth (L/D ratio)
- Shank type to DIN6535



● = Euro stock

Extra Long SUPER MULTI-DRILLs
MDW ... XHT/PHT Type

● MDW ... XHT A ... HAK





Helix angle: 30°
Uncoated grade: KH03

N ●MDW...XHT A Type for Aluminium and Copper Alloys

(mm)

Dimensions		Cat. No.	For 20 x D			For 30 x D		
			Stock	Dimensions		Stock	Dimensions	
øD (mm)	ød (mm)	20, 30	20	L	ℓ_1	30	L	ℓ_1
4,0	4,0	**MDW 040 XHT A□□ HAK**	●	127	97	●	167	137
5,0	6,0	**MDW 050 XHT A□□ HAK**	●	156	118	●	206	168
6,0		**MDW 060 XHT A□□ HAK**	●	178	138	●	238	198
7,0	8,0	**MDW 070 XHT A□□ HAK**	●	201	162	●	271	232
8,0		**MDW 080 XHT A□□ HAK**	●	221	182	●	301	262
9,0	10,0	**MDW 090 XHT A□□ HAK**	●	249	205	●	339	295
10,0		**MDW 100 XHT A□□ HAK**	●	267	225	●	367	325

- All Long Drill series include an allowance to accomodate regrinding!
- Uncoated carbide grade: KH03

How to Order

Non stock items – minimum order 6 pieces
Always specify the catalogue number and drill diameter as shown
- eg drill diameter 5,0mm = MDW 050

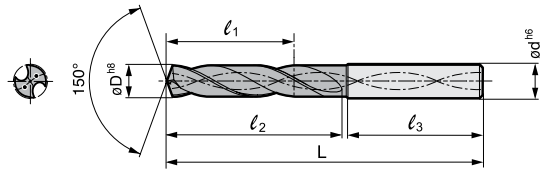
E.g.,

MDW 050 XHT A 30 HAK , KH03 (Grade)

- Super MULTI-DRILL
- øD=5,0 mm
- Extra long type
- with spiral coolant holes
- Shank type to DIN6535
- Drilling depth (L/D ratio)
- Cutting edges for Al and Cu alloys
- Special shape of clearance face

●MDW...PHT Type for Pilot Hole





Helix angle: 30°
ℓ_1 = Effective drilling length
Coated grade: ACW70

Dimensions		Cat. No.	For Pilot Hole				
			Stock	Dimensions (mm)			
øD (mm)	ød (mm)			L	ℓ_1	ℓ_2	ℓ_3
3,03	4,0	**MDW 0303 PHT**	●	52	9	22	28
3,53		**MDW 0353 PHT**	●	52	9	22	28
4,03	5,0	**MDW 0403 PHT**	●	59	12	29	28
4,53		**MDW 0453 PHT**	●	59	12	29	28
5,03	6,0	**MDW 0503 PHT**	●	71	15	33	36
5,53		**MDW 0553 PHT**	●	71	15	33	36
6,03	8,0	**MDW 0603 PHT**	●	76	18	38	36
6,50		**MDW 0653 PHT**	●	76	18	38	36
6,83		**MDW 0683 PHT**	●	76	18	38	36
7,03		**MDW 0703 PHT**	●	82	21	43	36
7,53		**MDW 0753 PHT**	●	82	21	43	36
8,03	10,0	**MDW 0803 PHT**	●	88	24	46	40
8,53		**MDW 0853 PHT**	●	88	24	46	40
9,03		**MDW 0903 PHT**	●	88	24	46	40
9,53		**MDW 0953 PHT**	●	88	24	46	40
10,03	12,0	**MDW 1003 PHT**	●	104	30	55	45
10,53		**MDW 1053 PHT**	●	104	30	55	45
11,03		**MDW 1103 PHT**	●	104	30	55	45
11,53		**MDW 1153 PHT**	●	104	30	55	45
12,03	14,0	**MDW 1203 PHT**	●	117	42	68	45

How to Order

Non stock items – minimum order 6 pieces
Always specify the catalogue number and drill diameter as shown -
eg. drill diameter 5,03mm = MDW 0503

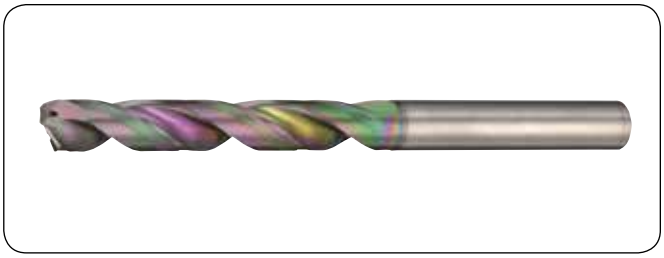
E.g.,

MDW 0503 PHT , ACW70

- Super MULTI-DRILL
- øD = 5,03 mm
- TiAlN coated grade
- Pilot drill with spiral coolant holes

With Coolant Holes (3D/5D/10D)





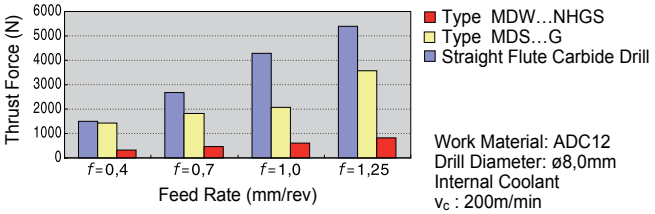
Characteristics

- **High efficiency drilling**
  AURORA COAT and strong helix design reduces cutting forces and improves edge sharpness.
- **Precision drilling**
  Special cutting edge design improves hole precision and quality.
- **Longer tool life**
  With AURORA COAT coupled with the cutting edge design, long and stable tool life can be achieved.
- **Deep hole (L/D=20) drilling**
  Drills for deep hole drilling can be custom-made.
  Production range: ø3,0~ø16,0mm
  total length: 50 times drill diameter (max. 290mm)

Applicable Work Materials

- Aluminium Die Casting
- Aluminium Alloy
- Aluminium Alloy Casting
- Brass Casting
- Bronze Casting

Comparison of Cutting Force (Thrust Force)



Recommended Cutting Conditions

ø D (mm)		Aluminium Alloy	Aluminium Die Casting	Copper Alloy
~ ø 5	v_c	80 ~ 160	80 ~ 180	80 ~ 160
	f	0,08 ~ 0,3	0,1 ~ 0,3	0,08 ~ 0,15
~ ø10	v_c	80 ~ 180	80 ~ 200	60 ~ 180
	f	0,1 ~ 0,3	0,1 ~ 0,35	0,1 ~ 0,2
~ ø16	v_c	80 ~ 200	80 ~ 200	80 ~ 200
	f	0,15 ~ 0,4	0,1 ~ 0,4	0,1 ~ 0,25

(v_c : Cutting Speed (m/min), f : Feed rate (mm/rev), Min ~ Max)

●Diameter ø3,0~8,0mm

(mm)

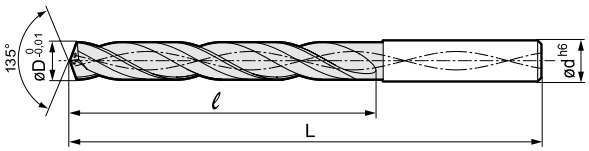
Dimensions		Cat. No.	3D Type			5D Type			10D Type		
			Stock	Dimensions		Stock	Dimensions		Stock	Dimensions	
øD	ød	3, 5, 10	3	L	ℓ	5	L	ℓ	10	L	ℓ
3,0	3,0	MDW 0300 NHGS□□	❍	68,6	18,1	❍	78,6	28,6	❍	92,6	42,6
3,1		MDW 0310 NHGS□□				❍					
3,2		MDW 0320 NHGS□□	❍			❍			❍		
3,3		MDW 0330 NHGS□□	❍		20,7	❍		32,7			49,7
3,4		MDW 0340 NHGS□□				❍			❍		
3,5		MDW 0350 NHGS□□	❍			❍			❍		
3,6		MDW 0360 NHGS□□				❍			❍		
3,65	4,0	MDW 0365 NHGS□□	❍	72,8		❍	86,8			106,8	
3,66		MDW 0366 NHGS□□				❍					
3,7		MDW 0370 NHGS□□			23,3	❍		36,8			56,8
3,8		MDW 0380 NHGS□□				❍					
3,9		MDW 0390 NHGS□□				❍			❍		
4,0		MDW 0400 NHGS□□	❍			❍			❍		
4,1		MDW 0410 NHGS□□	❍			❍					
4,2		MDW 0420 NHGS□□	❍			❍					
4,3		MDW 0430 NHGS□□			25,9	❍		40,9			63,9
4,4		MDW 0440 NHGS□□				❍					
4,5		MDW 0450 NHGS□□	❍			❍			❍		
4,6	5,0	MDW 0460 NHGS□□	❍	81,0		❍	99,0			125,0	
4,7		MDW 0470 NHGS□□				❍					
4,8		MDW 0480 NHGS□□			28,5	❍		45,0			71,0
4,9		MDW 0490 NHGS□□				❍			❍		
5,0		MDW 0500 NHGS□□	❍			❍			❍		
5,1		MDW 0510 NHGS□□				❍			❍		
5,2		MDW 0520 NHGS□□	❍			❍					
5,3		MDW 0530 NHGS□□	❍		28,6	❍		45,1			88,1
5,4		MDW 0540 NHGS□□				❍					
5,5		MDW 0550 NHGS□□	❍			❍			❍		
5,6	6,0	MDW 0560 NHGS□□		83,2		❍	101,2			137,2	
5,7		MDW 0570 NHGS□□				❍					
5,8		MDW 0580 NHGS□□			31,2	❍		49,2			85,2
5,9		MDW 0590 NHGS□□	❍			❍					
6,0		MDW 0600 NHGS□□	❍			❍			❍		
6,1		MDW 0610 NHGS□□				❍			❍		
6,2		MDW 0620 NHGS□□				❍					
6,3		MDW 0630 NHGS□□			33,8	❍		53,3			92,3
6,4		MDW 0640 NHGS□□				❍					
6,5		MDW 0650 NHGS□□	❍			❍			❍		
6,6	7,0	MDW 0660 NHGS□□		89,5		❍	110,5			152,5	
6,7		MDW 0670 NHGS□□	❍			❍			❍		
6,8		MDW 0680 NHGS□□	❍		36,5	❍		57,5	❍		99,5
6,9		MDW 0690 NHGS□□				❍					
7,0		MDW 0700 NHGS□□	❍			❍			❍		
7,1		MDW 0710 NHGS□□				❍					
7,2		MDW 0720 NHGS□□				❍			❍		
7,3		MDW 0730 NHGS□□			39,1	❍		61,6			116,6
7,35		MDW 0735 NHGS□□	❍			❍					
7,4		MDW 0740 NHGS□□	❍			❍					
7,5	8,0	MDW 0750 NHGS□□	❍	95,7		❍	119,7		❍	167,7	
7,6		MDW 0760 NHGS□□				❍					
7,7		MDW 0770 NHGS□□				❍					
7,8		MDW 0780 NHGS□□	❍		41,7	❍		65,7	❍		113,7
7,9		MDW 0790 NHGS□□				❍					
8,0		MDW 0800 NHGS□□	❍			❍			❍		

AURORA Coated NHGS Type, Grade: DL1300

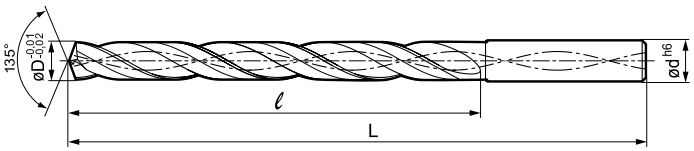
❍ = Japan stock

AURORA COAT SERIES
MDW ... NHGS Type

● NHGS 3/5 Type (ø3,0 ~ ø16,0mm)



● NHGS 10 Type (ø3,0 ~ ø16,0mm)



●Diameter ø8,1~13,0mm

(mm)

Dimensions		Cat. No.	3D Type			5D Type			10D Type		
			Stock	Dimensions		Stock	Dimensions		Stock	Dimensions	
øD	ød	3, 5, 10 ↘	3	L	ℓ	5	L	ℓ	10	L	ℓ
8,1		MDW 0810 NHGS□□				❍					
8,2		MDW 0820 NHGS□□				❍					
8,3		MDW 0830 NHGS□□			44,3	❍		69,8			118,8
8,4		MDW 0840 NHGS□□				❍					
8,5	9,0	MDW 0850 NHGS□□	❍	101,9		❍	128,9		❍	182,9	
8,6		MDW 0860 NHGS□□	❍			❍					
8,7		MDW 0870 NHGS□□				❍					
8,8		MDW 0880 NHGS□□	❍		46,9	❍		73,9			127,9
8,9		MDW 0890 NHGS□□				❍					
9,0		MDW 0900 NHGS□□	❍			❍			❍		
9,1		MDW 0910 NHGS□□				❍					
9,2		MDW 0920 NHGS□□				❍					
9,21		MDW 0921 NHGS□□	❍		49,5	❍		78,0			135,0
9,3		MDW 0930 NHGS□□				❍					
9,4		MDW 0940 NHGS□□	❍			❍					
9,5	10,0	MDW 0950 NHGS□□	❍	108,0		❍	138,0		❍	198,0	
9,6		MDW 0960 NHGS□□				❍					
9,7		MDW 0970 NHGS□□				❍					
9,8		MDW 0980 NHGS□□			52,0	❍		82,0	❍		142,0
9,9		MDW 0990 NHGS□□				❍					
10,0		MDW 1000 NHGS□□	❍			❍			❍		
10,1		MDW 1010 NHGS□□	❍								
10,2		MDW 1020 NHGS□□									
10,3		MDW 1030 NHGS□□	❍		54,7	❍		86,2			149,2
10,4		MDW 1040 NHGS□□				❍					
10,5	11,0	MDW 1050 NHGS□□	❍	168,3		❍	151,3		❍	217,3	
10,6		MDW 1060 NHGS□□	❍			❍					
10,7		MDW 1070 NHGS□□									
10,8		MDW 1080 NHGS□□			57,3			90,3			156,3
10,9		MDW 1090 NHGS□□									
11,0		MDW 1100 NHGS□□	❍			❍			❍		
11,08		MDW 1108 NHGS□□	❍			❍					
11,1		MDW 1110 NHGS□□	❍			❍					
11,2		MDW 1120 NHGS□□	❍		59,9	❍		94,4			163,4
11,3		MDW 1130 NHGS□□									
11,4		MDW 1140 NHGS□□	❍			❍					
11,5	12,0	MDW 1150 NHGS□□	❍	124,5		❍	160,5		❍	232,5	
11,6		MDW 1160 NHGS□□									
11,7		MDW 1170 NHGS□□									
11,8		MDW 1180 NHGS□□			62,5			98,5			170,5
11,9		MDW 1190 NHGS□□									
12,0		MDW 1200 NHGS□□	❍			❍			❍		
12,1		MDW 1210 NHGS□□	❍			❍					
12,2		MDW 1220 NHGS□□									
12,3		MDW 1230 NHGS□□	❍		65,1	❍		102,6			177,6
12,4		MDW 1240 NHGS□□									
12,5		MDW 1250 NHGS□□	❍			❍			❍		
12,6	13,0	MDW 1260 NHGS□□		130,7			169,7			247,7	
12,7		MDW 1270 NHGS□□									
12,8		MDW 1280 NHGS□□			67,7			106,7			184,7
12,9		MDW 1290 NHGS□□									
12,96		MDW 1296 NHGS□□	❍			❍					
13,0		MDW 1300 NHGS□□	❍			❍			❍		

●Diameter ø13,1~16,0mm

(mm)

Dimensions		Cat. No.	3D Type			5D Type			10D Type		
			Stock	Dimensions		Stock	Dimensions		Stock	Dimensions	
øD	ød	3, 5, 10 ↘	3	L	ℓ	5	L	ℓ	10	L	ℓ
13,1		MDW 1310 NHGS□□									
13,2		MDW 1320 NHGS□□									
13,3		MDW 1330 NHGS□□			70,8			110,8			191,8
13,4		MDW 1340 NHGS□□									
13,5	14,0	MDW 1350 NHGS□□	❍	136,9		❍	178,9			262,9	
13,6		MDW 1360 NHGS□□									
13,7		MDW 1370 NHGS□□									
13,8		MDW 1380 NHGS□□			72,9			114,9			198,9
13,9		MDW 1390 NHGS□□									
14,0		MDW 1400 NHGS□□	❍			❍					
14,1		MDW 1410 NHGS□□	❍			❍					
14,2		MDW 1420 NHGS□□									
14,3		MDW 1430 NHGS□□			75,5			119,0			206
14,4		MDW 1440 NHGS□□									
14,5		MDW 1450 NHGS□□	❍			❍					
14,6	15,0	MDW 1460 NHGS□□		141,1			188,1			278,1	
14,7		MDW 1470 NHGS□□									
14,8		MDW 1480 NHGS□□			78,1			123,1			213,1
14,9		MDW 1490 NHGS□□	❍			❍					
14,96		MDW 1496 NHGS□□	❍			❍					
15,0		MDW 1500 NHGS□□	❍			❍					
15,1		MDW 1510 NHGS□□									
15,2		MDW 1520 NHGS□□									
15,3		MDW 1530 NHGS□□			80,7			127,2			220,2
15,4		MDW 1540 NHGS□□									
15,5	16,0	MDW 1550 NHGS□□	❍	149,3		❍	197,3			293,3	
15,6		MDW 1560 NHGS□□									
15,7		MDW 1570 NHGS□□									
15,8		MDW 1580 NHGS□□			83,3			131,3			227,3
15,9		MDW 1590 NHGS□□									
16,0		MDW 1600 NHGS□□	❍			❍					

AURORA Coated NHGS Type, Grade: DL1300

■ How to Order

Non-Stock Items will be required minimum order quantity for 6 pcs.
Please specify the Cat. No.
For example, if the diameter of the drill is 10,3mm and the ratio to øD is 5, please indicate as follow.

E.g.,

MDW 1030 NHGS 5 , DL1300 (Grade)

- MDW: Super MULTI-DRILL
- 1030: øD=10,3 mm
- NH: Applicable work materials
- GS: with spiral coolant holes
- 5: Drilling depth (The ratio to øD): ~3 / ~**5** / ~10
- NHGS type Multi-Drills

Multi-Drills

Micro Long Drills
MLDH ....L/P Type



■ General Features

Micro Long Drills are oil-hole drills for high efficiency drilling that were developed for drilling deep, small-diameter holes. These next-generation, small-diameter hole drills feature improved strength - often a problem area with small-diameter drills.

■ Characteristics and Applications

● Deep-hole drilling
New groove shape ensures good drill rigidity and chip evacuation.
High efficiency drilling to depths of over 20x drill diameter at over v_f = 500mm/min (drill diameter 1,3mm, X12CrS13 equivalent).
Optimal thinning and edge balance for stable chip control.

● Long tool life
Special coating provides long tool life with a wide variety of work materials.
Improved chip evacuation makes it possible to reduce spindle load fluctuation, ensuring stable tool life.

■ Series

Application	Type	Diameter range (mm)	Hole depth (L/D)
Guide Hole Drilling	**MLDH □□□□ P**	ø 0,8 ~ 2,0	~ 2
Deep Hole Drilling	**MLDH □□□□ L5**	ø 0,8 ~ 2,0	~ 5
	MLDH □□□□ L12	ø 0,8 ~ 2,0	~ 12
	MLDH □□□□ L20	ø 0,8 ~ 2,0	~ 20
	MLDH □□□□ L30	ø 0,8 ~ 2,0	~ 30

■ Recommended Cutting Conditions

● MLDH .... P / L5

(v_c : Cutting Speed (m/min), f : Feed rate (mm/rev), Min - **Optimum** - Max)

Drill-ø (mm)	Cutting Cond.	Soft Steel (~ HB200)	General Steel (HB200~250)	Alloy Steel (HB250~300)	Stainless Steel (~ HB200)	Cast Iron	Aluminium Alloy	Heat-Resistant Steels
~ 1,0	v_c	40 - **50** - 60	40 - **50** - 60	40 - **50** - 60	20 -**30** - 40	40 - **50** - 60	50 - **60** - 70	5 - **10** - 15
	f	0,01 - **0,02** - 0,03	0,01 - **0,02** - 0,03	0,01 - **0,02** - 0,03	0,01 - **0,02** - 0,03	0,02 - **0,03** - 0,04	0,03 - **0,04** - 0,06	0,005 - **0,01** - 0,02
~ 1,5	v_c	40 - **50** - 60	40 - **50** - 60	40 - **50** - 60	20 - **30** - 40	40 - **50** - 60	50 - **60** - 70	5 - **10** - 15
	f	0,04 - **0,08** - 0,12	0,04 - **0,08** - 0,12	0,04 - **0,08** - 0,12	0,02 - **0,05** - 0,10	0,04 - **0,08** - 0,12	0,05 - **0,10** - 0,15	0,01 - **0,03** - 0,05
~ 2,0	v_c	40 - **50** - 60	40 - **50** - 60	40 - **50** - 60	20 - **30** - 40	40 - **50** - 60	50 - **60** - 70	5 - **10** - 15
	f	0,06 - **0,08** - 0,12	0,06 - **0,08** - 0,12	0,06 - **0,08** - 0,12	0,04 - **0,06** - 0,10	0,06 - **0,08** - 0,12	0,08 - **0,12** - 0,15	0,01 - **0,03** - 0,05

● MLDH .... L12 / L20 / L30

(v_c : Cutting Speed (m/min), f : Feed rate (mm/rev), Min - **Optimum** - Max)

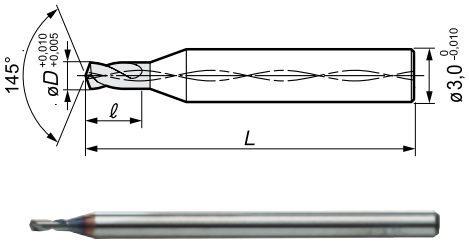
Drill-ø (mm)	Cutting Cond.	Soft Steel (~ HB200)	General Steel (HB200~250)	Alloy Steel (HB250~300)	Stainless Steel (~ HB200)	Cast Iron	Aluminium Alloy	Heat-Resistant Steels
~ 1,0	v_c	40 - **50** - 60	40 - **50** - 60	40 - **50** - 60	20 -**30** - 40	40 - **50** - 60	50 - **60** - 70	5 - **10** - 15
	f	0,01 - **0,02** - 0,03	0,01 - **0,02** - 0,03	0,01 - **0,02** - 0,03	0,01 - **0,02** - 0,03	0,02 - **0,03** - 0,04	0,03 - **0,04** - 0,06	0,005 - **0,01** - 0,02
~ 1,5	v_c	40 - **50** - 60	40 - **50** - 60	40 - **50** - 60	20 - **30** - 40	40 - **50** - 60	50 - **60** - 70	5 - **10** - 15
	f	0,03 - **0,05** - 0,07	0,03 - **0,05** - 0,07	0,03 - **0,05** - 0,07	0,02 - **0,04** - 0,07	0,04 - **0,07** - 0,10	0,05 - **0,08** - 0,12	0,01 - **0,02** - 0,03
~ 2,0	v_c	40 - **50** - 60	40 - **50** - 60	40 - **50** - 60	20 - **30** - 40	40 - **50** - 60	50 - **60** - 70	5 - **10** - 15
	f	0,04 - **0,06** - 0,08	0,04 - **0,06** - 0,08	0,04 - **0,06** - 0,08	0,04 - **0,06** - 0,08	0,04 - **0,07** - 0,10	0,05 - **0,08** - 0,12	0,01 - **0,02** - 0,03

○ = Japan stock

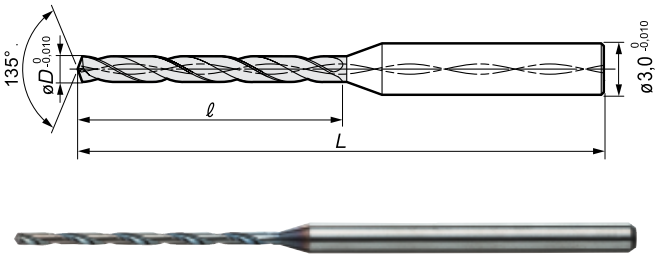
Micro Long Drills
MLDH ....L/P Type

Internal Coolant Supply

● MLDH-P For Pilot Hole Drilling



● MLDH-L For Deep Hole Drilling



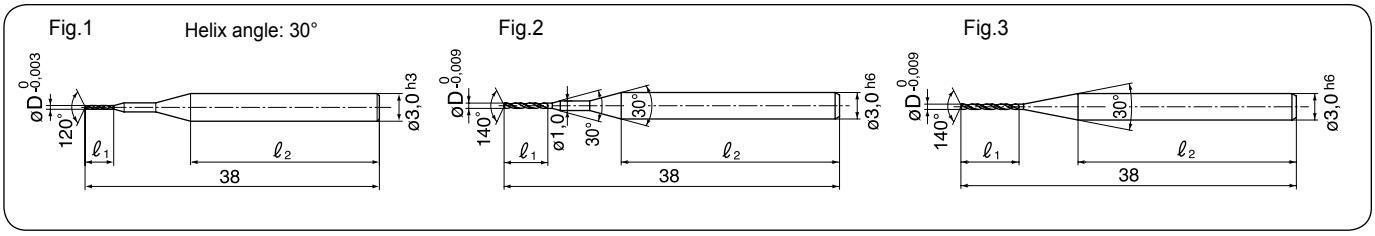
■ Stock

(mm)

øD (mm)	P Type for Pilot Hole Drilling				L Type for Deep Hole Drilling											
	Cat. No.	Stock	Dimensions		Cat. No. 5, 12, 20, 30	5x D			12x D			20x D			30x D		
						Stock	Dimensions		Stock	Dimensions		Stock	Dimensions		Stock	Dimensions	
			L	ℓ		5	L	ℓ	1 2	L	ℓ	2 0	L	ℓ	3 0	L	ℓ
0,80	MLDH 0800P	❍	45	3,2	MLDH 0800L□□	❍	50	8	❍	55	14	❍	60	19	❍	70	28
0,81	0810P	❍			0810L□□	❍		9	❍			❍		20	❍		
0,82	MLDH 0820P	❍		3,3	MLDH 0820L□□	❍			❍			❍			❍		
0,83	0830P	❍			0830L□□	❍			❍			❍			❍		
0,84	MLDH 0840P	❍		3,4	MLDH 0840L□□	❍			❍			❍			❍		29
0,85	0850P	❍			0850L□□	❍			❍			❍			❍		
0,86	0860P	❍			0860L□□	❍			❍		15	❍	65	21	❍		30
0,87	MLDH 0870P	❍		3,5	MLDH 0870L□□	❍			❍			❍			❍		
0,88	0880P	❍			0880L□□	❍			❍			❍			❍		
0,89	MLDH 0890P	❍		3,6	MLDH 0890L□□	❍			❍			❍			❍		31
0,90	0900P	❍			0900L□□	❍			❍			❍		22	❍	75	
0,91	0910P	❍			0910L□□	❍		10	❍			❍			❍		
0,92	MLDH 0920P	❍		3,7	MLDH 0920L□□	❍			❍	60	16	❍			❍		32
0,93	0930P	❍			0930L□□	❍			❍			❍			❍		
0,94	MLDH 0940P	❍		3,8	MLDH 0940L□□	❍			❍			❍		23	❍		
0,95	0950P	❍			0950L□□	❍			❍			❍			❍		
0,96	0960P	❍			0960L□□	❍			❍			❍			❍		33
0,97	MLDH 0970P	❍		3,9	MLDH 0970L□□	❍			❍			❍			❍		
0,98	0980P	❍			0980L□□	❍			❍		17	❍		24	❍		
0,99	MLDH 0990P	❍		4,0	MLDH 0990L□□	❍			❍			❍			❍		34
1,00	1000P	❍			1000L□□	❍			❍			❍			❍		
1,05	MLDH 1050P	❍		4,2	MLDH 1050L□□	❍	55	12	❍	65	18	❍	70	25	❍	80	36
1,10	MLDH 1100P	❍		4,4	MLDH 1100L□□	❍			❍		19	❍		26	❍		37
1,15	MLDH 1150P	❍		4,6	MLDH 1150L□□	❍			❍		20	❍		28	❍		39
1,20	MLDH 1200P	❍		4,8	MLDH 1200L□□	❍			❍			❍		29	❍	85	41
1,25	MLDH 1250P	❍		5,0	MLDH 1250L□□	❍		14	❍		21	❍		30	❍		43
1,30	MLDH 1300P	❍		5,2	MLDH 1300L□□	❍			❍		22	❍	75	31	❍		44
1,35	MLDH 1350P	❍		5,4	MLDH 1350L□□	❍			❍		23	❍		32	❍	90	46
1,40	MLDH 1400P	❍		5,6	MLDH 1400L□□	❍			❍		24	❍		34	❍		48
1,45	MLDH 1450P	❍		5,8	MLDH 1450L□□	❍			❍		25	❍		35	❍		49
1,50	MLDH 1500P	❍		6,0	MLDH 1500L□□	❍		16	❍		26	❍		36	❍		51
1,55	MLDH 1550P	❍		6,2	MLDH 1550L□□	❍			❍			❍	80	37	❍	95	53
1,60	MLDH 1600P	❍		6,4	MLDH 1600L□□	❍			❍	70	27	❍		38	❍		54
1,65	MLDH 1650P	❍	50	6,6	MLDH 1650L□□	❍	60	18	❍		28	❍		40	❍		56
1,70	MLDH 1700P	❍		6,8	MLDH 1700L□□	❍			❍		29	❍		41	❍	100	58
1,75	MLDH 1750P	❍		7,0	MLDH 1750L□□	❍			❍		30	❍		42	❍		60
1,80	MLDH 1800P	❍		7,2	MLDH 1800L□□	❍			❍		31	❍	85	43	❍		61
1,85	MLDH 1850P	❍		7,4	MLDH 1850L□□	❍		20	❍			❍		44	❍	103	63
1,90	MLDH 1900P	❍		7,6	MLDH 1900L□□	❍			❍	75	32	❍		46	❍		65
1,95	MLDH 1950P	❍		7,8	MLDH 1950L□□	❍			❍		33	❍		47	❍		66
2,00	MLDH 2000P	❍		8,0	MLDH 2000L□□	❍			❍		34	❍	90	48	❍		68

PVD Coated Grade: ACV70

MDUS / MDSS Type



●Diameter ø0,03~0,19mm

øD (mm)	Cat. No.	Stock	Dimensions ℓ1	Dimensions ℓ2	Fig.	Pcs./Packing
0,030	MDUS 0030-30C	❑	0,3	28	1	5
0,035	MDUS 0035-30C		0,4			
0,040	MDUS 0040-30C	❑				
0,045	MDUS 0045-30C		0,5			
0,050	MDUS 0050-30C	❑				
0,055	MDUS 0055-30C		0,6			
0,060	MDUS 0060-30C					
0,065	MDUS 0065-30C		0,7			
0,070	MDUS 0070-30C					
0,075	MDUS 0075-30C		0,8			
0,080	MDUS 0080-30C	❑				
0,085	MDUS 0085-30C		1,0			
0,090	MDUS 0090-30C					
0,095	MDUS 0095-30C					
0,100	MDUS 0100-30C	❑				
0,110	MDUS 0110-30C		1,2			1
0,120	MDUS 0120-30C	❑				
0,120	MDUS 0130-30C		1,5			
0,140	MDUS 0140-30C	❑				
0,150	MDUS 0150-30C					
0,160	MDUS 0160-30C		1,8			
0,170	MDUS 0170-30C	❑				
0,180	MDUS 0180-30C					
0,190	MDUS 0190-30C		1,9			

●Diameter ø0,20~0,59mm

øD (mm)	Cat. No.	Stock	Dimensions ℓ1	Dimensions ℓ2	Fig.	Pcs./Packing
0,20	MDSS 0020	❍	2,5	28	2	1
0,21	MDSS 0021	❍				
0,22	MDSS 0022	❍				
0,23	MDSS 0023	❍				
0,24	MDSS 0024	❍				
0,25	MDSS 0025	❍				
0,26	MDSS 0026	❍				
0,27	MDSS 0027	❍				
0,28	MDSS 0028	❍				
0,29	MDSS 0029	❍				
0,30	MDSS 0030	❍	3			
0,31	MDSS 0031	❍				
0,32	MDSS 0032	❍				
0,33	MDSS 0033	❍				
0,34	MDSS 0034	❍				
0,35	MDSS 0035	❍	4		3	
0,36	MDSS 0036	❍				
0,37	MDSS 0037	❍				
0,38	MDSS 0038	❍				
0,39	MDSS 0039	❍				
0,40	MDSS 0040	❍	5			
0,41	MDSS 0041	❍				
0,42	MDSS 0042	❍				
0,43	MDSS 0043	❍				
0,44	MDSS 0044	❍				
0,45	MDSS 0045	❍				
0,46	MDSS 0046	❍				
0,47	MDSS 0047	❍				
0,48	MDSS 0048	❍				
0,49	MDSS 0049	❍				
0,50	MDSS 0050	❍	6	27		
0,51	MDSS 0051	❍				
0,52	MDSS 0052	❍				
0,53	MDSS 0053	❍				
0,54	MDSS 0054	❍				
0,55	MDSS 0055	❍				
0,56	MDSS 0056	❍				
0,57	MDSS 0057	❍				
0,58	MDSS 0058	❍				
0,59	MDSS 0059	❍				

●Diameter ø0,60~1,00mm

øD (mm)	Cat. No.	Stock	Dimensions ℓ1	Dimensions ℓ2	Fig.	Pcs./Packing
0,60	MDSS 0060	❍	7	26	3	1
0,61	MDSS 0061	❍				
0,62	MDSS 0062	❍				
0,63	MDSS 0063	❍				
0,64	MDSS 0064	❍				
0,65	MDSS 0065	❍				
0,66	MDSS 0066	❍				
0,67	MDSS 0067	❍				
0,68	MDSS 0068	❍				
0,69	MDSS 0069	❍				
0,70	MDSS 0070	❍	9	24		
0,71	MDSS 0071	❍				
0,72	MDSS 0072	❍				
0,73	MDSS 0073	❍				
0,74	MDSS 0074	❍				
0,75	MDSS 0075	❍				
0,76	MDSS 0076	❍				
0,77	MDSS 0077	❍				
0,78	MDSS 0078	❍				
0,79	MDSS 0079	❍				
0,80	MDSS 0080	❍	10	23		
0,81	MDSS 0081	❍				
0,82	MDSS 0082	❍				
0,83	MDSS 0083	❍				
0,84	MDSS 0084	❍				
0,85	MDSS 0085	❍				
0,86	MDSS 0086	❍				
0,87	MDSS 0087	❍				
0,88	MDSS 0088	❍				
0,89	MDSS 0089	❍				
0,90	MDSS 0090	❍	11	22		
0,91	MDSS 0091	❍				
0,92	MDSS 0092	❍				
0,93	MDSS 0093	❍				
0,94	MDSS 0094	❍				
0,95	MDSS 0095	❍				
0,96	MDSS 0096	❍				
0,97	MDSS 0097	❍				
0,98	MDSS 0098	❍				
0,99	MDSS 0099	❍				
1,00	MDSS 0100	❍	12	21		



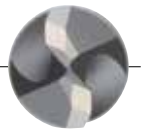
■ MDSS Recommended Cutting Conditions (Wet)

Work / Cond. / Drill-ø (mm)	Alloy Steel, Pre-hardened Steel: Spindle (rpm)	Feed rate (mm/min)	Step-feed (mm)	Die Steel, Tempered Steel (H_RC30~40): Spindle (rpm)	Feed rate (mm/min)	Step-feed (mm)	Stainless Steel: Spindle (rpm)	Feed rate (mm/min)	Step-feed (mm)
0,2	26500	50	0,1D	21200	40	0,1D	10600	20	0,1D
0,3	26500	80		21200	60		10600	30	
0,4	25900	100		19900	80		9500	40	
0,5	25500	150		19100	110		9500	50	
1,0	15900	240	0,2D~0,5D※	12700	190	0,2D~0,5D※	5600	80	

1. The above conditions are recommended under wet conditions, using water-soluble coolant.
2. If machine noises and vibrations are present, please adjust the cutting conditions accordingly.
3. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

※ Step feed is recommended for drilling of holes deeper than 3xD.

❍ = Japan stock
❑ = Delivery on request



SUMIDIA Coated Drills
SDC Type



General Features

SUMIDIA Coated SDC type drills for Carbon Fibre Reinforced Plastic (CFRP) employ Sumitomo Electric Hardmetal's proprietary multi-step point angle.
Combined with a diamond coating, this technology improves the quality of machined surfaces and extends tool life.

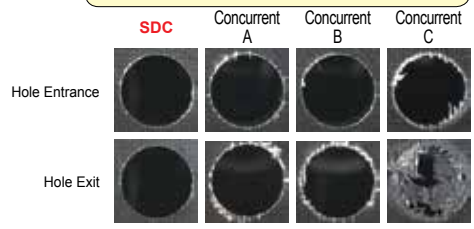
Characteristics and Applications

- Excellent drilled-hole quality
  - Sharp cutting edge shape reduces delamination of fibre layers and burrs.
  - Continuously changing point angle disperses load placed on cutting edge and prevents breakage.
- Long tool life
  - Use of high-strength diamond coating with excellent adhesion delivers high quality and long tool life.

Performance

Comparison of Machined Surface Finish

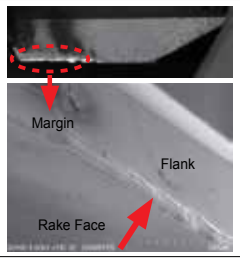
Excellent Machined Face Quality (Prevents Delamination And Burrs)



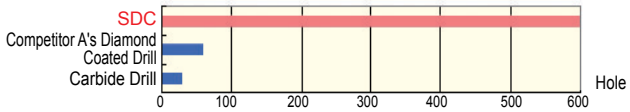
Tool:	SUMIDIA coated drill SDC type, øD=6,375 Competitor A B C´s drill øD=6,35 & øD=6,5
Work Material:	CFRP
Cutting Conditions:	n = 6.000rpm, f=0,1mm/rev, d_{oc} =28mm (Through) Dry

Tool Life Comparison

Effects of Diamond Coating

SDC type (After drilling 600 holes)	Competitor's product (After drilling 50 holes)
	
No delamination Low flank wear	More delamination from cutting edge to flank

Stable diamond layer adhesion prevents delamination.
Excellent wear resistance enables high-quality drilling with long tool life.



Tool:	SUMIDIA coated drill SDC type, øD=6,375 Competitor A B C´s drill øD=6,35 & øD=6,5
Work Material:	CFRP
Cutting Conditions:	n = 6.000rpm, f=0,1mm/rev, d_{oc} =28mm (Through) Dry

Series

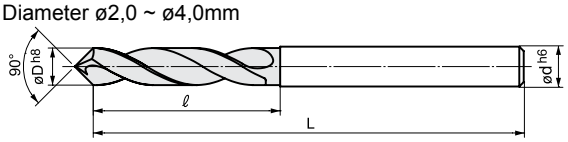
Type	Diameter Range (mm)	Point angle	Hole Depth ($^{L}/_{D}$)
MDS□□□□□SDC3	ø2,0 ~ ø4,0	90°	~ 3
	ø4,851 ~ ø10,0	130°	

DCX20	SUMI-DIA
Grade	Coating

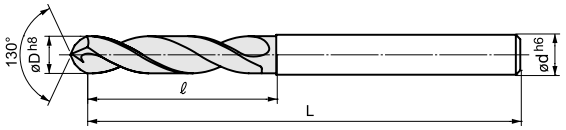
Structal Steel	Carbon Steel	Alloy Steel	Pre-hardened Steel	Tempered Die Steel	Hardened Steel 45~55 HRC	Hardened Steel 55~60 HRC	Hardened Steel 60~65 HRC	Stainless Steel	Ti Alloy / Heat Resistant Alloy	Cast iron	Al Alloy	Cu Alloy	CFRP *
											○		◎

* CFRP (Carbon Fibre Reinforced Plastic)

● Diameter ø2,0 ~ ø4,0mm



● Diameter ø4,851 ~ ø10,0mm





●Diameter ø2,0~10,0mm

(mm)

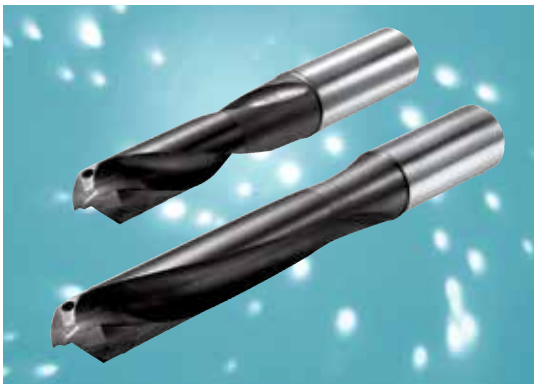
Dimensions øD (mm)	Dimensions ød (mm)	Cat. No.	3D Type Stock	3D Type Dimensions L	3D Type Dimensions ℓ
2,0	3,0	MDS 02000SDC3	❑	49	12,5
2,489		02489SDC3	❑		15,0
3,0		03000SDC3	❑		17,5
3,3	3,3	MDS 03300SDC3	❑	60	20,0
4,0	4,0	04000SDC3	❑		22,5
4,851	4,851	MDS 04851SDC3	❑	76	27,5
5,0	5,0	05000SDC3	❑		
5,6	5,6	MDS 05600SDC3	❑	81	30,0
6,0	6,0	06000SDC3	❑		
6,375	6,375	MDS 06375SDC3	❑	83	32,5
7,0	7,0	07000SDC3	❑		35,0
7,938	7,938	MDS 07938SDC3	❑	90	40,0
8,0	8,0	08000SDC3	❑		
9,0	9,0	MDS 09000SDC3	❑	98	45,0
9,550	9,550	MDS 09550SDC3	❑	105	50,0
10,0	10,0	10000SDC3	❑		

Recommended Cutting Conditions

øD \ Work / Cond.		CFRP Only (Dry Machining)	Stacked Plates of CFRP, Aluminium Alloys (Dry Machining)
~ ø 6,0	v_c	80 - **120** - 150	40 - **60** - 80
	f	0,05 - **0,08** - 0,10	0,05 - **0,05** - 0,10
~ ø10,0	v_c	80 - **100** - 120	40 - **60** - 80
	f	0,05 - **0,08** - 0,10	0,05 - **0,05** - 0,10

(v_c : Cutting Speed (m/min), f : Feed rate (mm/rev), Min - **Optimum** - Max)

KDS Type



Description

The new AK type drill features an extra long carbide drill head, new cutting geometry, coolant holes and ultra hard TiAlN coating for reliable high productivity drilling.

Advantages

- General purpose drill for steels, stainless steels, cast irons
- High productivity drilling even on deep holes up to 7 x D
- Twice the tool life of conventionally coated drills
- Self centering
- Surface finish and tolerances comparable to solid carbide
- Regrindable extra long carbide head halves drill replacement costs



Series

Type	Diameter range (mm)	Hole depth (L/D)	Remark
Short type (MAK Type)	ø9,5~ø40,5	~ 3	First choice general purpose drill
Long type (LAK Type)	ø9,5~ø40,5	~ 5	
Extra long type (DAK Type)	ø9,5~ø40,5	~ 7	Helix angle: 25° ---> 0°

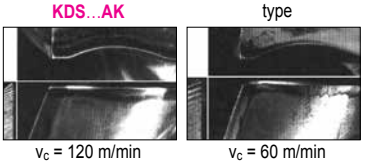
Series

Performance

● High efficiency drilling

Comparison of coating damage when high speed drilling

TiAlN coated KDS...AK | TiN coated type



v_c = 120 m/min | v_c = 60 m/min

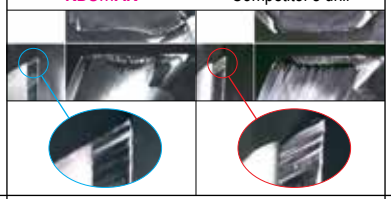
After 30 m cut length (600 holes)

Drill dia.: 18,0 mm
Work material: C50 (HB230)
f = 0,3 mm/rev
d_{oc} = 50 mm

● Optimized drill geometry

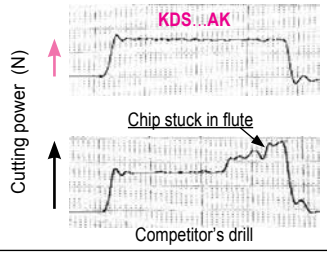
Comparison of damage to drill margin After 40 min. cut length

KDS...AK | Competitor's drill



Drill dia.: 18,0 mm
Work material: C50 (HB230)
v_c = 50 m/min
f = 0,25 mm/rev
d_{oc} = 38 mm

● Comparison of cutting power (chip removal capability)



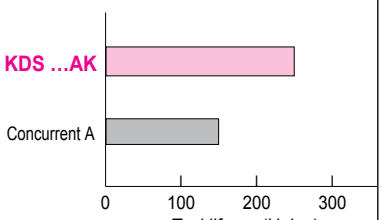
Drill dia.: 18,0 mm
Work material: C50 (HB230)
v_c = 50 m/min
f = 0,3 mm/rev
d_{oc} = 90 mm (L/D=5)

Application examples

● Workpiece material

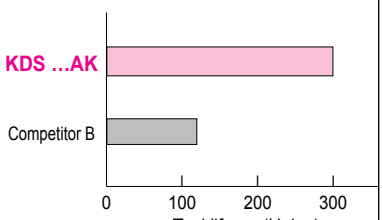
- General steel and alloy steel
- Low carbon steel
- Die steel
- Stainless steel
- Ductile cast iron
- Grey cast iron

● Automotive parts
Work material: C50 (HB250)



Drill:
Conditions: KDS 180 LAK (ø18,0mm)
v_c = 55 m/min, f = 0,25 mm/rev
d_{oc} = 70 mm

● Automotive parts
Work material: 42CrMo4 (HB250)



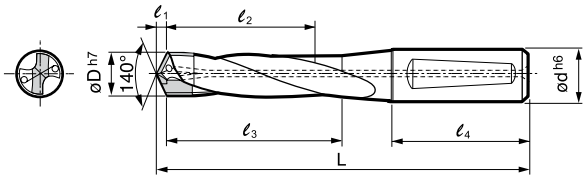
Drill:
Conditions: KDS 250 MAK (ø25,0mm)
v_c = 60 m/min, f = 0,25 mm/rev
d_{oc} = 65 mm

KDS ... MAK Type

Short Type (3 x D)

Brazed Carbide Drills with Coolant Holes





Helix angle: 20°
ℓ_2 = Effective drilling length

●Diameter ø9,5~15,5mm

Dimensions (mm)				Cat. No.	Short Series (3D)			
	Shank		Drill Head		Stock	Dimensions (mm)		
øD (mm)	ød	ℓ_4	ℓ_1		MAK	L	ℓ_2	ℓ_3
9,5~				**KDS 095 MAK**				
10,0	16	48	1,8	**KDS 100 MAK**		96,8	32	37
~10,5				**KDS 105 MAK**				
10,6~				**KDS 106 MAK**				
11,0	16	48	2	**KDS 110 MAK**		102,0	35	40
~11,5				**KDS 115 MAK**				
11,6				**KDS 116 MAK**				
11,7				**KDS 117 MAK**				
11,8				**KDS 118 MAK**				
11,9				**KDS 119 MAK**				
12,0	16	48	2,2	**KDS 120 MAK**	●	107,2	38	44
12,1				**KDS 121 MAK**				
12,2				**KDS 122 MAK**				
12,3				**KDS 123 MAK**				
12,4				**KDS 124 MAK**				
12,5				**KDS 125 MAK**	●			
12,6				**KDS 126 MAK**				
12,7				**KDS 127 MAK**				
12,8				**KDS 128 MAK**				
12,9				**KDS 129 MAK**				
13,0	16	48	2,4	**KDS 130 MAK**	●	112,4	41	47
13,1				**KDS 131 MAK**				
13,2				**KDS 132 MAK**				
13,3				**KDS 133 MAK**				
13,4				**KDS 134 MAK**				
13,5				**KDS 135 MAK**	●			
13,6				**KDS 136 MAK**				
13,7				**KDS 137 MAK**	●			
13,8				**KDS 138 MAK**				
13,9				**KDS 139 MAK**				
14,0	16	48	2,5	**KDS 140 MAK**	●	117,5	44	51
14,1				**KDS 141 MAK**				
14,2				**KDS 142 MAK**				
14,3				**KDS 143 MAK**				
14,4				**KDS 144 MAK**				
14,5				**KDS 145 MAK**	●			
14,6				**KDS 146 MAK**	●			
14,7				**KDS 147 MAK**				
14,8				**KDS 148 MAK**				
14,9				**KDS 149 MAK**				
15,0	20	50	2,7	**KDS 150 MAK**	●	127,7	47	54
15,1				**KDS 151 MAK**				
15,2				**KDS 152 MAK**				
15,3				**KDS 153 MAK**				
15,4				**KDS 154 MAK**				
15,5				**KDS 155 MAK**	●			

●Diameter ø15,6~20,0mm

Dimensions (mm)				Cat. No.	Short Series (3D)			
	Shank		Drill Head		Stock	Dimensions (mm)		
øD (mm)	ød	ℓ_4	ℓ_1		MAK	L	ℓ_2	ℓ_3
15,6				**KDS 156 MAK**				
15,7				**KDS 157 MAK**				
15,8				**KDS 158 MAK**				
15,9				**KDS 159 MAK**				
16,0	20	50	2,9	**KDS 160 MAK**	●	132,9	50	58
16,1				**KDS 161 MAK**				
16,2				**KDS 162 MAK**				
16,3				**KDS 163 MAK**				
16,4				**KDS 164 MAK**	●			
16,5				**KDS 165 MAK**	●			
16,6				**KDS 166 MAK**				
16,7				**KDS 167 MAK**				
16,8				**KDS 168 MAK**				
16,9				**KDS 169 MAK**				
17,0	20	50	3,1	**KDS 170 MAK**	●	138,1	53	61
17,1				**KDS 171 MAK**				
17,2				**KDS 172 MAK**				
17,3				**KDS 173 MAK**				
17,4				**KDS 174 MAK**				
17,5				**KDS 175 MAK**	●			
17,6				**KDS 176 MAK**				
17,7				**KDS 177 MAK**	●			
17,8				**KDS 178 MAK**				
17,9				**KDS 179 MAK**				
18,0	20	50	3,3	**KDS 180 MAK**	●	143,3	56	65
18,1				**KDS 181 MAK**				
18,2				**KDS 182 MAK**				
18,3				**KDS 183 MAK**				
18,4				**KDS 184 MAK**				
18,5				**KDS 185 MAK**	●			
18,6				**KDS 186 MAK**				
18,7				**KDS 187 MAK**	●			
18,8				**KDS 188 MAK**				
18,9				**KDS 189 MAK**				
19,0	25	56	3,5	**KDS 190 MAK**	●	158,5	59	68
19,1				**KDS 191 MAK**				
19,2				**KDS 192 MAK**				
19,3				**KDS 193 MAK**				
19,4				**KDS 194 MAK**				
19,5				**KDS 195 MAK**	●			
19,6				**KDS 196 MAK**				
19,7				**KDS 197 MAK**				
19,8	25	56	3,6	**KDS 198 MAK**		158,6	62	72
19,9				**KDS 199 MAK**				
20,0				**KDS 200 MAK**	●			

■ Recommended Cutting Conditions

(v_c : Cutting Speed (m/min), f : Feed rate (mm/rev)) (Min – **Standard** – Max)

Diameter (mm)		Steels (under HB250)	Steels (HB250~320)	Hardened Steels (HRC45)	Stainless Steels (< HB200)	Ductile Cast Irons	Cast Irons	Aluminium Alloys	Titanium Alloys (Ti-6Al-4V)	Inconel (Inconel 718)
~ ø15	v_c	50 – **65** – 75	50 – **60** – 70	30 – **35** – 45	35 – **45** – 50	55 – **65** – 75	60 – **80** – 100	70 – **85** – 100	20 – **25** – 35	10 – **20** – 30
	f	0,15 – 0,3	0,15 – 0,3	0,1 – 0,2	0,1 – 0,2	0,15 – 0,3	0,2 – 0,3	0,25 – 0,35	0,1 – 0,15	0,08 – 0,1
~ ø20	v_c	50 – **65** – 75	50 – **60** – 70	35 – **40** – 50	35 – **45** – 50	60 – **70** – 80	60 – **80** – 100	70 – **90** – 110	20 – **30** – 40	10 – **20** – 30
	f	0,15 – 0,35	0,15 – 0,35	0,15 – 0,25	0,15 – 0,25	0,15 – 0,35	0,2 – 0,35	0,25 – 0,4	0,1 – 0,15	0,08 – 0,1
~ ø30,5	v_c	55 – **70** – 90	55 – **65** – 90	35 – **40** – 50	35 – **45** – 50	60 – **70** – 90	60 – **90** – 110	75 – **100** – 120	25 – **35** – 40	15 – **25** – 35
	f	0,2 – 0,4	0,2 – 0,4	0,15 – 0,25	0,15 – 0,25	0,2 – 0,4	0,25 – 0,4	0,3 – 0,4	0,1 – 0,2	0,08 – 0,12

If the drilling operation is completely satisfactory with the above condition and the rigidity of the machine is sufficient, the cutting data can be raised. For more guidance, please contact our technical representative.

● = Euro stock

KDS ... MAK Type

TiAIN Coated Brazed Carbide Multi-Drills for General Steels, Cast Iron & Ductile Cast Iron



Specification:
- Brazed carbide drill TiAIN coated (Grade: ACW30) with coolant holes
- Shank with whistle notch

●Diameter ø20,1~24,5mm

Dimensions (mm)				Cat. No.	Short Series (3D)			
øD (mm)	Shank		Drill Head		Stock	Dimensions (mm)		
	ød	ℓ_4	ℓ_1		MAK	L	ℓ_2	ℓ_3
20,1	25	56	3,6	KDS 201 MAK		158,6	62	72
20,2				KDS 202 MAK				
20,3				KDS 203 MAK				
20,4				KDS 204 MAK				
20,5				KDS 205 MAK	●			
20,6	25	56	3,8	KDS 206 MAK		158,8	65	75
20,7				KDS 207 MAK				
20,8				KDS 208 MAK				
20,9				KDS 209 MAK				
21,0				KDS 210 MAK	●			
21,1				KDS 211 MAK				
21,2				KDS 212 MAK				
21,3				KDS 213 MAK				
21,4				KDS 214 MAK				
21,5				KDS 215 MAK	●			
21,6	25	56	4,0	KDS 216 MAK		164,0	68	79
21,7				KDS 217 MAK				
21,8				KDS 218 MAK				
21,9				KDS 219 MAK				
22,0				KDS 220 MAK	●			
22,1				KDS 221 MAK				
22,2				KDS 222 MAK				
22,3				KDS 223 MAK				
22,4				KDS 224 MAK				
22,5				KDS 225 MAK	●			
22,6	25	56	4,2	KDS 226 MAK		164,2	71	82
22,7				KDS 227 MAK				
22,8				KDS 228 MAK				
22,9				KDS 229 MAK				
23,0				KDS 230 MAK	●			
23,1				KDS 231 MAK				
23,2				KDS 232 MAK				
23,3				KDS 233 MAK				
23,4				KDS 234 MAK				
23,5				KDS 235 MAK				
23,6	32	60	4,4	KDS 236 MAK		174,4	74	86
23,7				KDS 237 MAK				
23,8				KDS 238 MAK				
23,9				KDS 239 MAK				
24,0				KDS 240 MAK	●			
24,1				KDS 241 MAK				
24,2				KDS 242 MAK				
24,3				KDS 243 MAK				
24,4				KDS 244 MAK				
24,5				KDS 245 MAK	●			

●Diameter ø24,6~40,5mm

Dimensions (mm)				Cat. No.	Short Series (3D)			
øD (mm)	Shank		Drill Head		Stock	Dimensions (mm)		
	ød	ℓ_4	ℓ_1		MAK	L	ℓ_2	ℓ_3
24,6	32	60	4,5	KDS 246 MAK		174,5	76	88
24,7				KDS 247 MAK				
24,8				KDS 248 MAK				
24,9				KDS 249 MAK				
25,0				KDS 250 MAK	●			
25,1				KDS 251 MAK				
25,2				KDS 252 MAK				
25,3				KDS 253 MAK				
25,4				KDS 254 MAK				
25,5				KDS 255 MAK				
25,6	32	60	4,7	KDS 256 MAK		179,7	79	92
25,7				KDS 257 MAK				
25,8				KDS 258 MAK				
25,9				KDS 259 MAK				
26,0				KDS 260 MAK	●			
26,1 ~26,5				KDS 261 MAK ~265 MAK				
26,6 ~27,5	32	60	4,9	KDS 266 MAK ~275 MAK		179,9	81	94
27,6 ~28,5	32	60	5,1	KDS 276 MAK ~285 MAK		185,1	83	97
28,6 ~29,5	32	60	5,3	KDS 286 MAK ~295 MAK		190,3	86	100
29,6 ~30,5	32	60	5,5	KDS 296 MAK ~305 MAK		190,5	89	104
30,6 ~31,5	40	70	5,6	KDS 306 MAK ~315 MAK		210,6	95	112
31,6 ~32,5	40	70	5,8	KDS 316 MAK ~325 MAK		215,8	98	115
32,6 ~33,5	40	70	6,0	KDS 326 MAK ~335 MAK		221,0	101	119
33,6 ~34,5	40	70	6,2	KDS 336 MAK ~345 MAK		226,2	104	122
34,6 ~35,5	40	70	6,4	KDS 346 MAK ~355 MAK		231,4	107	125
35,6 ~36,5	40	70	6,6	KDS 356 MAK ~365 MAK		231,6	110	128
36,6 ~37,5	40	70	6,7	KDS 366 MAK ~375 MAK		236,7	113	132
37,6 ~38,5	40	70	6,9	KDS 376 MAK ~385 MAK		241,9	116	163
38,6 ~39,5	40	70	7,1	KDS 386 MAK ~395 MAK		247,1	119	168
39,6 ~40,5	40	70	7,3	KDS 396 MAK ~405 MAK		252,3	122	173

■ How to Order

Non-Stock Items will be required minimum order quantity for 6 pcs. Please specify the Cat. No.
For example, if the diameter of the drill is 10,2 mm, please indicate as follow.

E.g., **KDS 102 M AK**, ACW30 (Grade)

KDS series: Brazed carbide drill with coolant holes

Drill diameter **10,2** mm

M : 3 x D

AK: Brazed carbide and TiAIN coated drill

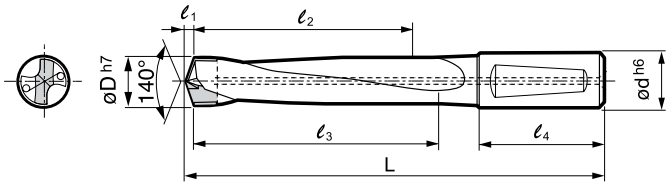


KDS ... LAK Type

Long Type (5 x D)

Brazed Carbide Drills with Coolant Holes





Helix angle: 20° ---> 6°
ℓ_2 = Effective drilling length

●Diameter ø9,5~15,5mm

Dimensions (mm)				Cat. No.	Long Series (5D)			
øD (mm)	Shank		Drill Head		Stock	Dimensions (mm)		
	ød	ℓ_4	ℓ_1		LAK	L	ℓ_2	ℓ_3
9,5~				KDS 095 LAK				
10,0	16	48	1,8	KDS 100 LAK		116,8	52	57
~10,5				KDS 105 LAK				
10,6~				KDS 106 LAK				
11,0	16	48	2	KDS 110 LAK		127,0	57	63
~11,5				KDS 115 LAK				
11,6				KDS 116 LAK				
11,7				KDS 117 LAK				
11,8				KDS 118 LAK				
11,9				KDS 119 LAK				
12,0	16	48	2,2	KDS 120 LAK	●	132,2	63	69
12,1				KDS 121 LAK				
12,2				KDS 122 LAK				
12,3				KDS 123 LAK				
12,4				KDS 124 LAK				
12,5				KDS 125 LAK	●			
12,6				KDS 126 LAK				
12,7				KDS 127 LAK				
12,8				KDS 128 LAK				
12,9				KDS 129 LAK				
13,0	16	48	2,4	KDS 130 LAK	●	142,4	67	74
13,1				KDS 131 LAK				
13,2				KDS 132 LAK				
13,3				KDS 133 LAK				
13,4				KDS 134 LAK				
13,5				KDS 135 LAK	●			
13,6				KDS 136 LAK				
13,7				KDS 137 LAK				
13,8				KDS 138 LAK				
13,9				KDS 139 LAK				
14,0	16	48	2,5	KDS 140 LAK	●	147,5	73	80
14,1				KDS 141 LAK	●			
14,2				KDS 142 LAK				
14,3				KDS 143 LAK				
14,4				KDS 144 LAK				
14,5				KDS 145 LAK	●			
14,6				KDS 146 LAK				
14,7				KDS 147 LAK				
14,8				KDS 148 LAK				
14,9				KDS 149 LAK				
15,0	20	50	2,7	KDS 150 LAK	●	157,7	77	85
15,1				KDS 151 LAK				
15,2				KDS 152 LAK				
15,3				KDS 153 LAK				
15,4				KDS 154 LAK				
15,5				KDS 155 LAK	●			

●Diameter ø15,6~20,0mm

Dimensions (mm)				Cat. No.	Long Series (5D)			
øD (mm)	Shank		Drill Head		Stock	Dimensions (mm)		
	ød	ℓ_4	ℓ_1		LAK	L	ℓ_2	ℓ_3
15,6				KDS 156 LAK				
15,7				KDS 157 LAK				
15,8				KDS 158 LAK				
15,9				KDS 159 LAK				
16,0	20	50	2,9	KDS 160 LAK	●	167,9	83	91
16,1				KDS 161 LAK				
16,2				KDS 162 LAK				
16,3				KDS 163 LAK				
16,4				KDS 164 LAK				
16,5				KDS 165 LAK	●			
16,6				KDS 166 LAK				
16,7				KDS 167 LAK				
16,8				KDS 168 LAK				
16,9				KDS 169 LAK				
17,0	20	50	3,1	KDS 170 LAK	●	173,1	87	96
17,1				KDS 171 LAK				
17,2				KDS 172 LAK				
17,3				KDS 173 LAK				
17,4				KDS 174 LAK				
17,5				KDS 175 LAK	●			
17,6				KDS 176 LAK				
17,7				KDS 177 LAK				
17,8				KDS 178 LAK				
17,9				KDS 179 LAK				
18,0	20	50	3,3	KDS 180 LAK	●	178,3	93	102
18,1				KDS 181 LAK				
18,2				KDS 182 LAK				
18,3				KDS 183 LAK				
18,4				KDS 184 LAK				
18,5				KDS 185 LAK	●			
18,6				KDS 186 LAK				
18,7				KDS 187 LAK				
18,8				KDS 188 LAK				
18,9				KDS 189 LAK				
19,0	25	56	3,5	KDS 190 LAK	●	193,5	97	107
19,1				KDS 191 LAK				
19,2				KDS 192 LAK				
19,3				KDS 193 LAK				
19,4				KDS 194 LAK				
19,5				KDS 195 LAK	●			
19,6				KDS 196 LAK				
19,7				KDS 197 LAK				
19,8	25	56	3,6	KDS 198 LAK		198,6	103	113
19,9				KDS 199 LAK				
20,0				KDS 200 LAK	●			

■ Recommended Cutting Conditions

(v_c : Cutting Speed (m/min), f : Feed rate (mm/rev)) (Min – **Standard** – Max)

Diameter (mm)		Steels (under HB250)	Steels (HB250~320)	Hardened Steels (HRC45)	Stainless Steels (< HB200)	Ductile Cast Irons	Cast Irons	Aluminium Alloys	Titanium Alloys (Ti-6Al-4V)	Inconel (Inconel 718)
~ ø15	v_c	50 – **65** – 75	50 – **60** – 70	30 – **35** – 45	35 – **45** – 50	55 – **65** – 75	60 – **80** – 100	70 – **85** – 100	20 – **25** – 35	10 – **20** – 30
	f	0,15 – 0,3	0,15 – 0,3	0,1 – 0,2	0,1 – 0,2	0,15 – 0,3	0,2 – 0,3	0,25 – 0,35	0,1 – 0,15	0,08 – 0,1
~ ø20	v_c	50 – **65** – 75	50 – **60** – 70	35 – **40** – 50	35 – **45** – 50	60 – **70** – 80	60 – **80** – 100	70 – **90** – 110	20 – **30** – 40	10 – **20** – 30
	f	0,15 – 0,35	0,15 – 0,35	0,15 – 0,25	0,15 – 0,25	0,15 – 0,35	0,2 – 0,35	0,25 – 0,4	0,1 – 0,15	0,08 – 0,1
~ ø30,5	v_c	55 – **70** – 90	55 – **65** – 90	35 – **40** – 50	35 – **45** – 50	60 – **70** – 90	60 – **90** – 110	75 – **100** – 120	25 – **35** – 40	15 – **25** – 35
	f	0,2 – 0,4	0,2 – 0,4	0,15 – 0,25	0,15 – 0,25	0,2 – 0,4	0,25 – 0,4	0,3 – 0,4	0,1 – 0,2	0,08 – 0,12

If the drilling operation is completely satisfactory with the above condition and the rigidity of the machine is sufficient, the cutting data can be raised. For more guidance, please contact our technical representative.

● = Euro stock

KDS ... LAK Type

TiAIN Coated Brazed Carbide Multi-Drills for General Steels, Cast Iron & Ductile Cast Iron



Specification:
- Brazed carbide drill TiAIN coated (Grade: ACW30) with coolant holes
- Shank with whistle notch

●Diameter ø20,1~24,5mm

Dimensions (mm)				Cat. No.	Long Series (5D)			
øD (mm)	Shank		Drill Head		Stock	Dimensions (mm)		
	ød	ℓ_4	ℓ_1		LAK	L	ℓ_2	ℓ_3
20,1	25	56	3,6	KDS 201 LAK		198,6	103	113
20,2				KDS 202 LAK				
20,3				KDS 203 LAK				
20,4				KDS 204 LAK				
20,5				KDS 205 LAK	●			
20,6	25	56	3,8	KDS 206 LAK		198,8	107	118
20,7				KDS 207 LAK				
20,8				KDS 208 LAK				
20,9				KDS 209 LAK				
21,0				KDS 210 LAK	●			
21,1				KDS 211 LAK				
21,2				KDS 212 LAK				
21,3				KDS 213 LAK				
21,4				KDS 214 LAK				
21,5				KDS 215 LAK	●			
21,6	25	56	4,0	KDS 216 LAK		204,0	113	124
21,7				KDS 217 LAK				
21,8				KDS 218 LAK				
21,9				KDS 219 LAK				
22,0				KDS 220 LAK	●			
22,1				KDS 221 LAK				
22,2				KDS 222 LAK				
22,3				KDS 223 LAK				
22,4				KDS 224 LAK				
22,5				KDS 225 LAK				
22,6	25	56	4,2	KDS 226 LAK		214,2	117	129
22,7				KDS 227 LAK				
22,8				KDS 228 LAK				
22,9				KDS 229 LAK				
23,0				KDS 230 LAK	●			
23,1				KDS 231 LAK				
23,2				KDS 232 LAK				
23,3				KDS 233 LAK				
23,4				KDS 234 LAK				
23,5				KDS 235 LAK				
23,6	32	60	4,4	KDS 236 LAK		224,4	123	135
23,7				KDS 237 LAK				
23,8				KDS 238 LAK				
23,9				KDS 239 LAK				
24,0				KDS 240 LAK	●			
24,1				KDS 241 LAK				
24,2				KDS 242 LAK				
24,3				KDS 243 LAK				
24,4				KDS 244 LAK				
24,5				KDS 245 LAK				

●Diameter ø24,6~40,5mm

Dimensions (mm)				Cat. No.	Long Series (5D)			
øD (mm)	Shank		Drill Head		Stock	Dimensions (mm)		
	ød	ℓ_4	ℓ_1		LAK	L	ℓ_2	ℓ_3
24,6	32	60	4,5	KDS 246 LAK		229,5	127	140
24,7				KDS 247 LAK				
24,8				KDS 248 LAK				
24,9				KDS 249 LAK				
25,0				KDS 250 LAK	●			
25,1				KDS 251 LAK				
25,2				KDS 252 LAK				
25,3				KDS 253 LAK				
25,4				KDS 254 LAK				
25,5				KDS 255 LAK				
25,6	32	60	4,7	KDS 256 LAK		234,7	133	146
25,7				KDS 257 LAK				
25,8				KDS 258 LAK				
25,9				KDS 259 LAK				
26,0				KDS 260 LAK	●			
26,1 ~26,5				KDS 261 LAK ~265 LAK				
26,6 ~27,5	32	60	4,9	KDS 266 LAK ~275 LAK		239,9	137	151
27,6 ~28,5	32	60	5,1	KDS 276 LAK ~285 LAK		245,1	143	157
28,6 ~29,5	32	60	5,3	KDS 286 LAK ~295 LAK		250,3	147	162
29,6 ~30,5	32	60	5,5	KDS 296 LAK ~305 LAK		260,5	152	167
30,6 ~31,5	40	70	5,6	KDS 306 LAK ~315 LAK		280,6	166	187
31,6 ~32,5	40	70	5,8	KDS 316 LAK ~325 LAK		285,8	172	190
32,6 ~33,5	40	70	6,0	KDS 326 LAK ~335 LAK		291,0	175	194
33,6 ~34,5	40	70	6,2	KDS 336 LAK ~345 LAK		296,2	177	197
34,6 ~35,5	40	70	6,4	KDS 346 LAK ~355 LAK		301,4	180	200
35,6 ~36,5	40	70	6,6	KDS 356 LAK ~365 LAK		306,6	183	203
36,6 ~37,5	40	70	6,7	KDS 366 LAK ~375 LAK		311,7	188	207
37,6 ~38,5	40	70	6,9	KDS 376 LAK ~385 LAK		321,9	193	243
38,6 ~39,5	40	70	7,1	KDS 386 LAK ~395 LAK		327,1	198	248
39,6 ~40,5	40	70	7,3	KDS 396 LAK ~405 LAK		332,3	203	253

■ How to Order

Non-Stock Items will be required minimum order quantity for 6 pcs. Please specify the Cat. No.
For example, if the diameter of the drill is 10,2 mm, please indicate as follow.

E.g., **KDS 102 L AK** , ACW30 (Grade)

KDS series: Brazed carbide drill with coolant holes

Drill diameter **10,2** mm

L : 5 x D

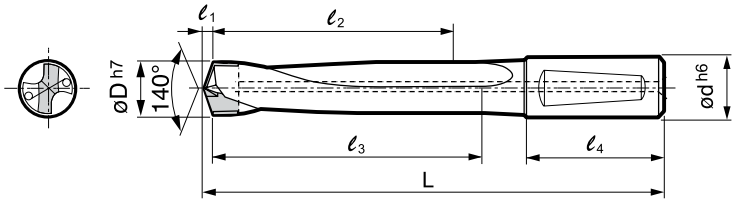
AK: Brazed carbide and TiAIN coated drill



KDS ... DAK Type

Extra Long Type (7 x D) Brazed Carbide Drills with Coolant Holes





Helix angle: 20° ---> 0°
ℓ_2 = Effective drilling length

●Diameter ø9,5~15,5mm

Dimensions (mm)				Cat. No.	Extra Long Series (7D)			
øD (mm)	Shank ød	Shank ℓ_4	Drill Head ℓ_1		Stock DAK	Dimensions (mm) L	ℓ_2	ℓ_3
9,5~				KDS 095 DAK				
10,0	16	48	1,8	KDS 100 DAK		141,8	75	80
~10,5				KDS 105 DAK				
10,6~				KDS 106 DAK				
11,0	16	48	2	KDS 110 DAK		152,0	81	87
~11,5				KDS 115 DAK				
11,6				KDS 116 DAK				
11,7				KDS 117 DAK				
11,8				KDS 118 DAK				
11,9				KDS 119 DAK				
12,0	16	48	2,2	KDS 120 DAK	●	162,2	91	97
12,1				KDS 121 DAK				
12,2				KDS 122 DAK				
12,3				KDS 123 DAK				
12,4				KDS 124 DAK				
12,5				KDS 125 DAK	●			
12,6				KDS 126 DAK				
12,7				KDS 127 DAK				
12,8				KDS 128 DAK				
12,9				KDS 129 DAK				
13,0	16	48	2,4	KDS 130 DAK	●	177,4	99	106
13,1				KDS 131 DAK				
13,2				KDS 132 DAK				
13,3				KDS 133 DAK				
13,4				KDS 134 DAK				
13,5				KDS 135 DAK				
13,6				KDS 136 DAK				
13,7				KDS 137 DAK				
13,8				KDS 138 DAK				
13,9				KDS 139 DAK				
14,0	16	48	2,5	KDS 140 DAK	●	182,5	106	113
14,1				KDS 141 DAK				
14,2				KDS 142 DAK				
14,3				KDS 143 DAK				
14,4				KDS 144 DAK				
14,5				KDS 145 DAK				
14,6				KDS 146 DAK				
14,7				KDS 147 DAK				
14,8				KDS 148 DAK				
14,9				KDS 149 DAK				
15,0	20	50	2,7	KDS 150 DAK	●	197,7	114	122
15,1				KDS 151 DAK				
15,2				KDS 152 DAK				
15,3				KDS 153 DAK				
15,4				KDS 154 DAK				
15,5				KDS 155 DAK				

●Diameter ø15,6~20,0mm

Dimensions (mm)				Cat. No.	Extra Long Series (7D)			
øD (mm)	Shank ød	Shank ℓ_4	Drill Head ℓ_1		Stock DAK	Dimensions (mm) L	ℓ_2	ℓ_3
15,6				KDS 156 DAK				
15,7				KDS 157 DAK				
15,8				KDS 158 DAK				
15,9				KDS 159 DAK				
16,0	20	50	2,9	KDS 160 DAK	●	207,9	121	129
16,1				KDS 161 DAK				
16,2				KDS 162 DAK				
16,3				KDS 163 DAK				
16,4				KDS 164 DAK				
16,5				KDS 165 DAK				
16,6				KDS 166 DAK				
16,7				KDS 167 DAK				
16,8				KDS 168 DAK				
16,9				KDS 169 DAK				
17,0	20	50	3,1	KDS 170 DAK	●	218,1	129	138
17,1				KDS 171 DAK				
17,2				KDS 172 DAK				
17,3				KDS 173 DAK				
17,4				KDS 174 DAK				
17,5				KDS 175 DAK	●			
17,6				KDS 176 DAK				
17,7				KDS 177 DAK				
17,8				KDS 178 DAK				
17,9				KDS 179 DAK				
18,0	20	50	3,3	KDS 180 DAK	●	223,3	136	145
18,1				KDS 181 DAK				
18,2				KDS 182 DAK				
18,3				KDS 183 DAK				
18,4				KDS 184 DAK				
18,5				KDS 185 DAK				
18,6				KDS 186 DAK				
18,7				KDS 187 DAK				
18,8				KDS 188 DAK				
18,9				KDS 189 DAK				
19,0	25	56	3,5	KDS 190 DAK	●	243,5	144	154
19,1				KDS 191 DAK				
19,2				KDS 192 DAK				
19,3				KDS 193 DAK				
19,4				KDS 194 DAK				
19,5				KDS 195 DAK				
19,6				KDS 196 DAK				
19,7				KDS 197 DAK				
19,8	25	56	3,6	KDS 198 DAK		248,6	151	161
19,9				KDS 199 DAK				
20,0				KDS 200 DAK	●			

■ Recommended Cutting Conditions

(v_c : Cutting Speed (m/min), f : Feed rate (mm/rev)) (Min – **Standard** – Max)

Diameter (mm)		Steels (under HB250)	Steels (HB250~320)	Die Steels (about HB250)	Ductile Cast Irons	Remarks
~ ø15		40 – **65** – 90	40 – **60** – 90	40 – **50** – 70	50 – **70** – 100	To avoid the drill bending, which can cause breakage, please pre-drill or reduce the cutting conditions at the entrance of hole: RPM: 100~300 f: 0,05~0,08 mm/rev
		0,15 – **0,2** – 0,3	0,1 – **0,2** – 0,25	0,1 – **0,2** – 0,25	0,2 – **0,3** – 0,35	
~ ø20		40 – **65** – 90	40 – **60** – 90	40 – **50** – 70	50 – **70** – 100	
		0,2 – **0,3** – 0,4	0,15 – **0,25** – 0,35	0,15 – **0,25** – 0,3	0,2 – **0,35** – 0,4	
~ ø40,5		40 – **70** – 90	40 – **65** – 90	40 – **55** – 70	50 – **70** – 100	
		0,2 – **0,35** – 0,45	0,2 – **0,3** – 0,4	0,2 – **0,3** – 0,35	0,25 – **0,4** – 0,5	

● = Euro stock

KDS ... DAK Type

TiAlN Coated Brazed Carbide Multi-Drills for General Steels & Ductile Cast Iron



Specification:
- Brazed carbide drill TiAlN coated (Grade: ACW30) with coolant holes
- Shank with whistle notch

●Diameter ø20,1~24,5mm

Dimensions (mm)				Cat. No.	Extra Long Series (7D)			
øD (mm)	Shank		Drill Head		Stock	Dimensions (mm)		
	ød	ℓ	ℓ		DAK	L	ℓ_2	ℓ_3
20,1	25	56	3,6	KDS 201 DAK		248,6	151	161
20,2				KDS 202 DAK				
20,3				KDS 203 DAK				
20,4				KDS 204 DAK				
20,5				KDS 205 DAK				
20,6	25	56	3,8	KDS 206 DAK		248,8	155	166
20,7				KDS 207 DAK				
20,8				KDS 208 DAK				
20,9				KDS 209 DAK				
21,0				KDS 210 DAK	●			
21,1				KDS 211 DAK				
21,2				KDS 212 DAK				
21,3				KDS 213 DAK				
21,4				KDS 214 DAK				
21,5				KDS 215 DAK				
21,6	25	56	4,0	KDS 216 DAK		259,0	166	177
21,7				KDS 217 DAK				
21,8				KDS 218 DAK				
21,9				KDS 219 DAK				
22,0				KDS 220 DAK	●			
22,1				KDS 221 DAK				
22,2				KDS 222 DAK				
22,3				KDS 223 DAK				
22,4				KDS 224 DAK				
22,5				KDS 225 DAK				
22,6	25	56	4,2	KDS 226 DAK		274,2	174	186
22,7				KDS 227 DAK				
22,8				KDS 228 DAK				
22,9				KDS 229 DAK				
23,0				KDS 230 DAK				
23,1				KDS 231 DAK				
23,2				KDS 232 DAK				
23,3				KDS 233 DAK				
23,4				KDS 234 DAK				
23,5				KDS 235 DAK				
23,6	32	60	4,4	KDS 236 DAK		284,4	178	190
23,7				KDS 237 DAK				
23,8				KDS 238 DAK				
23,9				KDS 239 DAK				
24,0				KDS 240 DAK				
24,1				KDS 241 DAK				
24,2				KDS 242 DAK				
24,3				KDS 243 DAK				
24,4				KDS 244 DAK				
24,5				KDS 245 DAK	●			

●Diameter ø24,6~40,5mm

Dimensions (mm)				Cat. No.	Extra Long Series (7D)			
øD (mm)	Shank		Drill Head		Stock	Dimensions (mm)		
	ød	ℓ_4	ℓ_1		DAK	L	ℓ_2	ℓ_3
24,6	32	60	4,5	KDS 246 DAK		294,5	187	200
24,7				KDS 247 DAK				
24,8				KDS 248 DAK				
24,9				KDS 249 DAK				
25,0				KDS 250 DAK				
25,1				KDS 251 DAK				
25,2				KDS 252 DAK				
25,3				KDS 253 DAK				
25,4				KDS 254 DAK				
25,5				KDS 255 DAK				
25,6	32	60	4,7	KDS 256 DAK		304,7	197	210
25,7				KDS 257 DAK				
25,8				KDS 258 DAK				
25,9				KDS 259 DAK				
26,0				KDS 260 DAK				
26,1 ~26,5				KDS 261 DAK ~265 DAK				
26,6 ~27,5	32	60	4,9	KDS 266 DAK ~275 DAK		309,9	201	215
27,6 ~28,5	32	60	5,1	KDS 276 DAK ~285 DAK		315,1	206	220
28,6 ~29,5	32	60	5,3	KDS 286 DAK ~295 DAK		325,3	215	230
29,6 ~30,5	32	60	5,5	KDS 296 DAK ~305 DAK		335,5	225	240
30,6 ~31,5	40	70	5,6	KDS 306 DAK ~315 DAK		350,6	229	245
31,6 ~32,5	40	70	5,8	KDS 316 DAK ~325 DAK		360,8	234	250
32,6 ~33,5	40	70	6,0	KDS 326 DAK ~335 DAK		371,0	243	260
33,6 ~34,5	40	70	6,2	KDS 336 DAK ~345 DAK		381,2	253	270
34,6 ~35,5	40	70	6,4	KDS 346 DAK ~355 DAK		391,4	257	275
35,6 ~36,5	40	70	6,6	KDS 356 DAK ~365 DAK		396,6	262	280
36,6 ~37,5	40	70	6,7	KDS 366 DAK ~375 DAK		406,7	271	290
37,6 ~38,5	40	70	6,9	KDS 376 DAK ~385 DAK		416,9	292	338
38,6 ~39,5	40	70	7,1	KDS 386 DAK ~395 DAK		422,1	296	343
39,6 ~40,5	40	70	7,3	KDS 396 DAK ~405 DAK		427,3	300	348

■ How to Order

Non-Stock Items will be required minimum order quantity for 6 pcs. Please specify the Cat. No.
For example, if the diameter of the drill is 10,2 mm, please indicate as follow.

E.g., **KDS 102 D AK** , ACW30 (Grade)

KDS series: Brazed carbide drill with coolant holes

Drill diameter **10,2** mm

AK: Brazed carbide and TiAlN coated drill

D : 7 x D

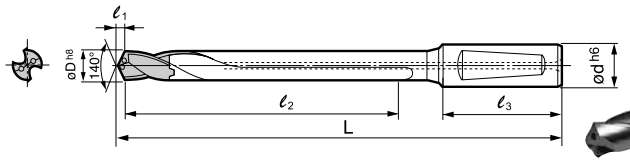


Brazed Carbide MULTI-DRILLs
KDS ... FA Type

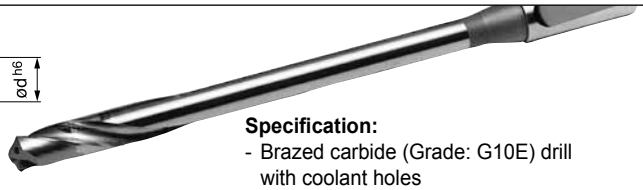
(Available on Request)

Extra Long Type (10 x D)

Brazed Carbide Drills with Coolant Holes



Helix angle: 25° ---> 0°
ℓ_2 = Effective drilling length



Specification:
- Brazed carbide (Grade: G10E) drill with coolant holes
- Shank with whistle notch

●Diameter ø8.0~15,0mm

Dimensions (mm)				Cat. No.	Extra Long Series (10D)		
øD (mm)	Shank		Drill Head		Stock	Dimensions (mm)	
	ød	ℓ_3	ℓ_1		FA10	L	ℓ_2
8,0 ~8,5	16	48	1,5	**KDS 080 FA10 ~085 FA10**		156,5	93
8,6 ~9,5	16	48	1,6	**KDS 086 FA10 ~095 FA10**		171,6	104
9,6 ~10,5	16	48	1,8	**KDS 096 FA10 ~105 FA10**		181,8	115
10,6 ~11,5	16	48	2,0	**KDS 106 FA10 ~115 FA10**		197,0	126
11,6 ~12,5	16	48	2,2	**KDS 116 FA10 ~125 FA10**		207,2	137
12,6 ~13,5	16	48	2,4	**KDS 126 FA10 ~135 FA10**		222,4	148
13,6 ~14,5	16	48	2,5	**KDS 136 FA10 ~145 FA10**		232,5	159
14,6 ~15,5	20	50	2,7	**KDS 146 FA10 ~155 FA10**		247,7	170
15,6 ~16,5	20	50	2,9	**KDS 156 FA10 ~165 FA10**		262,9	181
16,6 ~17,5	20	50	3,1	**KDS 166 FA10 ~175 FA10**		273,1	192
17,6 ~18,5	20	50	3,3	**KDS 176 FA10 ~185 FA10**		288,3	203
18,6 ~19,5	25	56	3,5	**KDS 186 FA10 ~195 FA10**		303,5	214

●Diameter ø15,1~19,5mm

Dimensions (mm)				Cat. No.	Extra Long Series (10D)		
øD (mm)	Shank		Drill Head		Stock	Dimensions (mm)	
	ød	ℓ_3	ℓ_1		FA10	L	ℓ_2
19,6 ~20,5	25	56	3,6	**KDS 196 FA10 ~205 FA10**		318,6	225
20,6 ~21,5	25	56	3,8	**KDS 206 FA10 ~215 FA10**		328,8	236
21,6 ~22,5	25	56	4,0	**KDS 216 FA10 ~225 FA10**		344,0	247
22,6 ~23,5	25	56	4,2	**KDS 226 FA10 ~235 FA10**		354,2	258
23,6 ~24,5	32	60	4,4	**KDS 236 FA10 ~245 FA10**		374,4	269
24,6 ~25,5	32	60	4,5	**KDS 246 FA10 ~255 FA10**		384,5	280
25,6 ~26,5	32	60	4,7	**KDS 256 FA10 ~265 FA10**		399,7	291
26,6 ~27,5	32	60	4,9	**KDS 266 FA10 ~275 FA10**		409,9	302
27,6 ~28,5	32	60	5,1	**KDS 276 FA10 ~285 FA10**		425,1	313
28,6 ~29,5	32	60	5,3	**KDS 286 FA10 ~295 FA10**		435,3	324
29,6 ~30,5	32	60	5,5	**KDS 296 FA10 ~305 FA10**		450,5	335

Brazed Carbide Multi-Drills for Cast Irons and Aluminium Alloys



■ How to Order

Non-Stock Items will be required minimum order quantity for 6 pcs. Please specify the Cat. No.
For example, if the diameter of the drill is 10,2 mm, please indicate as follow.

E.g., **KDS 102 FA 10 ,G10E** (Grade)

KDS series: Brazed carbide drill with coolant holes

Drill diameter **10,2** mm

10: Effective drilling length

FA: Extra long type brazed carbide drill with special flutes (Helix angle: 25° ⇨ 0°)

■ Recommended Cutting Conditions

(v_c : Cutting Speed (m/min), f : Feed rate (mm/rev)) (Min – **Standard** – Max)

Diameter (mm)		Cast Irons	Aluminium Alloys	Remarks
~ ø12	v_c	30 – **55** – 60	50 – **70** – 90	To avoid the drill bending, which can cause breakage, please pre-drill or reduce the cutting conditions at the entrance of hole; RPM: 100 ~ 300, f : 0,05 ~ 0,08 mm/rev. Higher feed rates and deep holes require high coolant pressure. Cutting fluid : Water soluble oil Cutting fluid pressure : 4 ~ 10 bar
	f	0,1 – **0,2** – 0,25	0,1 – **0,2** – 0,3	
~ ø20	v_c	40 – **60** – 70	60 –**70** – 100	
	f	0,2 – **0,3** – 0,4	0,3 – **0,35** – 0,5	
~ ø30	v_c	40 – **60** – 70	70 – **100** – 150	
	f	0,3 – **0,4** – 0,5	0,3 – **0,4** – 0,5	

SMD Type



General Features

Fast accurate and ideal for drilling steels, this newly developed drill from SUMITOMO gives similar hole accuracy to that of regrindable drills renowned within the industry as being the ultimate hole making tool.

Advantages

- Available in diameters ranging from 12,0~42,5mm
- Drilling Depths to 8 x Diameter
- Optimised heat dissipation via precisely located coolant holes
- Maximised rigidity from newly developed clamping system
- High performance drilling of precision holes from solid
- 2 different type of head for general and smooth cutting

The newly developed tungsten carbide substrate with it's ultra hard smooth coating proved that against competition users can expect to see holes with tolerances similar to that of reaming and tool life almost doubled.



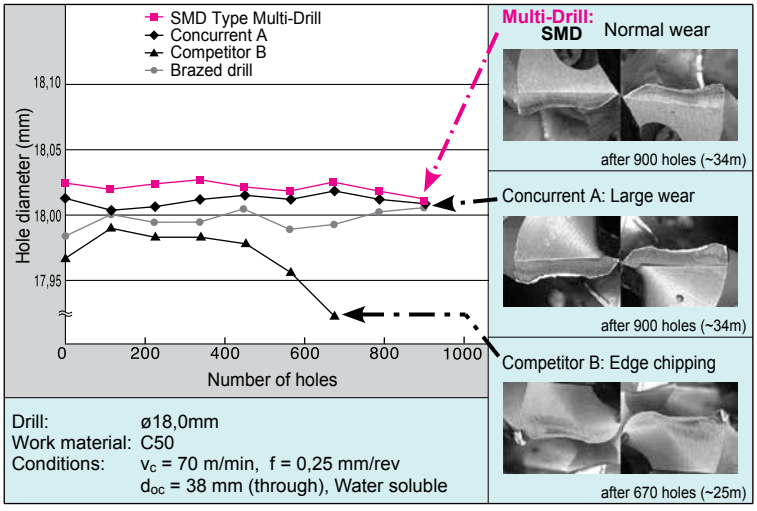
Edge security comes from replaceable drilling heads bolted to fixed radial serrations which provide a rigid and precise clamping platform.

Specially treated toughened steel body to resist wear and rust



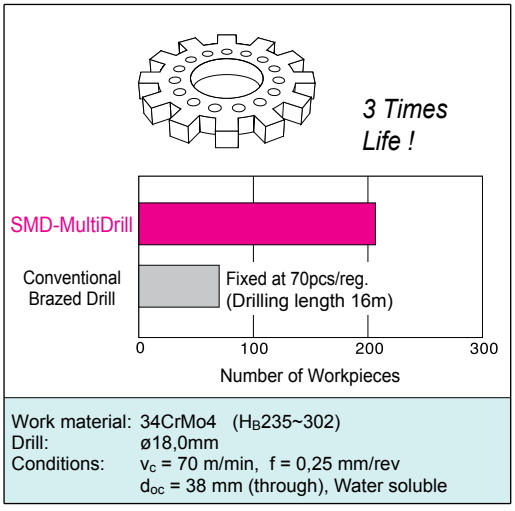
Through coolant holes positioned to optimise coolant pressure and direction.

Drilling Precision



Drill: ø18,0mm
Work material: C50
Conditions: v_c = 70 m/min, f = 0,25 mm/rev
d_{oc} = 38 mm (through), Water soluble

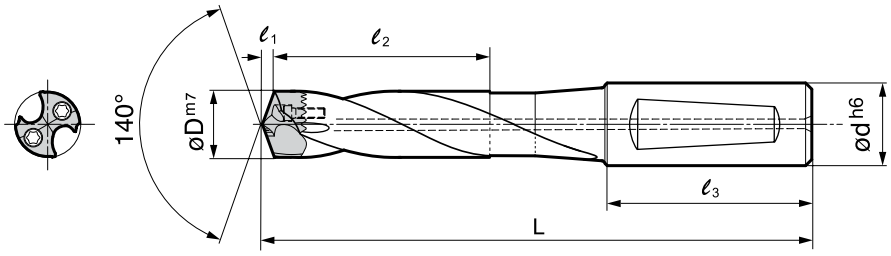
Application Example



Work material: 34CrMo4 (H_B235~302)
Drill: ø18,0mm
Conditions: v_c = 70 m/min, f = 0,25 mm/rev
d_{oc} = 38 mm (through), Water soluble

SMDH Type

● Holder



ℓ_2 = Effective drilling length

■ Holder

(mm)

Dimensions (mm)				Cat. No.	Short Series (3D)			Long Series (5D)			Deep Hole Series (8D)			Applicable Drill Head
Drill Head		Shank			Stock	Dimensions		Stock	Dimensions		Stock	Dimensions		
øD	ℓ_1	ød	ℓ_3		M3	L	ℓ_2	M5	L	ℓ_2	M8	L	ℓ_2	
12,0	2,2	16	48	**SMDH 120 □□**	●	107,2	38,0	●	132,2	63,0	–	–	–	SMDT 1200~1249 D MOL
12,5	2,3			**SMDH 125 □□**	●	107,3	37,8	●	132,3	62,8	–	–	–	SMDT 1250~1299 D MOL
13,0	2,4			**SMDH 130 □□**	●	112,4	40,5	●	142,4	67,5	–	–	–	SMDT 1300~1349 D MOL
14,0	2,5			**SMDH 140 □□**	●	119,0	45,5	●	149,0	74,5	●	194,0	117,5	SMDT 1350~1450 D MOL
15,0	2,7	20	50	**SMDH 150 □□**	●	129,2	48,0	●	159,2	79,0	●	204,2	126,0	SMDT 1451~1550 D MOL
16,0	2,9			**SMDH 160 □□**	●	134,4	51,5	●	169,4	84,5	●	214,4	133,5	SMDT 1551~1650 D MOL
17,0	3,1			**SMDH 170 □□**	●	139,6	54,0	●	174,6	89,0	●	224,6	142,0	SMDT 1651~1750 D MOL
18,0	3,3			**SMDH 180 □□**	●	144,8	57,5	●	179,8	94,5	●	229,8	149,5	SMDT 1751~1850 D MOL
19,0	3,5	25	56	**SMDH 190 □□**	●	160,1	60,0	●	195,0	99,0	●	255,0	158,0	SMDT 1851~1950 D MOL
20,0	3,6			**SMDH 200 □□**	●	160,1	63,5	●	200,1	104,5	●	265,6	165,5	SMDT 1951~2050 D MOL
21,0	3,8			**SMDH 210 □□**	●	160,3	66,0	●	200,3	109,0	●	270,3	174,0	SMDT 2051~2150 D MOL
22,0	4,0			**SMDH 220 □□**	●	165,1	69,1	●	205,1	114,1	●	275,1	181,1	SMDT 2151~2280 D MOL
23,0	4,2			**SMDH 230 □□**	●	164,8	71,0	●	214,8	118,1	●	284,8	189,1	SMDT 2281~2380 D MOL
24,0	4,4	32	60	**SMDH 240 □□**	●	174,6	74,2	●	224,6	123,2	●	299,6	196,2	SMDT 2381~2480 D MOL
25,0	4,6			**SMDH 250 □□**	●	174,6	75,5	●	229,6	127,5	●	304,6	204,5	SMDT 2481~2580 D MOL
26,0	4,7			**SMDH 260 □□**	●	179,7	79,0	●	234,7	133,0	●	314,7	212,0	SMDT 2581~2680 D MOL
27,0	4,9			**SMDH 270 □□**	●	179,9	80,5	●	239,9	137,5	●	324,9	220,5	SMDT 2681~2780 D MOL
28,0	5,1			**SMDH 280 □□**	●	185,1	83,0	●	245,1	143,0	●	330,1	228,0	SMDT 2781~2880 D MOL
29,0	5,3			**SMDH 290 □□**	●	190,3	85,5	●	250,3	147,5	●	340,3	236,5	SMDT 2881~2980 D MOL
30,0	5,5			**SMDH 300 □□**	●	190,5	89,0	●	260,5	152,0	●	350,5	244,0	SMDT 2981~3080 D MOL

■ Recommended Torque

Screw		Applicable Insert
	Torque (N·m)	
BXD 02208 IP	0,8 ~ 1,0	SMDT 1200 ~ 1550 M□L
BXD 02509 IP	0,9 ~ 1,2	SMDT 1551 ~ 1850 M□L
BXD 03011 IP	1,8 ~ 2,4	SMDT 1851 ~ 2150 M□L
BXD 03512 IP	2,8 ~ 3,7	SMDT 2151 ~ 2480 M□L
BXD 04014 IP	4,1 ~ 5,5	SMDT 2481 ~ 2780 M□L
BXD 04515 IP	5,0 ~ 6,6	SMDT 2781 ~ 3050 M□L

■ Spare Parts

Screw	Wrench	Applicable Holder
		
BXD 02208 IP	TRDR 08 IP	SMDH 120 ~ 150 M□
BXD 02509 IP	TRDR 10 IP	SMDH 160 ~ 180 M□
BXD 03011 IP	TRDR 15 IP	SMDH 190 ~ 210 M□
BXD 03512 IP	TRDR 15 IP	SMDH 220 ~ 240 M□
BXD 04014 IP	TRDR 20 IP	SMDH 250 ~ 270 M□
BXD 04515 IP	TRDR 25 IP	SMDH 280 ~ 300 M□



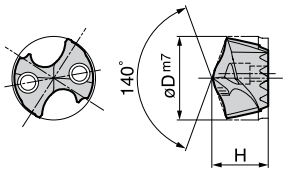
● = Euro stock

Regrindable Drill Head Insert
SMDT... D MTL Type

PVD coated grade: **ACX70**

Type MTL







Drill Head (Insert)

● øD: 12,0~15,3mm

øD (mm)	Cat. No.	Stock	H (mm)
12,0	SMDT 1200 D MTL	●	9,1
12,1	SMDT 1210 D MTL	●	9,1
12,2	SMDT 1220 D MTL	●	9,1
12,3	SMDT 1230 D MTL	●	9,1
12,4	SMDT 1240 D MTL	●	9,1
12,5	SMDT 1250 D MTL	●	9,4
12,6	SMDT 1260 D MTL	●	9,4
12,7	SMDT 1270 D MTL	●	9,4
12,8	SMDT 1280 D MTL	●	9,4
12,9	SMDT 1290 D MTL	●	9,4
13,0	SMDT 1300 D MTL	●	9,7
13,1	SMDT 1310 D MTL	●	9,7
13,2	SMDT 1320 D MTL	●	9,7
13,3	SMDT 1330 D MTL	●	9,7
13,4	SMDT 1340 D MTL	●	9,7
13,5	SMDT 1350 D MTL	●	10,3
13,6	SMDT 1360 D MTL	●	10,3
13,7	SMDT 1370 D MTL	●	10,3
13,8	SMDT 1380 D MTL	●	10,3
13,9	SMDT 1390 D MTL	●	10,3
14,0	SMDT 1400 D MTL	●	10,3
14,1	SMDT 1410 D MTL	●	10,3
14,2	SMDT 1420 D MTL	●	10,3
14,3	SMDT 1430 D MTL	●	10,3
14,4	SMDT 1440 D MTL	●	10,3
14,5	SMDT 1450 D MTL	●	10,3
14,6	SMDT 1460 D MTL	●	10,3
14,7	SMDT 1470 D MTL	●	10,3
14,8	SMDT 1480 D MTL	●	10,3
14,9	SMDT 1490 D MTL	●	10,3
15,0	SMDT 1500 D MTL	●	11,0
15,1	SMDT 1510 D MTL	●	11,0
15,2	SMDT 1520 D MTL	●	11,0
15,3	SMDT 1530 D MTL	●	11,0

● øD: 15,4~18,7mm

øD (mm)	Cat. No.	Stock	H (mm)
15,4	SMDT 1540 D MTL	●	11,0
15,5	SMDT 1550 D MTL	●	11,0
15,6	SMDT 1560 D MTL	●	11,0
15,7	SMDT 1570 D MTL	●	11,0
15,8	SMDT 1580 D MTL	●	11,0
15,9	SMDT 1590 D MTL	●	11,0
16,0	SMDT 1600 D MTL	●	11,6
16,1	SMDT 1610 D MTL	●	11,6
16,2	SMDT 1620 D MTL	●	11,6
16,3	SMDT 1630 D MTL	●	11,6
16,4	SMDT 1640 D MTL	●	11,6
16,5	SMDT 1650 D MTL	●	11,6
16,6	SMDT 1660 D MTL	●	11,6
16,7	SMDT 1670 D MTL	●	11,6
16,8	SMDT 1680 D MTL	●	11,6
16,9	SMDT 1690 D MTL	●	11,6
17,0	SMDT 1700 D MTL	●	12,2
17,1	SMDT 1710 D MTL	●	12,2
17,2	SMDT 1720 D MTL	●	12,2
17,3	SMDT 1730 D MTL	●	12,2
17,4	SMDT 1740 D MTL	●	12,2
17,5	SMDT 1750 D MTL	●	12,2
17,6	SMDT 1760 D MTL	●	12,2
17,7	SMDT 1770 D MTL	●	12,2
17,8	SMDT 1780 D MTL	●	12,2
17,9	SMDT 1790 D MTL	●	12,2
18,0	SMDT 1800 D MTL	●	12,9
18,1	SMDT 1810 D MTL	●	12,9
18,2	SMDT 1820 D MTL	●	12,9
18,3	SMDT 1830 D MTL	●	12,9
18,4	SMDT 1840 D MTL	●	12,9
18,5	SMDT 1850 D MTL	●	12,9
18,6	SMDT 1860 D MTL	●	12,9
18,7	SMDT 1870 D MTL	●	12,9

● øD: 18,8~30,5mm

øD (mm)	Cat. No.	Stock	H (mm)
18,8	SMDT 1880 D MTL	●	12,9
18,9	SMDT 1890 D MTL	●	12,9
19,0	SMDT 1900 D MTL	●	13,5
19,1	SMDT 1910 D MTL	●	13,5
19,2	SMDT 1920 D MTL	●	13,5
19,3	SMDT 1930 D MTL	●	13,5
19,4	SMDT 1940 D MTL	●	13,5
19,5	SMDT 1950 D MTL	●	13,5
19,6	SMDT 1960 D MTL	●	13,5
19,7	SMDT 1970 D MTL	●	13,5
19,8	SMDT 1980 D MTL	●	13,5
19,9	SMDT 1990 D MTL	●	13,5
20,0	SMDT 2000 D MTL	●	14,1
20,5	SMDT 2050 D MTL	●	14,1
21,0	SMDT 2100 D MTL	●	14,8
21,5	SMDT 2150 D MTL	●	14,8
22,0	SMDT 2200 D MTL	●	15,0
22,5	SMDT 2250 D MTL	●	15,0
23,0	SMDT 2300 D MTL	●	15,1
23,5	SMDT 2350 D MTL	●	15,1
24,0	SMDT 2400 D MTL	●	15,4
24,5	SMDT 2450 D MTL	●	15,4
25,0	SMDT 2500 D MTL	●	15,8
25,5	SMDT 2550 D MTL	●	15,8
26,0	SMDT 2600 D MTL	●	16,4
26,5	SMDT 2650 D MTL	●	16,4
27,0	SMDT 2700 D MTL	●	17,1
27,5	SMDT 2750 D MTL	●	17,1
28,0	SMDT 2800 D MTL	●	17,7
28,5	SMDT 2850 D MTL	●	17,7
29,0	SMDT 2900 D MTL	●	18,3
29,5	SMDT 2950 D MTL	●	18,3
30,0	SMDT 3000 D MTL	●	19,0
30,5	SMDT 3050 D MTL	●	19,0

Recommended Cutting Conditions

● For using **3xD** and **5xD** type drills

Drill Ø (mm) \ Work material		General steel (HB250~320)	Harden steel (HRC45)	Nodular cast iron
~ 16,0	v_c	70 – **100** – 120	40 – **60** – 90	50 – **60** – 80
	f	0,15 – **0,2** – 0,3	0,1 – **0,15** – 0,2	0,2 – **0,25** – 0,3
~ 20,0	v_c	70 – **100** – 120	40 – **70** – 90	50 – **70** – 90
	f	0,15 – **0,25** – 0,35	0,15 – **0,2** – 0,25	0,2 – **0,25** – 0,35
~ 30,8	v_c	70 – **100** – 120	40 – **60** – 90	50 – **70** – 90
	f	0,2 – **0,25** – 0,35	0,15 – **0,2** – 0,25	0,25 – **0,3** – 0,35

Note: High cutting performance is enhanced when using a high quality machine and rigid set up.

● For using **8xD** type drills

Drill Ø (mm) \ Work material		General steel (HB250~320)	Harden steel (HRC45)	Nodular cast iron
~ 16,0	v_c	50 – **70** – 80	30 – **50** – 70	40 – **50** – 70
	f	0,15 – **0,2** – 0,3	0,1 – **0,15** – 0,2	0,2 – **0,25** – 0,3
~ 20,0	v_c	50 – **70** – 80	30 – **50** – 70	40 – **60** – 80
	f	0,15 – **0,25** – 0,35	0,15 – **0,2** – 0,25	0,2 – **0,25** – 0,35
~ 30,8	v_c	50 – **70** – 80	30 – **50** – 70	40 – **60** – 80
	f	0,2 – **0,25** – 0,35	0,15 – **0,2** – 0,25	0,25 – **0,3** – 0,35

[v_c : Cutting Speed (m/min), f : Feed rate (mm/rev), Min - **Optimum** - Max]

Regrindable Drill Head Insert
SMDT... D MEL Type

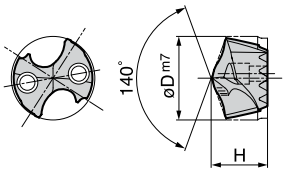
MEL Type for Smooth Cutting

(Soft Steel, Stainless Steel, Grey Cast Iron)

PVD coated grade: **ACX80**

Type MEL







Drill Head (Insert)

● øD: 12,0~15,3mm

øD (mm)	Cat. No.	Stock	H (mm)
12,0	**SMDT 1200 D MEL**	●	9,1
12,1	**SMDT 1210 D MEL**	●	9,1
12,2	**SMDT 1220 D MEL**	●	9,1
12,3	**SMDT 1230 D MEL**	●	9,1
12,4	**SMDT 1240 D MEL**	●	9,1
12,5	**SMDT 1250 D MEL**	●	9,4
12,6	**SMDT 1260 D MEL**	●	9,4
12,7	**SMDT 1270 D MEL**	●	9,4
12,8	**SMDT 1280 D MEL**	●	9,4
12,9	**SMDT 1290 D MEL**	●	9,4
13,0	**SMDT 1300 D MEL**	●	9,7
13,1	**SMDT 1310 D MEL**	●	9,7
13,2	**SMDT 1320 D MEL**	●	9,7
13,3	**SMDT 1330 D MEL**	●	9,7
13,4	**SMDT 1340 D MEL**	●	9,7
13,5	**SMDT 1350 D MEL**	●	10,3
13,6	**SMDT 1360 D MEL**	●	10,3
13,7	**SMDT 1370 D MEL**	●	10,3
13,8	**SMDT 1380 D MEL**	●	10,3
13,9	**SMDT 1390 D MEL**	●	10,3
14,0	**SMDT 1400 D MEL**	●	10,3
14,1	**SMDT 1410 D MEL**	●	10,3
14,2	**SMDT 1420 D MEL**	●	10,3
14,3	**SMDT 1430 D MEL**	●	10,3
14,4	**SMDT 1440 D MEL**	●	10,3
14,5	**SMDT 1450 D MEL**	●	10,3
14,6	**SMDT 1460 D MEL**	●	10,3
14,7	**SMDT 1470 D MEL**	●	10,3
14,8	**SMDT 1480 D MEL**	●	10,3
14,9	**SMDT 1490 D MEL**	●	10,3
15,0	**SMDT 1500 D MEL**	●	11,0
15,1	**SMDT 1510 D MEL**	●	11,0
15,2	**SMDT 1520 D MEL**	●	11,0
15,3	**SMDT 1530 D MEL**	●	11,0

● øD: 15,4~18,7mm

øD (mm)	Cat. No.	Stock	H (mm)
15,4	**SMDT 1540 D MEL**	●	11,0
15,5	**SMDT 1550 D MEL**	●	11,0
15,6	**SMDT 1560 D MEL**	●	11,0
15,7	**SMDT 1570 D MEL**	●	11,0
15,8	**SMDT 1580 D MEL**	●	11,0
15,9	**SMDT 1590 D MEL**	●	11,0
16,0	**SMDT 1600 D MEL**	●	11,6
16,1	**SMDT 1610 D MEL**	●	11,6
16,2	**SMDT 1620 D MEL**	●	11,6
16,3	**SMDT 1630 D MEL**	●	11,6
16,4	**SMDT 1640 D MEL**	●	11,6
16,5	**SMDT 1650 D MEL**	●	11,6
16,6	**SMDT 1660 D MEL**	●	11,6
16,7	**SMDT 1670 D MEL**	●	11,6
16,8	**SMDT 1680 D MEL**	●	11,6
16,9	**SMDT 1690 D MEL**	●	11,6
17,0	**SMDT 1700 D MEL**	●	12,2
17,1	**SMDT 1710 D MEL**	●	12,2
17,2	**SMDT 1720 D MEL**	●	12,2
17,3	**SMDT 1730 D MEL**	●	12,2
17,4	**SMDT 1740 D MEL**	●	12,2
17,5	**SMDT 1750 D MEL**	●	12,2
17,6	**SMDT 1760 D MEL**	●	12,2
17,7	**SMDT 1770 D MEL**	●	12,2
17,8	**SMDT 1780 D MEL**	●	12,2
17,9	**SMDT 1790 D MEL**	●	12,2
18,0	**SMDT 1800 D MEL**	●	12,9
18,1	**SMDT 1810 D MEL**	●	12,9
18,2	**SMDT 1820 D MEL**	●	12,9
18,3	**SMDT 1830 D MEL**	●	12,9
18,4	**SMDT 1840 D MEL**	●	12,9
18,5	**SMDT 1850 D MEL**	●	12,9
18,6	**SMDT 1860 D MEL**	●	12,9
18,7	**SMDT 1870 D MEL**	●	12,9

● øD: 18,8~30,5mm

øD (mm)	Cat. No.	Stock	H (mm)
18,8	**SMDT 1880 D MEL**	●	12,9
18,9	**SMDT 1890 D MEL**	●	12,9
19,0	**SMDT 1900 D MEL**	●	13,5
19,1	**SMDT 1910 D MEL**	●	13,5
19,2	**SMDT 1920 D MEL**	●	13,5
19,3	**SMDT 1930 D MEL**	●	13,5
19,4	**SMDT 1940 D MEL**	●	13,5
19,5	**SMDT 1950 D MEL**	●	13,5
19,6	**SMDT 1960 D MEL**	●	13,5
19,7	**SMDT 1970 D MEL**	●	13,5
19,8	**SMDT 1980 D MEL**	●	13,5
19,9	**SMDT 1990 D MEL**	●	13,5
20,0	**SMDT 2000 D MEL**	●	14,1
20,5	**SMDT 2050 D MEL**	●	14,1
21,0	**SMDT 2100 D MEL**	●	14,8
21,5	**SMDT 2150 D MEL**	●	14,8
22,0	**SMDT 2200 D MEL**	●	15,0
22,5	**SMDT 2250 D MEL**	●	15,0
23,0	**SMDT 2300 D MEL**	●	15,1
23,5	**SMDT 2350 D MEL**	●	15,1
24,0	**SMDT 2400 D MEL**	●	15,4
24,5	**SMDT 2450 D MEL**	●	15,4
25,0	**SMDT 2500 D MEL**	●	15,8
25,5	**SMDT 2550 D MEL**	●	15,8
26,0	**SMDT 2600 D MEL**	●	16,4
26,5	**SMDT 2650 D MEL**	●	16,4
27,0	**SMDT 2700 D MEL**	●	17,1
27,5	**SMDT 2750 D MEL**	●	17,1
28,0	**SMDT 2800 D MEL**	●	17,7
28,5	**SMDT 2850 D MEL**	●	17,7
29,0	**SMDT 2900 D MEL**	●	18,3
29,5	**SMDT 2950 D MEL**	●	18,3
30,0	**SMDT 3000 D MEL**	●	19,0
30,5	**SMDT 3050 D MEL**	●	19,0

Recommended Cutting Conditions

● For using **3xD** and **5xD** type drills

Drill Ø (mm) \ Work material		Soft steel (~HB250)	Stainless steel (~HB200)	Grey cast iron
~ 16,0	v_c	80 – **100** – 120	50 – **60** – 80	50 – **70** – 90
	f	0,15 – **0,2** – 0,35	0,1 – **0,15** – 0,2	0,2 – **0,25** – 0,3
~ 20,0	v_c	80 – **100** – 120	60 – **70** – 90	60 – **80** – 100
	f	0,15 – **0,25** – 0,35	0,15 – **0,2** – 0,25	0,25 – **0,3** – 0,35
~ 30,8	v_c	80 – **100** – 120	60 – **70** – 90	60 – **80** – 100
	f	0,2 – **0,3** – 0,35	0,15 – **0,2** – 0,25	0,2 – **0,35** – 0,40

Note: High cutting performance is enhanced when using a high quality machine and rigid set up.

● For using **8xD** type drills

Drill Ø (mm) \ Work material		Soft steel (~HB250)	Stainless steel (~HB200)	Grey cast iron
~ 16,0	v_c	50 – **70** – 80	40 – **50** – 60	40 – **60** – 80
	f	0,15 – **0,2** – 0,35	0,1 – **0,15** – 0,2	0,2 – **0,25** – 0,3
~ 20,0	v_c	50 – **70** – 80	40 – **60** – 70	50 – **70** – 90
	f	0,15 – **0,25** – 0,35	0,15 – **0,2** – 0,25	0,25 – **0,3** – 0,35
~ 30,8	v_c	60 – **70** – 80	40 – **60** – 70	50 – **70** – 90
	f	0,2 – **0,3** – 0,35	0,15 – **0,2** – 0,25	0,2 – **0,35** – 0,4

[v_c : Cutting Speed (m/min), f : Feed rate (mm/rev), Min - **Optimum** - Max]

● = Euro stock

SMDT... MEL Type

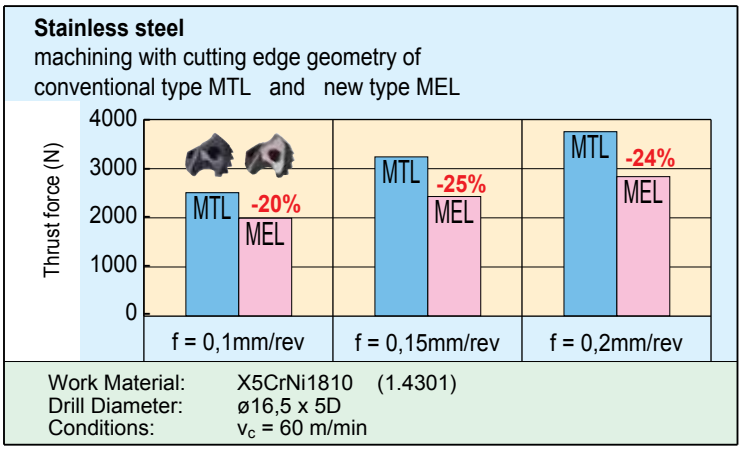


Advantages

- **Replaceable and regrindable drill head**
- **New design decreases cutting force by 25%**
- **Ideal for stainless steels - soft steels etc**
- **Excellent tool life when drilling cast iron**
- **Improves drilling performance on low powered machines**
- **Increases productivity**

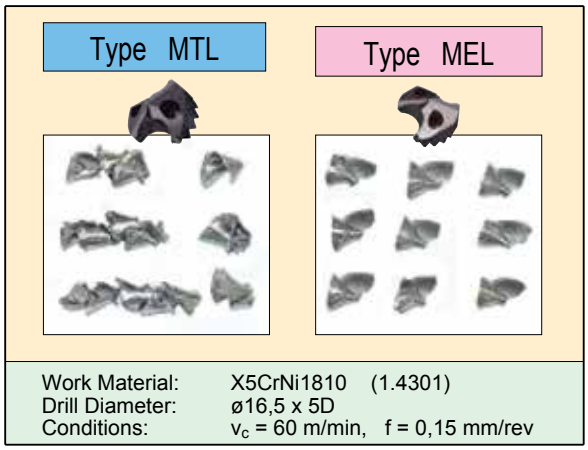
Performance (Stainless steel machinig)

Comparison of cutting force



Work Material: X5CrNi1810 (1.4301)
Drill Diameter: ø16,5 x 5D
Conditions: v_c = 60 m/min

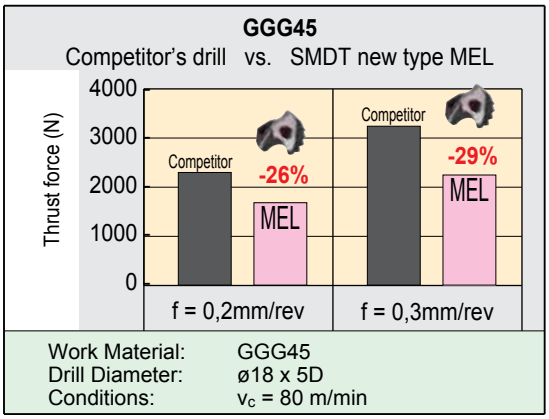
Chip comparison



Work Material: X5CrNi1810 (1.4301)
Drill Diameter: ø16,5 x 5D
Conditions: v_c = 60 m/min, f = 0,15 mm/rev

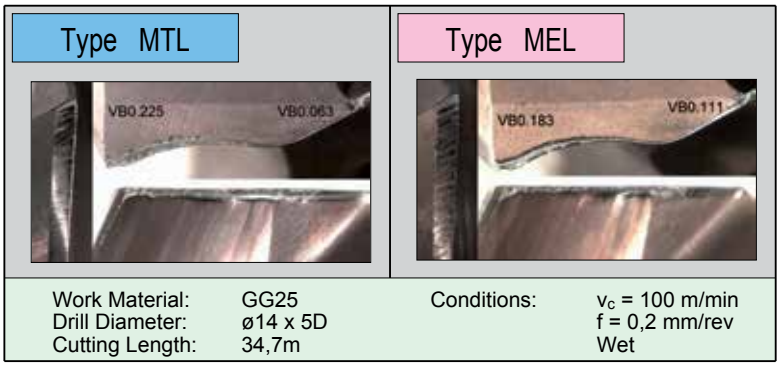
Performance (Cast iron machinig)

Comparison of cutting force



Work Material: GGG45
Drill Diameter: ø18 x 5D
Conditions: v_c = 80 m/min

Comparison of wear resistance



Work Material: GG25
Drill Diameter: ø14 x 5D
Cutting Length: 34,7m

Conditions: v_c = 100 m/min
f = 0,2 mm/rev
Wet

SMD Type

Large Hole MTL Type

New **For Large Holes**



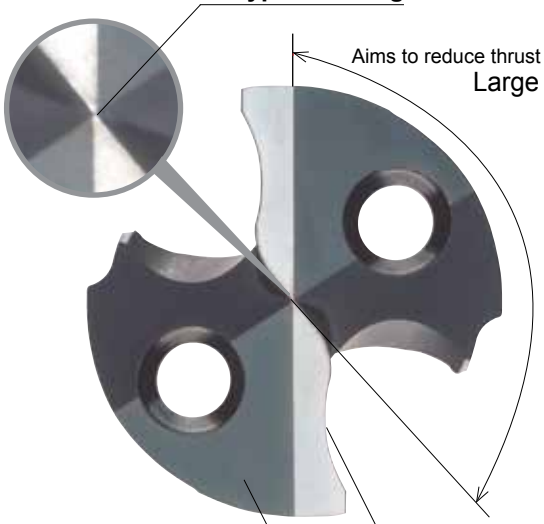
Tool edge design ideal for malleable material used for large casings, etc.
Edge design suitable for malleable material commonly used for large hole drilling.



Improved chip management
for highly malleable materials
Large Helix Angle Design

Reduces movement when starting the hole
X-Type Thinning

Aims to reduce thrust under heavy cutting
Large Thinning Angle



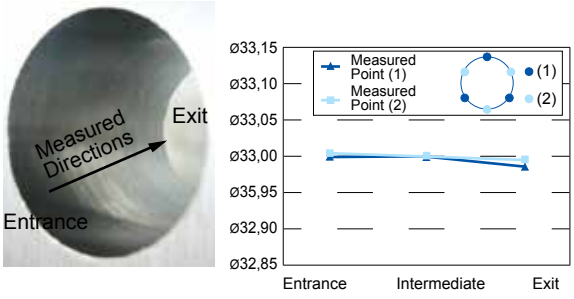
Designed to handle low
machine and clamp rigidity
Edge Treatment Exclusively for Large Diameters

Prevents unexpected breakage
when working with expensive materials
Robust Substrate

Machined Surface Accuracy

Work Material: St 52-3 (Base substrate for construction use)
Drill Size: Ø33,0mm x 5D
Cutting Conditions: v_c=120m/min, f=0,25mm/rev
Cutting Environment: Emulsion Type

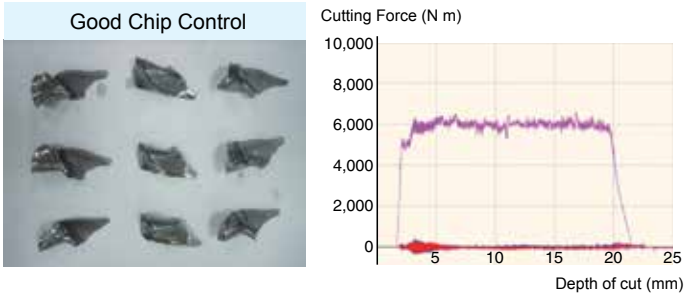
High drilling accuracy with large diameters



Cutting Force Comparison (Thrust)

Work Material: St 42-2 (Laminated plates)
Drill Size: Ø37,5mm x 5D
Cutting Conditions: v_c=90m/min, f=0,35mm/rev
Cutting Environment: Emulsion Type

Stable even when machining laminated plates



Recommended Cutting Conditions

v_C=Cutting Speed (m/min) f=Feed Rate (mm/rev)

Work Material		Soft Steel (~HB250)	General Steel (HB250~320)	Hardened Steel (HRC45)	Stainless Steel (~HB200)	Grey Cast Iron	Ductil Cast Iron
Recommended Head		**MTL** Type	**MTL** Type	**MTL** Type	**MTL** Type	**MTL** Type	**MTL** Type
Drill Ø (mm)	Cutt. Conditions						
~ 36,5	v_c	**60 ~ 120** (40 ~ 80)	**60 ~ 120** (40 ~ 80)	**40 ~ 80** (30 ~ 60)	**40 ~ 80** (30 ~ 60)	**50 ~ 100** (40 ~ 90)	**50 ~ 90** (40 ~ 70)
	f	0,25 ~ 0,4	0,2 ~ 0,35	0,15 ~ 0,3	0,15 ~ 0,25	0,25 ~ 0,45	0,25 ~ 0,35
~ 42,5	v_c	**60 ~ 120** (40 ~ 80)	**60 ~ 120** (40 ~ 80)	**40 ~ 80** (30 ~ 60)	**40 ~ 80** (30 ~ 60)	**50 ~ 100** (40 ~ 90)	**50 ~ 90** (40 ~ 70)
	f	0,25 ~ 0,4	0,2 ~ 0,35	0,15 ~ 0,3	0,15 ~ 0,25	0,25~ 0,45	0,25 ~ 0,35

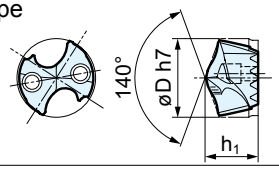
Note: Where machining and work clamp rigidity are good, conditions may be increased up to the maximum.
For 8D drills, please use feed rates stated within the ( ). Before drilling 8D holes, a guide hole of similar diameter must be made.

○ = Japan stock

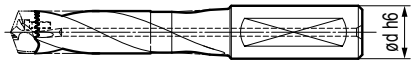
New

For Large Holes

● Indexable Head MTL Type



● Toolholder

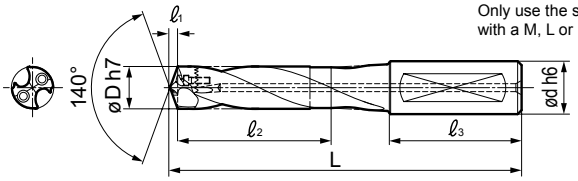


■ Drill Head (Ø31,0 to Ø42,5mm) Grade MTL Type - ACX80

■ Holders M (3D), L (5D), D (8D)

Drill Diameter ØD	Heads New MTL Type Cat. No.	Stock	h1	Toolholder M (3D) Cat. No.	Stock	L (5D) Cat. No.	Stock	D (8D) New Cat. No.	Stock
31,0	**SMDT 3100 MTL**	❍	15,2	**SMDH 320 M**	❍	**SMDH 320 L**	❍	**SMDH 320 D**	❍
31,5	**SMDT 3150 MTL**								
32,0	**SMDT 3200 MTL**	❍							
32,5	**SMDT 3250 MTL**		15,2	**SMDH 335 M**	❍	**SMDH 335 L**	❍	**SMDH 335 D**	❍
33,0	**SMDT 3300 MTL**	❍							
33,5	**SMDT 3350 MTL**								
34,0	**SMDT 3400 MTL**	❍	16,6	**SMDH 350 M**	❍	**SMDH 350 L**	❍	**SMDH 350 D**	❍
34,5	**SMDT 3450 MTL**								
35,0	**SMDT 3500 MTL**	❍							
35,5	**SMDT 3550 MTL**		16,4	**SMDH 365 M**	❍	**SMDH 365 L**	❍	**SMDH 365 D**	❍
36,0	**SMDT 3600 MTL**	❍							
36,5	**SMDT 3650 MTL**								
37,0	**SMDT 3700 MTL**	❍	18,1	**SMDH 380 M**	❍	**SMDH 380 L**	❍	**SMDH 380 D**	❍
37,5	**SMDT 3750 MTL**	❍							
38,0	**SMDT 3800 MTL**	❍							
38,5	**SMDT 3850 MTL**		17,8	**SMDH 395 M**	❍	**SMDH 395 L**	❍	**SMDH 395 D**	❍
39,0	**SMDT 3900 MTL**	❍							
39,5	**SMDT 3950 MTL**								
40,0	**SMDT 4000 MTL**	❍	19,5	**SMDH 410 M**	❍	**SMDH 410 L**	❍	**SMDH 410 D**	❍
40,5	**SMDT 4050 MTL**	❍							
41,0	**SMDT 4100 MTL**	❍							
41,5	**SMDT 4150 MTL**		19,3	**SMDH 425 M**	❍	**SMDH 425 L**	❍	**SMDH 425 D**	❍
42,0	**SMDT 4200 MTL**	❍							
42,5	**SMDT 4250 MTL**								

● Mounted Figure



Only use the special MTL Type head with a M, L or D type holder

Dimensions (mm) Drill Head øD	ℓ1	M (3D) ℓ2	M (3D) L	L (5D) ℓ2	L (5D) L	D (8D) ℓ2	D (8D) L	Shank ℓ3	Shank ød	Cap Screw	Wrench	Recommended Tightening Torque (N m)
31,0												
31,5	5,7	97,9	200,7	163	265,7	257,9	360,7	60	32,0	BXD04515IP	TRDR25IP	5 ~ 6,6
32,0												
32,5												
33,0	6,0	103,3	206,0	171,5	276,0	273,3	376,0	60	32,0			
33,5												
34,0												
34,5	6,3	106,8	221,3	182	296,3	287	401,3	70	40,0			
35,0												
35,5												
36,0	6,6	112,3	226,6	187,5	301,6	297,3	411,6	70	40,0			
36,5												
37,0												
37,5	6,8	115,8	231,8	195,8	311,8	310,8	426,8	70	40,0			
38,0												
38,5										BX0515	HD040	7,2
39,0	7,1	121,3	237,1	206,3	322,1	321,3	437,1	70	40,0			
39,5												
40,0												
40,5	7,4	129,8	252,4	209,8	332,4	334,8	457,4	70	40,0			
41,0												
41,5												
42,0	7,6	135,3	257,6	220,3	342,6	345,3	467,6	70	40,0			
42,5												

WDX Type

ECONOMICAL - FAST - ACCURATE - RIGID

High Feed Drilling - 4 Edge Inserts



General Features

The newly designed WDX drill features indexable inserts with 4 cutting edges and a range of optimised chipbreakers;
light (L) - general purpose (G) - heavy (H) for rapid chip removal.

The balanced cut design maximises feed rates and accuracy whilst the super ZX ultra hard coated inserts double the tool life.

Advantages

● Rigid - Economical - Multi-function

Drills - Bores - External Turns
Diameter range 13,0 ~ 55,0 mm
Drilling depth ~ 2D, ~ 3D, ~ 4D, ~ 5D

● Excellent chip control

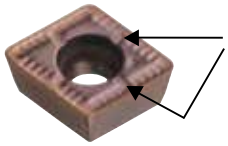
Wide application suitability - choose from 3 styles of chipbreaker



L Type
- Excellent chip control under low feed rate conditions
- Excellent hole accuracy
- Excellent surface finish



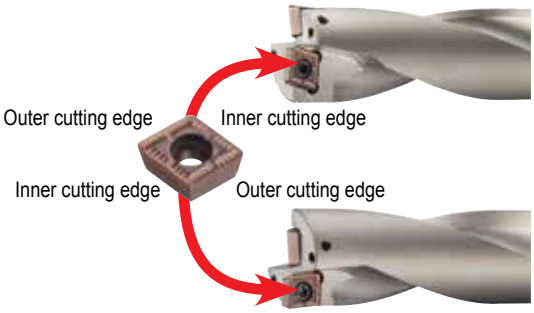
G Type
- General purpose chipbreaker
- Excellent chip control
- Low cutting force
- Low / medium feed rates



H Type
- Strong cutting edge at higher feed rates
- Stable machining ~ eliminates vibration and noise

● One insert style for both pockets

4 Edge insert provides both Inner and Outer cutting edges
Newly designed insert style simplifies insert management.

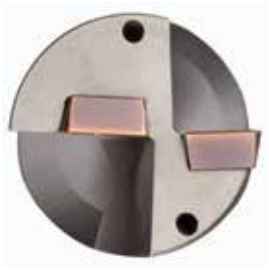


● Ultra hard Super ZX inserts double tool life

ACP300 for steels - stainless steels - difficult to cut materials
ACK300 for cast irons

● Excellent hole accuracy

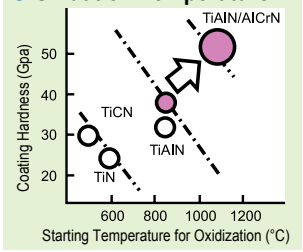
Improved cutting force balance and insert design for optimum performance



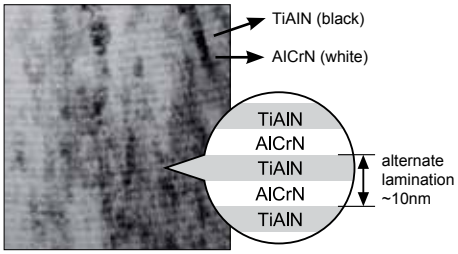
● Features of Super ZX Coating

- Super-multi layered coating with ultra-thin (nanometer) layers of TiAlN and AlCrN, alternately stacked up to 1.000 layers.
- 40% increase in coating hardness and 200% increase in oxidation temperature as compared with conventional grades

● Oxidation Temperature



● Coating Structure



"AURORA" Coating DLC (Diamond Like Carbon)

Coated Grade **DL1500** for Aluminium

G Type



● Super smooth surface and low coefficient of friction

Achieving beautiful finishing on Aluminium and non-ferrous metalls with its high resistance to build-up edge.

Peripheral Insert	
DL1500	ACK300
	

Central Insert	
DL1500	ACK300
	

● = Euro stock
○ = Japan stock

WDX Type (2D)



Max. Depth : 2 x øD

Fig. 1

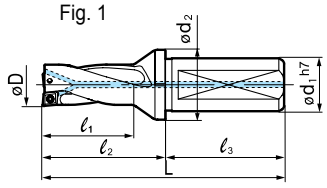


Fig. 2

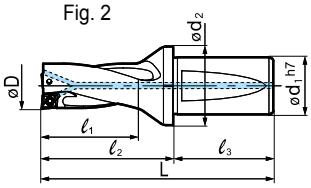
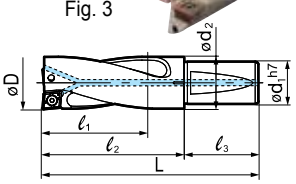


Fig. 3



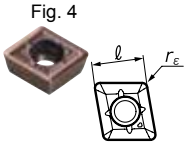
Holder

øD (mm)	Cat. No.	Stock	Dimensions (mm) L	ℓ1	ℓ2	ød1	ød2	ℓ3	Applicable Insert	Fig.
13,0	WDX 130D2S20	●	88	29	44					
13,5	WDX 135D2S20	●	89	30	45					
14,0	WDX 140D2S20	●	90	31	46	20	28	44	WDXT 042004	
14,5	WDX 145D2S20	●	91	32	47					
15,0	WDX 150D2S20	●	92	33	48					
15,5	WDX 155D2S20	●	93	34	49					
16,0	WDX 160D2S20	●	94	35	50	20	30	44	WDXT 052504	
16,5	WDX 165D2S20	●	95	36	51					
17,0	WDX 170D2S20	●	96	37	52					
17,5	WDX 175D2S25	●	109	38	53	25	32	56		
18,0	WDX 180D2S25	●	110	39	54					
18,5	WDX 185D2S25	●	111	40	55					
19,0	WDX 190D2S25	●	112	41	56					
19,5	WDX 195D2S25	●	113	42	57					
20,0	WDX 200D2S25	●	114	43	58					
20,5	WDX 205D2S25	●	115	44	59	25	33	56	WDXT 063006	1
21,0	WDX 210D2S25	●	116	45	60					
21,5	WDX 215D2S25	●	117	46	61					
22,0	WDX 220D2S25	●	118	47	62					
22,5	WDX 225D2S25	●	119	48	63					
23,0	WDX 230D2S25	●	123	49	67					
23,5	WDX 235D2S25	●	124	50	68					
24,0	WDX 240D2S25	●	125	51	69	25	37	56		
24,5	WDX 245D2S25	●	126	52	70					
25,0	WDX 250D2S25	●	127	53	71					
25,5	WDX 255D2S32	●	134	54	74				WDXT 073506	
26,0	WDX 260D2S32	●	135	55	75					
26,5	WDX 265D2S32	●	136	56	76					
27,0	WDX 270D2S32	●	137	57	77	32	41	60		
27,5	WDX 275D2S32	●	138	58	78					
28,0	WDX 280D2S32	●	139	59	79					
28,5	WDX 285D2S32	●	140	60	80					
29,0	WDX 290D2S32	●	143	62	83	32	50	60		
29,5	WDX 295D2S32	●	144	63	84					
30,0	WDX 300D2S40	●	158	64	88					
31,0	WDX 310D2S40	●	160	66	90					
32,0	WDX 320D2S40	●	162	68	92					
33,0	WDX 330D2S40	●	164	70	94	40	54	70	WDXT 094008	
34,0	WDX 340D2S40	●	166	72	96					
35,0	WDX 350D2S40	●	168	74	98					
36,0	WDX 360D2S40	●	170	76	100					2
37,0	WDX 370D2S40	●	179	79	109					
38,0	WDX 380D2S40	●	181	81	111					
39,0	WDX 390D2S40	●	183	83	113					
40,0	WDX 400D2S40	●	185	85	115					
41,0	WDX 410D2S40	●	187	87	117	40	49,5	70	WDXT 125012	
42,0	WDX 420D2S40	●	189	89	119					
43,0	WDX 430D2S40	●	191	91	121					
44,0	WDX 440D2S40	●	193	93	123					
45,0	WDX 450D2S40	●	195	95	125					
46,0	WDX 460D2S40	●	197	97	127					
47,0	WDX 470D2S40	●	199	99	129					
48,0	WDX 480D2S40	●	201	101	131		49,5			
49,0	WDX 490D2S40	●	203	103	133					
50,0	WDX 500D2S40	●	205	105	135	40		70	WDXT 156012	
51,0	WDX 510D2S40	●	207	107	137					
52,0	WDX 520D2S40	●	209	109	139		50,5			
53,0	WDX 530D2S40	●	211	111	141		51,5			
54,0	WDX 540D2S40	●	213	113	143		52,5			
55,0	WDX 550D2S40	●	215	115	145		53,5			
56,0	WDX 560D2S40	❍	222	120	152		54			
57,0	WDX 570D2S40	❍	224	122	154		55			
58,0	WDX 580D2S40	❍	226	124	156		56			3
59,0	WDX 590D2S40	❍	228	126	158		57			
60,0	WDX 600D2S40	❍	230	128	160	40	58	70	WDXT 186012	
61,0	WDX 610D2S40	❍	232	130	162		59			
62,0	WDX 620D2S40	❍	234	132	164		60			
63,0	WDX 630D2S40	❍	236	134	166		61			
64,0	WDX 640D2S40	❍	238	136	168		62			
65,0	WDX 650D2S40	❍	240	138	170		63			

Inserts

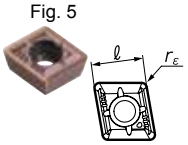
(mm)

Fig. 4



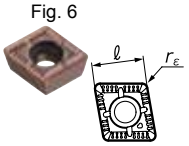
L Type
Excellent chip control at low feed rates

Fig. 5



G Type
General purpose chipbreaker

Fig. 6



H Type
Strong cutting edge at higher feed rates

Cat. No.	Coated ACP300	ACK300	DL1500	Fig.	Dimensions (mm) ℓ	Thickness	rε	Applicable Holder
WDXT 042004-L	●	●		4				
WDXT 042004-G	●	●	●	5	4,2	2,0	0,4	WDX 130 ~ 150
WDXT 042004-H	●	●		6				
WDXT 052504-L	●	●		4				
WDXT 052504-G	●	●	●	5	5,0	2,5	0,4	WDX 155 ~ 180
WDXT 052504-H	●	●		6				
WDXT 063006-L	●	●		4				
WDXT 063006-G	●	●	●	5	6,0	3,0	0,6	WDX 185 ~ 225
WDXT 063006-H	●	●		6				
WDXT 073506-L	●	●		4				
WDXT 073506-G	●	●	●	5	7,5	3,5	0,6	WDX 230 ~ 285
WDXT 073506-H	●	●		6				
WDXT 094008-L	●	●		4				
WDXT 094008-G	●	●	●	5	9,6	4,0	0,8	WDX 290 ~ 360
WDXT 094008-H	●	●		6				
WDXT 125012-L	●	●		4				
WDXT 125012-G	●	●	●	5	12,4	5,0	1,2	WDX 370 ~ 450
WDXT 125012-H	●	●		6				
WDXT 156012-L	●	●		4				
WDXT 156012-G	●	●	●	5	15,2	6,0	1,2	WDX 460 ~ 550
WDXT 156012-H	●	●		6				
WDXT 186012-G	❍	❍		5	18,0	6,0	1,2	WDX 560 ~ 650

Spare Parts

Screw	Wrench	Wrench	Applicable Holders	Recommended Torque (Nm)
				
BFTX 01604 N	TRX 06	–	WDX 130DCS20 ~ 150DCS20	0,3
BFTX 0204 N	TRX 06	–	WDX 155DCS20 ~ 180DCS25	0,5
BFTY 02206	–	TRD 07	WDX 185DCS25 ~ 225DCS25	1,0
BFTX 02506 N	–	TRD 08	WDX 230DCS25 ~ 285DCS32	1,5
BFTX 03584	–	TRD 15	WDX 290DCS32 ~ 360DCS40	3,5
BFTX 0511 N	–	TRD 20	WDX 370DCS40 ~ 450DCS40	5,0
BFTX 0615 N	–	TRD 25	WDX 460DCS40 ~ 650DCS40	5,0

Identification of Drill Body

WDX 200 D2 S25

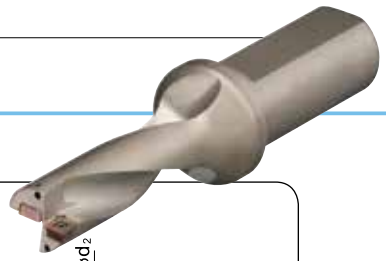
- 200 — Drill Diameter (ø20,0 mm)
- D2 — Flute Length L/D (2 x D)
- S25 — Shank Size (ø25,0 mm)

Identification of Indexable Insert

WDXT 06 30 06 -G

- 06 — Width Across Flats (6,0 mm)
- 30 — Thickness (3,0 mm)
- 06 — Corner Radius (0,6 mm)
- -G — Breaker Type

WDX Type (3D)



Max. Depth : 3 x øD

Fig. 1

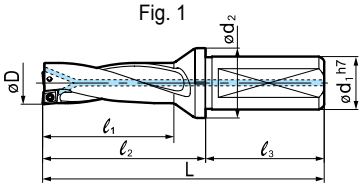


Fig. 2

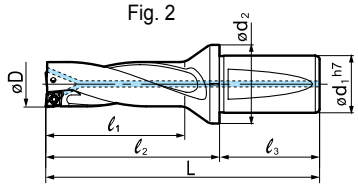
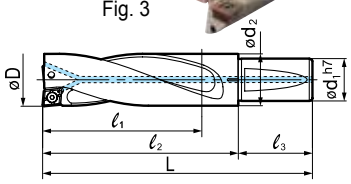


Fig. 3



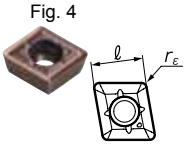
Holder

øD (mm)	Cat. No.	Stock	Dimensions (mm) L	ℓ1	ℓ2	ød1	ød2	ℓ3	Applicable Insert	Fig.
13,0	WDX 130D3S20	●	101,0	42,0	57,0					
13,5	WDX 135D3S20	●	102,5	43,5	58,5					
14,0	WDX 140D3S20	●	104,0	45,0	60,0	20	28	44	WDXT 042004	
14,5	WDX 145D3S20	●	105,5	46,5	61,5					
15,0	WDX 150D3S20	●	107,0	58,0	63,0					
15,5	WDX 155D3S20	●	108,5	49,5	64,5					
16,0	WDX 160D3S20	●	110,0	51,0	66,0	20	30	44	WDXT 052504	
16,5	WDX 165D3S20	●	111,5	52,5	67,5					
17,0	WDX 170D3S20	●	113,0	54,0	69,0					
17,5	WDX 175D3S25	●	126,5	55,5	70,5	25	32	56		
18,0	WDX 180D3S25	●	128,0	57,0	72,0					
18,5	WDX 185D3S25	●	129,5	58,5	73,5					
19,0	WDX 190D3S25	●	131,0	60,0	75,0					
19,5	WDX 195D3S25	●	132,5	61,5	76,5					
20,0	WDX 200D3S25	●	134,0	63,0	78,0					
20,5	WDX 205D3S25	●	135,5	64,5	79,5	25	33	56	WDXT 063006	1
21,0	WDX 210D3S25	●	137,0	66,0	81,0					
21,5	WDX 215D3S25	●	138,5	67,5	82,5					
22,0	WDX 220D3S25	●	140,0	69,0	84,0					
22,5	WDX 225D3S25	●	141,5	70,5	85,5					
23,0	WDX 230D3S25	●	146,0	72,0	90,0					
23,5	WDX 235D3S25	●	147,5	73,5	91,5					
24,0	WDX 240D3S25	●	149,0	75,0	93,0	25	37	56		
24,5	WDX 245D3S25	●	150,5	76,5	94,5					
25,0	WDX 250D3S25	●	152,0	78,0	96,0					
25,5	WDX 255D3S32	●	159,5	79,5	97,5					
26,0	WDX 260D3S32	●	161,0	81,0	101,0					
26,5	WDX 265D3S32	●	162,5	82,5	102,5					
27,0	WDX 270D3S32	●	164,0	84,0	104,0	32	41	60	WDXT 073506	
27,5	WDX 275D3S32	●	165,5	85,5	105,5					
28,0	WDX 280D3S32	●	167,0	87,0	107,0					
28,5	WDX 285D3S32	●	168,5	88,5	108,5					
29,0	WDX 290D3S32	●	172,0	91,0	112,0	32	50	60		
29,5	WDX 295D3S32	●	173,5	92,5	113,5					
30,0	WDX 300D3S40	●	188,0	94,0	118,0					
31,0	WDX 310D3S40	●	191,0	97,0	121,0					
32,0	WDX 320D3S40	●	194,0	100,0	124,0					
33,0	WDX 330D3S40	●	197,0	103,0	127,0	40	54	70	WDXT 094008	
34,0	WDX 340D3S40	●	200,0	106,0	130,0					
35,0	WDX 350D3S40	●	203,0	109,0	133,0					
36,0	WDX 360D3S40	●	206,0	112,0	136,0					2
37,0	WDX 370D3S40	●	216,0	116,0	146,0					
38,0	WDX 380D3S40	●	219,0	119,0	149,0					
39,0	WDX 390D3S40	●	222,0	122,0	152,0					
40,0	WDX 400D3S40	●	225,0	125,0	155,0					
41,0	WDX 410D3S40	●	228,0	128,0	158,0	40	49,5	70	WDXT 125012	
42,0	WDX 420D3S40	●	231,0	131,0	161,0					
43,0	WDX 430D3S40	●	234,0	134,0	164,0					
44,0	WDX 440D3S40	●	237,0	137,0	167,0					
45,0	WDX 450D3S40	●	240,0	140,0	170,0					
46,0	WDX 460D3S40	●	243,0	143,0	173,0					
47,0	WDX 470D3S40	●	246,0	146,0	176,0					
48,0	WDX 480D3S40	●	249,0	149,0	179,0		49,5			
49,0	WDX 490D3S40	●	252,0	152,0	182,0					
50,0	WDX 500D3S40	●	255,0	155,0	185,0					
51,0	WDX 510D3S40	●	258,0	158,0	188,0	40		70	WDXT 156012	
52,0	WDX 520D3S40	●	261,0	161,0	191,0		50,5			
53,0	WDX 530D3S40	●	264,0	164,0	194,0		51,5			
54,0	WDX 540D3S40	●	267,0	167,0	197,0		52,5			
55,0	WDX 550D3S40	●	270,0	170,0	200,0		53,5			
56,0	WDX 560D3S40	○	278,0	176,0	208,0		54			
57,0	WDX 570D3S40	○	281,0	179,0	211,0		55			
58,0	WDX 580D3S40	○	284,0	182,0	214,0		56			3
59,0	WDX 590D3S40	○	287,0	185,0	217,0		57			
60,0	WDX 600D3S40	○	290,0	188,0	220,0	40	58	70	WDXT 186012	
61,0	WDX 610D3S40	○	293,0	191,0	223,0		59			
62,0	WDX 620D3S40	○	296,0	194,0	226,0		60			
63,0	WDX 630D3S40	○	299,0	197,0	229,0		61			
64,0	WDX 640D3S40	○	302,0	200,0	232,0		62			
65,0	WDX 650D3S40	○	305,0	203,0	235,0		63			

Inserts

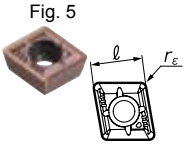
(mm)

Fig. 4



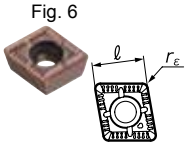
L Type
Excellent chip control at low feed rates

Fig. 5



G Type
General purpose chipbreaker

Fig. 6



H Type
Strong cutting edge at higher feed rates

Cat. No.	Coated ACP300	ACK300	DL1500	Fig.	Dimensions (mm) ℓ	Thickness	rε	Applicable Holder
WDXT 042004-L	●	●		4				
WDXT 042004-G	●	●	●	5	4,2	2,0	0,4	WDX 130 ~ 150
WDXT 042004-H	●	●		6				
WDXT 052504-L	●	●		4				
WDXT 052504-G	●	●	●	5	5,0	2,5	0,4	WDX 155 ~ 180
WDXT 052504-H	●	●		6				
WDXT 063006-L	●	●		4				
WDXT 063006-G	●	●	●	5	6,0	3,0	0,6	WDX 185 ~ 225
WDXT 063006-H	●	●		6				
WDXT 073506-L	●	●		4				
WDXT 073506-G	●	●	●	5	7,5	3,5	0,6	WDX 230 ~ 285
WDXT 073506-H	●	●		6				
WDXT 094008-L	●	●		4				
WDXT 094008-G	●	●	●	5	9,6	4,0	0,8	WDX 290 ~ 360
WDXT 094008-H	●	●		6				
WDXT 125012-L	●	●		4				
WDXT 125012-G	●	●	●	5	12,4	5,0	1,2	WDX 370 ~ 450
WDXT 125012-H	●	●		6				
WDXT 156012-L	●	●		4				
WDXT 156012-G	●	●	●	5	15,2	6,0	1,2	WDX 460 ~ 550
WDXT 156012-H	●	●		6				
WDXT 186012-G	❍	❍		5	18,0	6,0	1,2	WDX 560 ~ 650

Spare Parts

Screw	Wrench	Wrench	Applicable Holders	Recommended Torque (Nm)
				
BFTX 01604 N	TRX 06	–	WDX 130DO S20 ~ 150DO S20	0,3
BFTX 0204 N	TRX 06	–	WDX 155DO S20 ~ 180DO S25	0,5
BFTY 02206	–	TRD 07	WDX 185DO S25 ~ 225DO S25	1,0
BFTX 02506 N	–	TRD 08	WDX 230DO S25 ~ 285DO S32	1,5
BFTX 03584	–	TRD 15	WDX 290DO S32 ~ 360DO S40	3,5
BFTX 0511 N	–	TRD 20	WDX 370DO S40 ~ 450DO S40	5,0
BFTX 0615 N	–	TRD 25	WDX 460DO S40 ~ 650DO S40	5,0

Identification of Drill Body

WDX 200 D3 S25

- 200 — Drill Diameter (ø20,0 mm)
- D3 — Flute Length L/D (3 x D)
- S25 — Shank Size (ø25,0 mm)

Identification of Indexable Insert

WDXT 06 30 06 -G

- 06 — Width Across Flats (6,0 mm)
- 30 — Thickness (3,0 mm)
- 06 — Corner Radius (0,6 mm)
- -G — Breaker Type

● = Euro stock
○ = Japan stock

WDX Type (4D)



Max. Depth : 4 x øD

Fig. 1

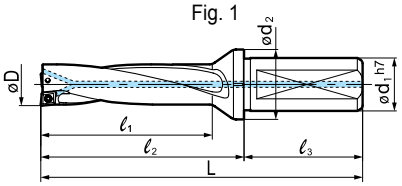


Fig. 2

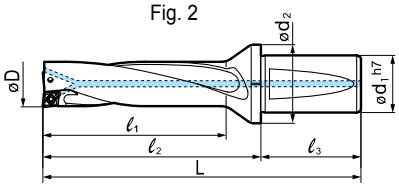
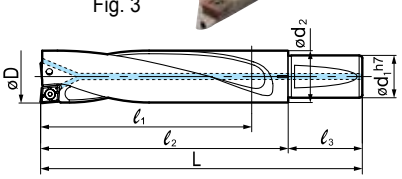


Fig. 3



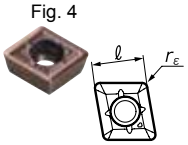
Holder

øD (mm)	Cat. No.	Stock	Dimensions (mm) L	ℓ1	ℓ2	ød1	ød2	ℓ3	Applicable Insert	Fig.
13,0	WDX 130D4S20	●	114	55	70	20	28	44	WDXT 042004	1
13,5	WDX 135D4S20	●	116	57	72					
14,0	WDX 140D4S20	●	118	59	74					
14,5	WDX 145D4S20	●	120	61	76					
15,0	WDX 150D4S20	●	122	63	78					
15,5	WDX 155D4S20	●	124	65	80	20	30	44	WDXT 052504	
16,0	WDX 160D4S20	●	126	67	82					
16,5	WDX 165D4S20	●	128	69	84					
17,0	WDX 170D4S20	●	130	71	86					
17,5	WDX 175D4S25	●	144	73	88	25	32	56		
18,0	WDX 180D4S25	●	146	75	90					
18,5	WDX 185D4S25	●	148	77	92	25	33	56	WDXT 063006	
19,0	WDX 190D4S25	●	150	79	94					
19,5	WDX 195D4S25	●	152	81	96					
20,0	WDX 200D4S25	●	154	83	98					
20,5	WDX 205D4S25	●	156	85	100					
21,0	WDX 210D4S25	●	158	87	102					
21,5	WDX 215D4S25	●	160	89	104					
22,0	WDX 220D4S25	●	162	91	106					
22,5	WDX 225D4S25	●	164	93	108					
23,0	WDX 230D4S25	●	169	95	113	25	37	56		
23,5	WDX 235D4S25	●	171	97	115					
24,0	WDX 240D4S25	●	173	99	117					
24,5	WDX 245D4S25	●	175	101	119					
25,0	WDX 250D4S25	●	177	103	121					
25,5	WDX 255D4S32	●	185	105	125	32	41	60	WDXT 073506	2
26,0	WDX 260D4S32	●	187	107	127					
26,5	WDX 265D4S32	●	189	109	129					
27,0	WDX 270D4S32	●	191	111	131					
27,5	WDX 275D4S32	●	193	113	133					
28,0	WDX 280D4S32	●	195	115	135					
28,5	WDX 285D4S32	●	197	117	137					
29,0	WDX 290D4S32	●	201	120	141	32	50	60	WDXT 094008	
29,5	WDX 295D4S32	●	203	122	143					
30,0	WDX 300D4S40	●	218	124	148	40	54	70		
31,0	WDX 310D4S40	●	222	128	152					
32,0	WDX 320D4S40	●	226	132	156					
33,0	WDX 330D4S40	●	230	136	160					
34,0	WDX 340D4S40	●	234	140	164					
35,0	WDX 350D4S40	●	238	144	168					
36,0	WDX 360D4S40	●	242	148	172					
37,0	WDX 370D4S40	●	253	153	183	40	49,5	70	WDXT 125012	
38,0	WDX 380D4S40	●	257	157	187					
39,0	WDX 390D4S40	●	261	161	191					
40,0	WDX 400D4S40	●	265	165	195					
41,0	WDX 410D4S40	●	269	169	199					
42,0	WDX 420D4S40	●	273	173	203					
43,0	WDX 430D4S40	●	277	177	207					
44,0	WDX 440D4S40	●	281	181	211					
45,0	WDX 450D4S40	●	285	185	215					
46,0	WDX 460D4S40	●	289	189	219	40	49,5	70	WDXT 156012	3
47,0	WDX 470D4S40	●	293	193	223					
48,0	WDX 480D4S40	●	297	197	227					
49,0	WDX 490D4S40	●	301	201	231					
50,0	WDX 500D4S40	●	305	205	235					
51,0	WDX 510D4S40	●	309	209	239					
52,0	WDX 520D4S40	●	313	213	243		50,5			
53,0	WDX 530D4S40	●	317	217	247		51,5			
54,0	WDX 540D4S40	●	321	221	251		52,5			
55,0	WDX 550D4S40	●	325	225	255		53,5			
56,0	WDX 560D4S40	❍	334	232	264	40	54	70	WDXT 186012	
57,0	WDX 570D4S40	❍	338	236	268		55			
58,0	WDX 580D4S40	❍	342	240	272		56			
59,0	WDX 590D4S40	❍	346	244	276		57			
60,0	WDX 600D4S40	❍	350	248	280		58			

Inserts

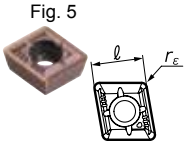
(mm)

Fig. 4



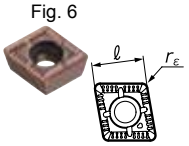
L Type
Excellent chip control at low feed rates

Fig. 5



G Type
General purpose chipbreaker

Fig. 6



H Type
Strong cutting edge at higher feed rates

Cat. No.	Coated ACP300	ACK300	DL1500	Fig.	Dimensions (mm) ℓ	Thickness	rε	Applicable Holder
WDXT 042004-L	●	●		4				
WDXT 042004-G	●	●	●	5	4,2	2,0	0,4	WDX 130 ~ 150
WDXT 042004-H	●	●		6				
WDXT 052504-L	●	●		4				
WDXT 052504-G	●	●	●	5	5,0	2,5	0,4	WDX 155 ~ 180
WDXT 052504-H	●	●		6				
WDXT 063006-L	●	●		4				
WDXT 063006-G	●	●	●	5	6,0	3,0	0,6	WDX 185 ~ 225
WDXT 063006-H	●	●		6				
WDXT 073506-L	●	●		4				
WDXT 073506-G	●	●	●	5	7,5	3,5	0,6	WDX 230 ~ 285
WDXT 073506-H	●	●		6				
WDXT 094008-L	●	●		4				
WDXT 094008-G	●	●	●	5	9,6	4,0	0,8	WDX 290 ~ 360
WDXT 094008-H	●	●		6				
WDXT 125012-L	●	●		4				
WDXT 125012-G	●	●	●	5	12,4	5,0	1,2	WDX 370 ~ 450
WDXT 125012-H	●	●		6				
WDXT 156012-L	●	●		4				
WDXT 156012-G	●	●	●	5	15,2	6,0	1,2	WDX 460 ~ 550
WDXT 156012-H	●	●		6				
WDXT 186012-G	❍	❍		5	18,0	6,0	1,2	WDX 560 ~ 650

Spare Parts

Screw	Wrench	Wrench	Applicable Holders	Recommended Torque (Nm)
				
BFTX 01604 N	TRX 06	–	WDX 130DOS20 ~ 150DOS20	0,3
BFTX 0204 N	TRX 06	–	WDX 155DOS20 ~ 180DOS25	0,5
BFTY 02206	–	TRD 07	WDX 185DOS25 ~ 225DOS25	1,0
BFTX 02506 N	–	TRD 08	WDX 230DOS25 ~ 285DOS32	1,5
BFTX 03584	–	TRD 15	WDX 290DOS32 ~ 360DOS40	3,5
BFTX 0511 N	–	TRD 20	WDX 370DOS40 ~ 450DOS40	5,0
BFTX 0615 N	–	TRD 25	WDX 460DOS40 ~ 600DOS40	5,0

Identification of Drill Body

WDX 200 D4 S25

- 200 — Drill Diameter (ø20,0 mm)
- D4 — Flute Length L/D (4 x D)
- S25 — Shank Size (ø25,0 mm)

Identification of Indexable Insert

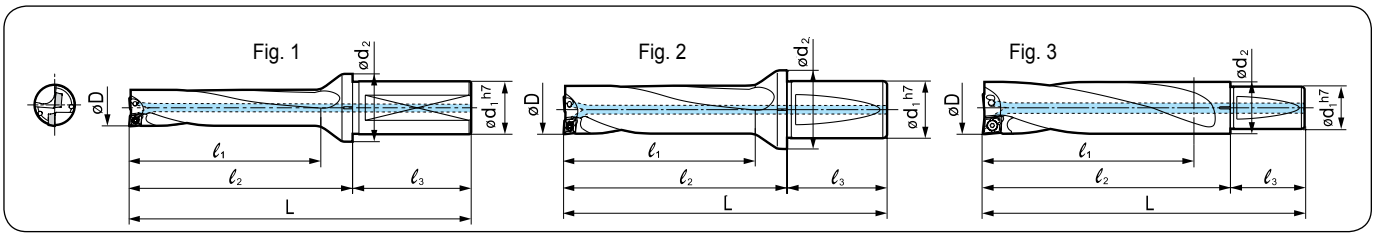
WDXT 06 30 06 -G

- 06 — Width Across Flats (6,0 mm)
- 30 — Thickness (3,0 mm)
- 06 — Corner Radius (0,6 mm)
- -G — Breaker Type

WDX Type (5D)



Max. Depth : 5 x øD



Holder

øD (mm)	Cat. No.	Stock	Dimensions (mm) L	ℓ1	ℓ2	ød1	ød2	ℓ3	Applicable Insert	Fig.
13,0	WDX 130D5S20	●	127,0	68,0	83,0	20	28	44	WDXT 042004	1
13,5	WDX 135D5S20	●	129,5	70,5	85,5					
14,0	WDX 140D5S20	●	132,0	73,0	88,0					
14,5	WDX 145D5S20	●	134,5	75,5	90,5					
15,0	WDX 150D5S20	●	137,0	78,0	93,0					
15,5	WDX 155D5S20	●	139,5	80,5	95,5	20	30	44	WDXT 052504	
16,0	WDX 160D5S20	●	142,0	83,0	98,0					
16,5	WDX 165D5S20	●	144,5	85,5	100,5					
17,0	WDX 170D5S20	●	147,0	88,0	103,0					
17,5	WDX 175D5S25	●	161,5	90,5	105,5	25	32	56		
18,0	WDX 180D5S25	●	164,0	93,0	108,0					
18,5	WDX 185D5S25	●	166,5	95,5	110,5	25	33	56	WDXT 063006	
19,0	WDX 190D5S25	●	169,0	98,0	113,0					
19,5	WDX 195D5S25	●	171,5	100,5	115,5					
20,0	WDX 200D5S25	●	174,0	103,0	118,0					
20,5	WDX 205D5S25	●	176,5	105,5	120,5					
21,0	WDX 210D5S25	●	179,0	108,0	123,0					
21,5	WDX 215D5S25	●	181,5	110,5	125,5					
22,0	WDX 220D5S25	●	184,0	113,0	128,0					
22,5	WDX 225D5S25	●	186,5	115,5	130,5					
23,0	WDX 230D5S25	●	192,0	118,0	136,0	25	37	56	WDXT 073506	
23,5	WDX 235D5S25	●	194,5	120,5	138,5					
24,0	WDX 240D5S25	●	197,0	123,0	141,0					
24,5	WDX 245D5S25	●	199,5	125,5	143,5					
25,0	WDX 250D5S25	●	202,0	128,0	146,0					
26,0	WDX 260D5S32	●	213,0	133,0	153,0	32	41	60		2
27,0	WDX 270D5S32	●	218,0	138,0	158,0					
28,0	WDX 280D5S32	●	223,0	143,0	163,0					
29,0	WDX 290D5S32	●	230,0	149,0	170,0	32	50	60		
30,0	WDX 300D5S40	●	248,0	154,0	178,0	40	54	70	WDXT 094008	
31,0	WDX 310D5S40	●	253,0	159,0	183,0					
32,0	WDX 320D5S40	●	258,0	164,0	188,0					
33,0	WDX 330D5S40	●	263,0	169,0	193,0					
34,0	WDX 340D5S40	●	268,0	174,0	198,0					
35,0	WDX 350D5S40	●	273,0	179,0	203,0					
36,0	WDX 360D5S40	●	278,0	184,0	208,0					

Inserts

(mm)



L Type
Excellent chip control at low feed rates

G Type
General purpose chipbreaker

H Type
Strong cutting edge at higher feed rates

Cat. No.	Coated ACP300	ACK300	DL1500	Fig.	Dimensions (mm) ℓ	Thickness	rε	Applicable Holder
WDXT 042004-L	●	●		4	4,2	2,0	0,4	WDX 130 ~ 150
WDXT 042004-G	●	●	●	5				
WDXT 042004-H	●	●		6				
WDXT 052504-L	●	●		4	5,0	2,5	0,4	WDX 155 ~ 180
WDXT 052504-G	●	●	●	5				
WDXT 052504-H	●	●		6				
WDXT 063006-L	●	●		4	6,0	3,0	0,6	WDX 185 ~ 225
WDXT 063006-G	●	●	●	5				
WDXT 063006-H	●	●		6				
WDXT 073506-L	●	●		4	7,5	3,5	0,6	WDX 230 ~ 285
WDXT 073506-G	●	●	●	5				
WDXT 073506-H	●	●		6				
WDXT 094008-L	●	●		4	9,6	4,0	0,8	WDX 290 ~ 360
WDXT 094008-G	●	●	●	5				
WDXT 094008-H	●	●		6				
WDXT 125012-L	●	●		4	12,4	5,0	1,2	WDX 370 ~ 450
WDXT 125012-G	●	●	●	5				
WDXT 125012-H	●	●		6				
WDXT 156012-L	●	●		4	15,2	6,0	1,2	WDX 460 ~ 550
WDXT 156012-G	●	●	●	5				
WDXT 156012-H	●	●		6				

Spare Parts

Screw	Wrench	Wrench	Applicable Holders	Recommended Torque (Nm)
BFTX 01604 N	TRX 06	–	WDX 130DS20 ~ 150DS20	0,3
BFTX 0204 N	TRX 06	–	WDX 155DS20 ~ 180DS25	0,5
BFTY 02206	–	TRD 07	WDX 185DS25 ~ 225DS25	1,0
BFTX 02506 N	–	TRD 08	WDX 230DS25 ~ 285DS32	1,5
BFTX 03584	–	TRD 15	WDX 290DS32 ~ 360DS40	3,5
BFTX 0511 N	–	TRD 20	WDX 370DS40 ~ 450DS40	5,0
BFTX 0615 N	–	TRD 25	WDX 460DS40 ~ 550DS40	5,0

Identification of Drill Body

WDX 200 D5 S25

- 200 — Drill Diameter (ø20,0 mm)
- D5 — Flute Length L/D (5 x D)
- S25 — Shank Size (ø25,0 mm)

Identification of Indexable Insert

WDXT 06 30 06 -G

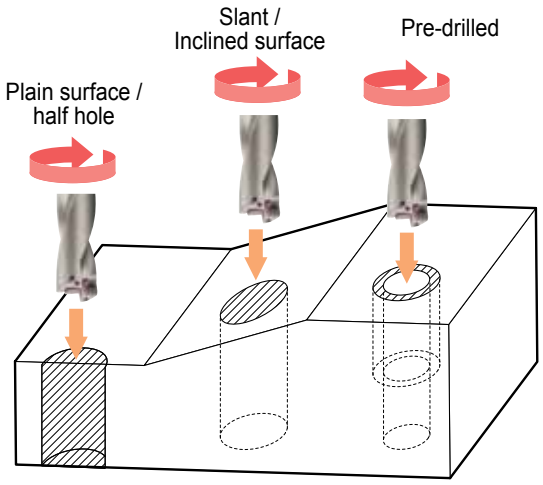
- 06 — Width Across Flats (6,0 mm)
- 30 — Thickness (3,0 mm)
- 06 — Corner Radius (0,6 mm)
- -G — Breaker Type

● = Euro stock
○ = Japan stock

Indexable Insert Type "SumiDrill"
WDX Type

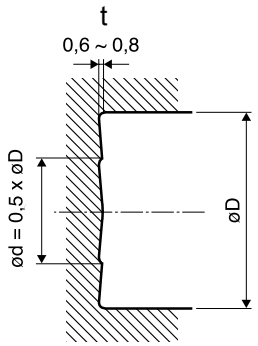
Multi-Purpose Functionality

● Applications for machining centre



Recommended conditions - reduce feed rate to 70%

● Hole profile

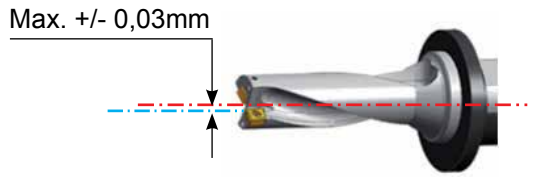


Drill Diameter	t (mm)
13,0 - 18,0	0,4
18,5 - 28,5	0,6
29,0 - 36,0	0,8
37,0 - 55,0	1,2

Applications for Lathes

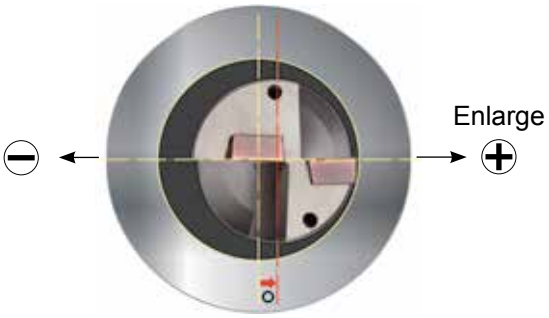
Setting Instruction

Ensure the face of the drill flange is hard against the face of the tool holder.
Align the centreline of the drill to the centreline of the lathes Y axis



Drilling Over Holes

Offset the lathes X axis within the maximum amount stated in the table



Drill description	Max. Offset (mm)	Drill description	Max. Offset (mm)
WDX130...	0,35	WDX280...	0,15
WDX135...	0,30	WDX285...	0,10
WDX140...	0,25	WDX290...	1,00
WDX145...	0,20	WDX295...	0,95
WDX150...	0,15	WDX300...	0,90
WDX155...	0,40	WDX310...	0,80
WDX160...	0,40	WDX320...	0,70
WDX165...	0,35	WDX330...	0,55
WDX170...	0,30	WDX340...	0,45
WDX175...	0,25	WDX350...	0,35
WDX180...	0,20	WDX360...	0,20
WDX185...	0,50	WDX370...	1,00
WDX190...	0,45	WDX380...	1,00
WDX195...	0,40	WDX390...	0,90
WDX200...	0,30	WDX400...	0,80
WDX205...	0,30	WDX410...	0,70
WDX210...	0,20	WDX420...	0,60
WDX215...	0,15	WDX430...	0,50
WDX220...	0,10	WDX440...	0,50
WDX225...	0,06	WDX450...	0,40
WDX230...	0,70	WDX460...	1,50
WDX235...	0,70	WDX470...	1,40
WDX240...	0,60	WDX480...	1,30
WDX245...	0,50	WDX490...	1,20
WDX250...	0,50	WDX500...	1,10
WDX255...	0,45	WDX510...	1,00
WDX260...	0,40	WDX520...	0,90
WDX265...	0,35	WDX530...	0,80
WDX270...	0,25	WDX540...	0,60
WDX275...	0,20	WDX550...	0,50

Recommended conditions - reduce feed rate to 30%

Turning by lathes

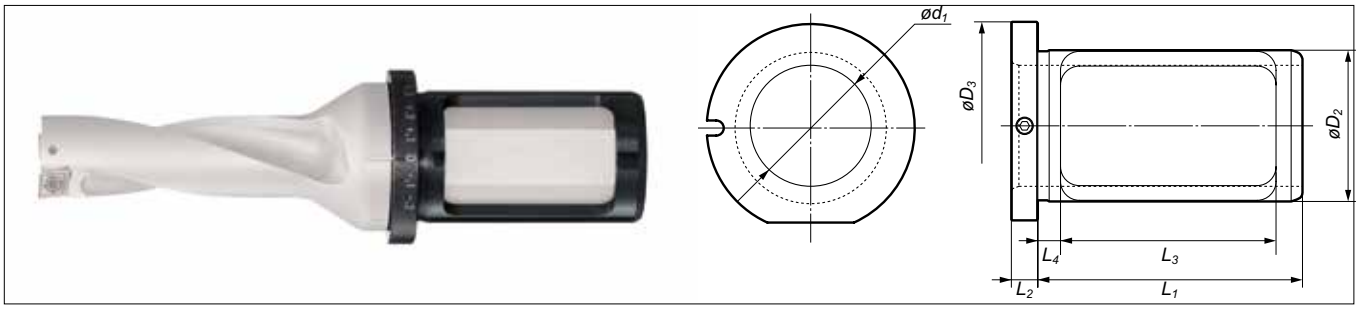


Recommended conditions - reduce feed rate to 50%

Eccentric Sleeve WAS Type

New

The Eccentric Sleeve WAS Type, exclusively designed for "SumiDrill" WDX Type, provides up to ±0,3mm of hole size adjustment.

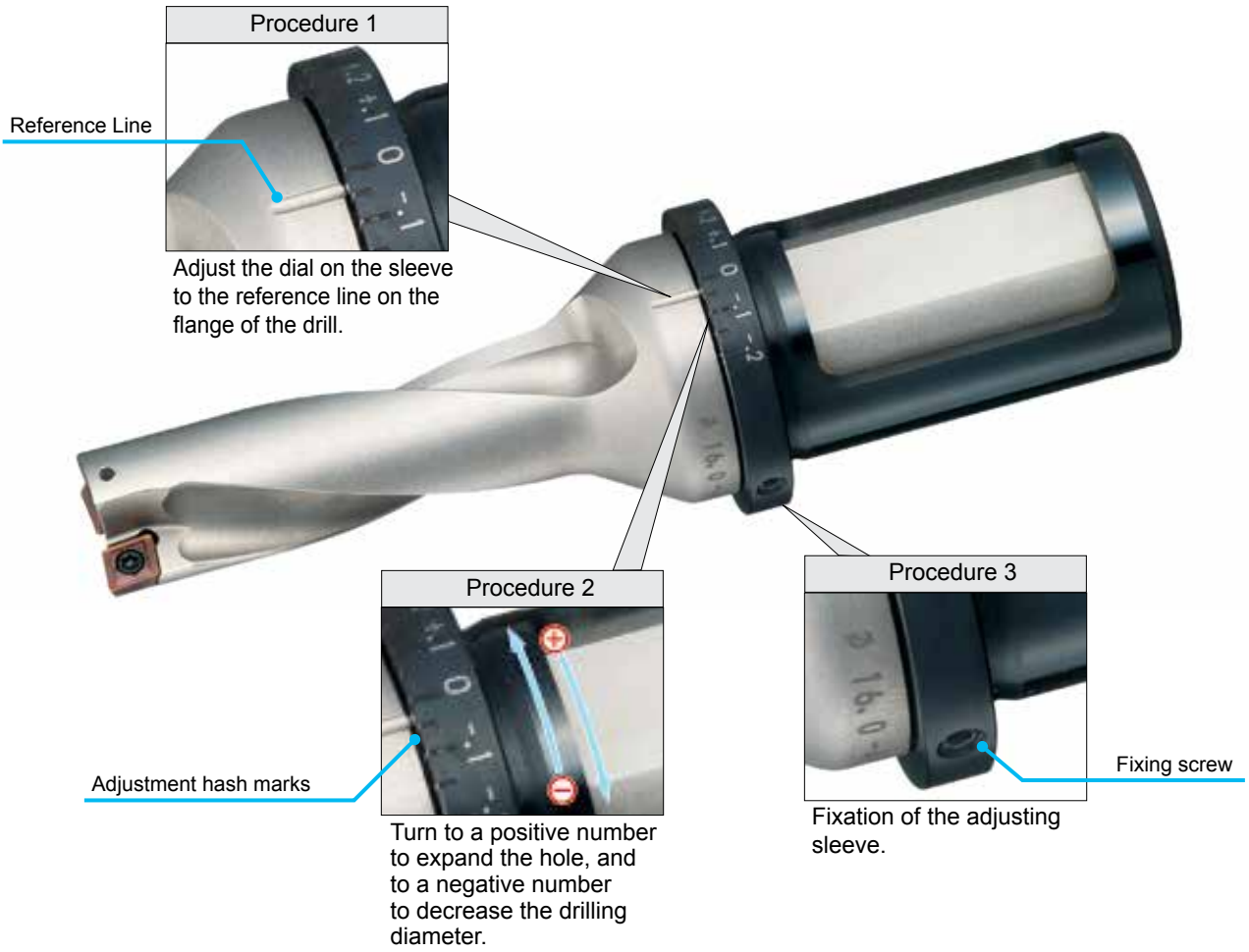


■ Dimensions

(mm)

Cat. No.	Stock	Ød1	ØD2	ØD3	L1	L2	L3	L4	Diameter Adjustment Range (max.)
WAS 2025-48	●	20	25	33	43	5	32	5	+0,3 ~ -0,2
WAS 2532-60	●	25	32	42	60	7	46	6	+0,3 ~ -0,3
WAS 3240-70	●	32	40	55	70	7	57	6	+0,3 ~ -0,3
WAS 4050-85	●	40	50	60	80	7	64	6	+0,3 ~ -0,3

■ Diameter Adjustment



Note 1: The dial is for reference purposes. Always measure the actual drilling diameter and adjust accordingly.
Note 2: Not usable with collet chuck type holders. Only use with a side-locking holder like Weldon.

● = Euro stock

■ Application Examples

"SumiDrill" WDX type


Normal wear


Good chip control

Competitor


Breakage


Long chips

Automotive Component (SUS304)
Drill Body: WDX220D2S25
Drill Insert: WDXT063006-L(ACP300)
Conditions: v_c=125m/min, f=0,07mm/rev, H=5mm, through, Wet

Insert breakage was eliminated with improved chip control and better surface finish.

"SumiDrill" WDX type

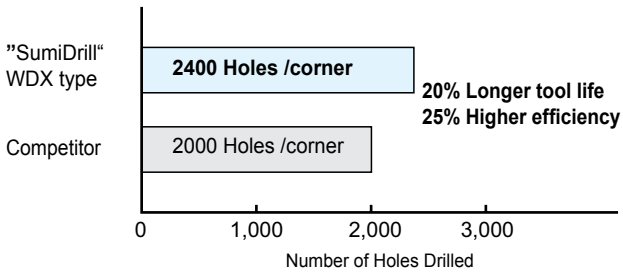

Good chip form

Competitor


Entangled chips

Structural Steel
Drill Body: WDX190D4S25
Drill Insert: WDXT063006-L(ACP300)
Conditions: v_c=100m/min, f=0,06mm/rev, H=40mm, through, Wet

Eliminated the problem of entangled chips.



Machine Component (SCM440)
Drill Body: WDX220D3S25
Drill Insert: WDXT063006-G(ACP300)
Conditions (Sumitomo): v_c=157m/min, f=0,19mm/rev, H=19mm, through, Wet
Conditions (Comp.): v_c=157m/min, f=0,15mm/rev, H=19mm, through, Wet

Good chip control even under high efficiency conditions.
Better stability through lower cutting force, resulting in 25% higher efficiency and 20% higher tool life.

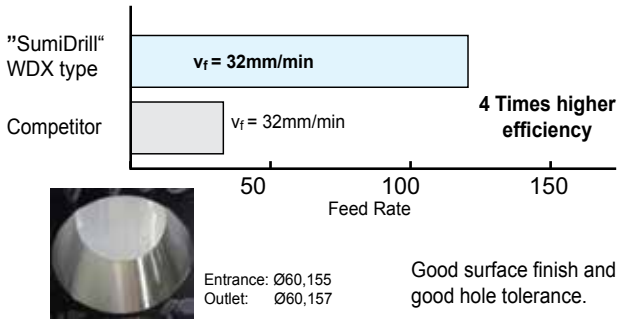
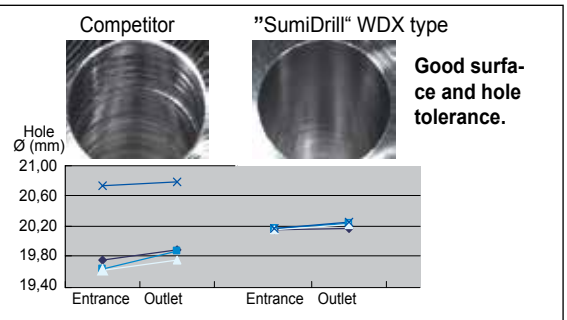


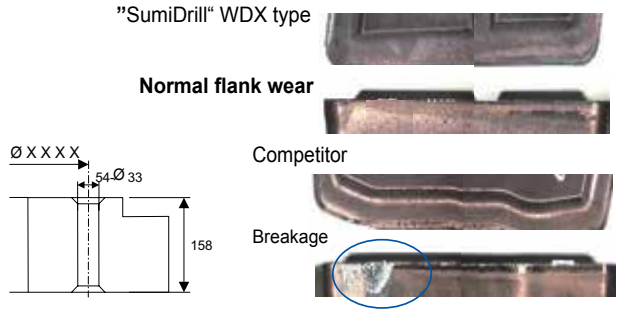
Plate (S48C)
Drill Body: WDX600D3S40
Drill Insert: WDXT186012-G(ACP300)
Conditions (Sumitomo): v_c=150m/min, f=0,16mm/rev, H=60mm, through, Wet
Conditions (Comp.): v_c=30m/min, f=0,20mm/rev, H=60mm, through, Wet

Stable drilling performance.
4 times higher efficiency.



Automotive Component (SCM415)
Drill Body: WDX200D5S25
Drill Insert: WDXT063006-G(ACP300)
Conditions: v_c=185m/min, f=0,12mm/rev, H=87mm, through, Wet

Good surface roughness.
Stable hole diameter.



Bearing Component for Windmill (42CrMo)
Drill Body: WDX330D5S40
Drill Insert: WDXT094008-L(ACP300)
Conditions: v_c=146m/min, f=0,10mm/rev, H=158mm, through, Wet

WDX shows stable drilling performance, no cutting edge breakage.

■ Recommended Cutting Conditions (2D)

[min. - **optimal** - max.]

ISO	Work material	Hardness (HB)	Chip breaker & Grade		Cutting Speed Vc (m/min)	Feed rate (mm/rev) ø13,0 ~ ø18,0	ø18,5 ~ ø29,0	ø29,5 ~ ø36,0	ø37,0 ~ ø55,0	ø56,0 ~ ø65,0
P	Carbon steel	125	L	ACP300	150 - **220** - 250	0,04 - **0,08** - 0,12	0,04 - **0,08** - 0,12	0,04 - **0,08** - 0,13	0,05 - **0,10** - 0,15	0,06 - **0,11** - 0,17
		190	G	ACP300	150 - **220** - 250	0,08 - **0,13** - 0,24	0,08 - **0,13** - 0,24	0,08 - **0,14** - 0,26	0,09 - **0,16** - 0,29	0,10 - **0,17** - 0,32
		250	G	ACP300	125 - **170** - 230	0,06 - **0,11** - 0,18	0,06 - **0,11** - 0,18	0,06 - **0,12** - 0,19	0,07 - **0,13** - 0,22	0,08 - **0,14** - 0,24
		270	G	ACP300	125 - **170** - 230	0,08 - **0,13** - 0,22	0,08 - **0,14** - 0,24	0,08 - **0,14** - 0,23	0,09 - **0,16** - 0,26	0,10 - **0,17** - 0,29
		300	G	ACP300	100 - **130** - 170	0,06 - **0,11** - 0,17	0,06 - **0,12** - 0,18	0,06 - **0,12** - 0,18	0,07 - **0,13** - 0,20	0,08 - **0,14** - 0,22
	Low alloyed steel	180	L	ACP300	150 - **180** - 220	0,05 - **0,08** - 0,14	0,05 - **0,08** - 0,14	0,05 - **0,08** - 0,16	0,06 - **0,09** - 0,17	0,07 - **0,10** - 0,19
		275	G	ACP300	125 - **150** - 200	0,06 - **0,11** - 0,17	0,06 - **0,11** - 0,17	0,06 - **0,12** - 0,18	0,07 - **0,13** - 0,20	0,08 - **0,14** - 0,22
		300	G	ACP300	100 - **140** - 170	0,06 - **0,11** - 0,17	0,06 - **0,11** - 0,17	0,06 - **0,12** - 0,18	0,07 - **0,13** - 0,20	0,08 - **0,14** - 0,22
		350	G	ACP300	80 - **120** - 150	0,06 - **0,11** - 0,17	0,06 - **0,11** - 0,17	0,06 - **0,12** - 0,18	0,07 - **0,13** - 0,20	0,08 - **0,14** - 0,22
	High alloyed steel	200	G	ACP300	100 - **150** - 200	0,08 - **0,13** - 0,24	0,08 - **0,13** - 0,24	0,08 - **0,14** - 0,26	0,09 - **0,16** - 0,29	0,10 - **0,17** - 0,32
		325	G	ACP300	80 - **120** - 160	0,06 - **0,11** - 0,18	0,06 - **0,11** - 0,18	0,06 - **0,12** - 0,19	0,07 - **0,13** - 0,22	0,08 - **0,14** - 0,24
M	Stainless steel, martensitic / ferritic	200	L/G	ACP300	100 - **150** - 200	0,06 - **0,11** - 0,18	0,06 - **0,11** - 0,18	0,06 - **0,12** - 0,19	0,07 - **0,13** - 0,22	0,08 - **0,14** - 0,24
	Stainless steel, martensitic / tempered	240	L/G	ACP300	90 - **120** - 150	0,06 - **0,11** - 0,18	0,06 - **0,11** - 0,18	0,06 - **0,12** - 0,19	0,07 - **0,13** - 0,22	0,08 - **0,14** - 0,24
	Stainless steel, austenitic / quenched	180	L/G	ACP300	100 - **150** - 200	0,04 - **0,08** - 0,18	0,06 - **0,11** - 0,18	0,06 - **0,12** - 0,19	0,07 - **0,13** - 0,22	0,08 - **0,14** - 0,24
	Stainless steel, austenitic / ferritic (Duplex)	230	L/G	ACP300	80 - **120** - 150	0,04 - **0,08** - 0,18	0,06 - **0,11** - 0,18	0,06 - **0,12** - 0,19	0,07 - **0,13** - 0,22	0,08 - **0,14** - 0,24
K	Cast iron (GG)	180	H	ACK300	120 - **160** - 200	0,09 - **0,20** - 0,32	0,10 - **0,22** - 0,36	0,11 - **0,24** - 0,39	0,12 - **0,26** - 0,44	0,13 - **0,29** - 0,48
		260	H	ACK300	120 - **160** - 200	0,09 - **0,20** - 0,32	0,10 - **0,22** - 0,36	0,11 - **0,24** - 0,39	0,12 - **0,26** - 0,44	0,13 - **0,29** - 0,48
	Nodular cast iron (GGG)	160	H	ACK300	90 - **120** - 250	0,09 - **0,20** - 0,32	0,10 - **0,22** - 0,36	0,11 - **0,24** - 0,39	0,12 - **0,26** - 0,44	0,13 - **0,29** - 0,48
		250	H	ACK300	90 - **120** - 150	0,09 - **0,20** - 0,32	0,10 - **0,22** - 0,36	0,11 - **0,24** - 0,39	0,12 - **0,26** - 0,44	0,13 - **0,29** - 0,48
S	Heat resistant alloy	200	L/G	ACP300	25 - **50** - 70	0,06 - **0,11** - 0,18	0,06 - **0,11** - 0,18	0,06 - **0,12** - 0,19	0,07 - **0,13** - 0,22	0,08 - **0,14** - 0,24
N	Aluminium alloy		G	DL1500	200 - **260** - 320	0,06 - **0,11** - 0,17	0,06 - **0,11** - 0,17	0,06 - **0,12** - 0,18	0,07 - **0,13** - 0,20	0,08 - **0,14** - 0,22
	Copper alloy		G	DL1500	180 - **230** - 280	0,06 - **0,11** - 0,17	0,06 - **0,11** - 0,17	0,06 - **0,12** - 0,18	0,07 - **0,13** - 0,20	0,08 - **0,14** - 0,22

■ Recommended Cutting Conditions (3D)

[min. - **optimal** - max.]

ISO	Work material	Hardness (HB)	Chip breaker & Grade		Cutting Speed Vc (m/min)	Feed rate (mm/rev) ø13,0 ~ ø18,0	ø18,5 ~ ø29,0	ø29,5 ~ ø36,0	ø37,0 ~ ø55,0	ø56,0 ~ ø65,0
P	Carbon steel	125	L	ACP300	150 - **220** - 250	0,04 - **0,07** - 0,1	0,04 - **0,07** - 0,10	0,04 - **0,08** - 0,11	0,05 - **0,09** - 0,12	0,06 - **0,10** - 0,13
		190	G	ACP300	150 - **220** - 250	0,08 - **0,12** - 0,2	0,08 - **0,12** - 0,20	0,08 - **0,13** - 0,22	0,09 - **0,14** - 0,24	0,10 - **0,16** - 0,27
		250	G	ACP300	125 - **170** - 230	0,06 - **0,10** - 0,15	0,06 - **0,10** - 0,15	0,06 - **0,11** - 0,16	0,07 - **0,12** - 0,18	0,08 - **0,13** - 0,20
		270	G	ACP300	125 - **170** - 230	0,08 - **0,12** - 0,18	0,08 - **0,12** - 0,18	0,08 - **0,13** - 0,19	0,09 - **0,14** - 0,22	0,10 - **0,16** - 0,24
		300	G	ACP300	100 - **130** - 170	0,06 - **0,10** - 0,14	0,06 - **0,10** - 0,14	0,06 - **0,11** - 0,15	0,07 - **0,12** - 0,17	0,08 - **0,13** - 0,19
	Low alloyed steel	180	L	ACP300	150 - **180** - 220	0,05 - **0,07** - 0,12	0,05 - **0,07** - 0,12	0,05 - **0,08** - 0,13	0,06 - **0,08** - 0,15	0,07 - **0,09** - 0,16
		275	G	ACP300	125 - **150** - 200	0,06 - **0,10** - 0,14	0,06 - **0,10** - 0,14	0,06 - **0,11** - 0,15	0,07 - **0,12** - 0,17	0,08 - **0,13** - 0,19
		300	G	ACP300	100 - **140** - 170	0,06 - **0,10** - 0,14	0,06 - **0,10** - 0,14	0,06 - **0,11** - 0,15	0,07 - **0,12** - 0,17	0,08 - **0,13** - 0,19
		350	G	ACP300	80 - **120** - 150	0,06 - **0,10** - 0,14	0,06 - **0,10** - 0,14	0,06 - **0,11** - 0,15	0,07 - **0,12** - 0,17	0,08 - **0,13** - 0,19
	High alloyed steel	200	G	ACP300	100 - **150** - 200	0,08 - **0,12** - 0,2	0,08 - **0,12** - 0,20	0,08 - **0,13** - 0,22	0,09 - **0,14** - 0,24	0,10 - **0,16** - 0,27
		325	G	ACP300	80 - **120** - 160	0,06 - **0,10** - 0,15	0,06 - **0,10** - 0,15	0,06 - **0,11** - 0,16	0,07 - **0,12** - 0,18	0,08 - **0,13** - 0,20
M	Stainless steel, martensitic / ferritic	200	L/G	ACP300	100 - **150** - 200	0,06 - **0,10** - 0,15	0,06 - **0,10** - 0,15	0,06 - **0,11** - 0,16	0,07 - **0,12** - 0,18	0,08 - **0,13** - 0,20
	Stainless steel, martensitic / tempered	240	L/G	ACP300	90 - **120** - 150	0,06 - **0,10** - 0,15	0,06 - **0,10** - 0,15	0,06 - **0,11** - 0,16	0,07 - **0,12** - 0,18	0,08 - **0,13** - 0,20
	Stainless steel, austenitic / quenched	180	L/G	ACP300	100 - **150** - 200	0,04 - **0,10** - 0,15	0,06 - **0,10** - 0,15	0,06 - **0,11** - 0,16	0,07 - **0,12** - 0,18	0,08 - **0,13** - 0,20
	Stainless steel, austenitic / ferritic (Duplex)	230	L/G	ACP300	80 - **120** - 150	0,04 - **0,10** - 0,15	0,06 - **0,10** - 0,15	0,06 - **0,11** - 0,16	0,07 - **0,12** - 0,18	0,08 - **0,13** - 0,20
K	Cast iron (GG)	180	H	ACK300	120 - **160** - 200	0,09 - **0,18** - 0,27	0,10 - **0,20** - 0,30	0,11 - **0,22** - 0,32	0,12 - **0,24** - 0,36	0,13 - **0,26** - 0,40
		260	H	ACK300	120 - **160** - 200	0,09 - **0,18** - 0,27	0,10 - **0,20** - 0,30	0,11 - **0,22** - 0,32	0,12 - **0,24** - 0,36	0,13 - **0,26** - 0,40
	Nodular cast iron (GGG)	160	H	ACK300	90 - **120** - 250	0,09 - **0,18** - 0,27	0,10 - **0,20** - 0,30	0,11 - **0,22** - 0,32	0,12 - **0,24** - 0,36	0,13 - **0,26** - 0,40
		250	H	ACK300	90 - **120** - 150	0,09 - **0,18** - 0,27	0,10 - **0,20** - 0,30	0,11 - **0,22** - 0,32	0,12 - **0,24** - 0,36	0,13 - **0,26** - 0,40
S	Heat resistant alloy	200	L/G	ACP300	25 - **50** - 70	0,06 - **0,10** - 0,15	0,06 - **0,10** - 0,15	0,06 - **0,11** - 0,16	0,07 - **0,12** - 0,18	0,08 - **0,13** - 0,20
N	Aluminium alloy		G	DL1500	200 - **260** - 320	0,06 - **0,11** - 0,17	0,06 - **0,11** - 0,17	0,06 - **0,12** - 0,18	0,07 - **0,13** - 0,20	0,08 - **0,14** - 0,22
	Copper alloy		G	DL1500	180 - **230** - 280	0,06 - **0,11** - 0,17	0,06 - **0,11** - 0,17	0,06 - **0,12** - 0,18	0,07 - **0,13** - 0,20	0,08 - **0,14** - 0,22

Indexable Insert Type "SumiDrill"
WDX Type

■ Recommended Cutting Conditions (4D)

[min. - **optimal** - max.]

Material Group ISO	Work material	Hardness (HB)	Chip breaker & Grade		Cutting Speed Vc (m/min)	Feed rate (mm/rev) ø13,0 ~ ø18,0	ø18,5 ~ ø29,0	ø29,5 ~ ø36,0	ø37,0 ~ ø55,0	ø56,0 ~ ø65,0
P	Carbon steel	125	L	ACP300	150 - **220** - 250	0,04 - **0,07** - 0,09	0,04 - **0,07** - 0,09	0,04 - **0,07** - 0,09	0,05 - **0,08** - 0,10	0,05 - **0,08** - 0,10
		190	G	ACP300	150 - **220** - 250	0,08 - **0,11** - 0,17	0,08 - **0,11** - 0,17	0,08 - **0,12** - 0,18	0,09 - **0,14** - 0,21	0,09 - **0,14** - 0,21
		250	G	ACP300	125 - **170** - 230	0,06 - **0,10** - 0,13	0,06 - **0,10** - 0,13	0,06 - **0,10** - 0,14	0,07 - **0,11** - 0,15	0,07 - **0,11** - 0,15
		270	G	ACP300	125 - **170** - 230	0,08 - **0,11** - 0,15	0,08 - **0,11** - 0,15	0,08 - **0,12** - 0,17	0,09 - **0,14** - 0,19	0,09 - **0,14** - 0,19
		300	G	ACP300	100 - **130** - 170	0,06 - **0,10** - 0,12	0,06 - **0,10** - 0,12	0,06 - **0,10** - 0,13	0,07 - **0,11** - 0,14	0,07 - **0,11** - 0,14
	Low alloyed steel	180	L	ACP300	150 - **180** - 220	0,05 - **0,07** - 0,10	0,05 - **0,07** - 0,10	0,05 - **0,07** - 0,11	0,06 - **0,08** - 0,12	0,06 - **0,08** - 0,12
		275	G	ACP300	125 - **150** - 200	0,06 - **0,10** - 0,12	0,06 - **0,10** - 0,12	0,06 - **0,10** - 0,13	0,07 - **0,11** - 0,14	0,07 - **0,11** - 0,14
		300	G	ACP300	100 - **140** - 170	0,06 - **0,10** - 0,12	0,06 - **0,10** - 0,12	0,06 - **0,10** - 0,13	0,07 - **0,11** - 0,14	0,07 - **0,11** - 0,14
		350	G	ACP300	80 - **120** - 150	0,06 - **0,10** - 0,12	0,06 - **0,10** - 0,12	0,06 - **0,10** - 0,13	0,07 - **0,11** - 0,14	0,07 - **0,11** - 0,14
	High alloyed steel	200	G	ACP300	100 - **150** - 200	0,08 - **0,11** - 0,17	0,08 - **0,11** - 0,17	0,08 - **0,12** - 0,18	0,09 - **0,14** - 0,21	0,09 - **0,14** - 0,21
		325	G	ACP300	80 - **120** - 160	0,06 - **0,10** - 0,13	0,06 - **0,10** - 0,13	0,06 - **0,10** - 0,14	0,07 - **0,11** - 0,15	0,07 - **0,11** - 0,15
M	Stainless steel, martensitic / ferritic	200	L/G	ACP300	100 - **150** - 200	0,06 - **0,10** - 0,13	0,06 - **0,10** - 0,13	0,06 - **0,10** - 0,14	0,07 - **0,11** - 0,15	0,07 - **0,11** - 0,15
	Stainless steel, martensitic / tempered	240	L/G	ACP300	90 - **120** - 150	0,06 - **0,10** - 0,13	0,06 - **0,10** - 0,13	0,06 - **0,10** - 0,14	0,07 - **0,11** - 0,15	0,07 - **0,11** - 0,15
	Stainless steel, austenitic / quenched	180	L/G	ACP300	100 - **150** - 200	0,04 - **0,10** - 0,13	0,06 - **0,10** - 0,13	0,06 - **0,10** - 0,14	0,07 - **0,11** - 0,15	0,07 - **0,11** - 0,15
	Stainless steel, austenitic / ferritic (Duplex)	230	L/G	ACP300	80 - **120** - 150	0,04 - **0,10** - 0,13	0,06 - **0,10** - 0,13	0,06 - **0,10** - 0,14	0,07 - **0,11** - 0,15	0,07 - **0,11** - 0,15
K	Cast iron (GG)	180	H	ACK300	120 - **160** - 200	0,09 - **0,17** - 0,23	0,10 - **0,19** - 0,26	0,11 - **0,21** - 0,28	0,12 - **0,23** - 0,31	0,12 - **0,23** - 0,31
		260	H	ACK300	120 - **160** - 200	0,09 - **0,17** - 0,23	0,10 - **0,19** - 0,26	0,11 - **0,21** - 0,28	0,12 - **0,23** - 0,31	0,12 - **0,23** - 0,31
	Nodular cast iron (GGG)	160	H	ACK300	90 - **120** - 250	0,09 - **0,17** - 0,23	0,10 - **0,19** - 0,26	0,11 - **0,21** - 0,28	0,12 - **0,23** - 0,31	0,12 - **0,23** - 0,31
		250	H	ACK300	90 - **120** - 150	0,09 - **0,17** - 0,23	0,10 - **0,19** - 0,26	0,11 - **0,21** - 0,28	0,12 - **0,23** - 0,31	0,12 - **0,23** - 0,31
S	Heat resistant alloy	200	L/G	ACP300	25 - **50** - 70	0,06 - **0,10** - 0,13	0,06 - **0,10** - 0,13	0,06 - **0,10** - 0,14	0,07 - **0,11** - 0,15	0,07 - **0,11** - 0,15
N	Aluminium alloy		G	DL1500	200 - **260** - 320	0,05 - **0,10** - 0,15	0,05 - **0,10** - 0,15	0,06 - **0,11** - 0,16	0,06 - **0,12** - 0,18	0,07 - **0,13** - 0,20
	Copper alloy		G	DL1500	180 - **230** - 280	0,05 - **0,10** - 0,15	0,05 - **0,10** - 0,15	0,06 - **0,11** - 0,16	0,06 - **0,12** - 0,18	0,07 - **0,13** - 0,20

■ Recommended Cutting Conditions (5D)

[min. - **optimal** - max.]

Material Group ISO	Work material	Hardness (HB)	Chip breaker & Grade		Cutting Speed Vc (m/min)	Feed rate (mm/rev) ø13,0 ~ ø18,0	ø18,5 ~ ø29,0	ø29,5 ~ ø36,0	ø37,0 ~ ø55,0	ø56,0 ~ ø65,0
P	Carbon steel	125	L	ACP300	150 - **220** - 250	0,04 - **0,06** - 0,09	0,04 - **0,06** - 0,08	0,04 - **0,06** - 0,08	0,05 - **0,07** - 0,09	
		190	G	ACP300	150 - **220** - 250	0,07 - **0,10** - 0,15	0,07 - **0,10** - 0,15	0,08 - **0,11** - 0,17	0,09 - **0,12** - 0,19	
		250	G	ACP300	125 - **170** - 230	0,05 - **0,09** - 0,11	0,05 - **0,09** - 0,11	0,06 - **0,09** - 0,12	0,06 - **0,10** - 0,14	
		270	G	ACP300	125 - **170** - 230	0,07 - **0,10** - 0,14	0,07 - **0,10** - 0,14	0,08 - **0,11** - 0,15	0,09 - **0,12** - 0,17	
		300	G	ACP300	100 - **130** - 170	0,05 - **0,09** - 0,11	0,05 - **0,09** - 0,11	0,06 - **0,09** - 0,12	0,06 - **0,10** - 0,13	
	Low alloyed steel	180	L	ACP300	150 - **180** - 220	0,05 - **0,06** - 0,09	0,05 - **0,06** - 0,09	0,05 - **0,06** - 0,10	0,05 - **0,07** - 0,11	
		275	G	ACP300	125 - **150** - 200	0,05 - **0,09** - 0,11	0,05 - **0,09** - 0,11	0,06 - **0,09** - 0,12	0,06 - **0,10** - 0,13	
		300	G	ACP300	100 - **140** - 170	0,05 - **0,09** - 0,11	0,05 - **0,09** - 0,11	0,06 - **0,09** - 0,12	0,06 - **0,10** - 0,13	
		350	G	ACP300	80 - **120** - 150	0,05 - **0,09** - 0,11	0,05 - **0,09** - 0,11	0,06 - **0,09** - 0,12	0,06 - **0,10** - 0,13	
	High alloyed steel	200	G	ACP300	100 - **150** - 200	0,07 - **0,10** - 0,15	0,07 - **0,10** - 0,15	0,08 - **0,11** - 0,17	0,09 - **0,12** - 0,19	
		325	G	ACP300	80 - **120** - 160	0,05 - **0,09** - 0,11	0,06 - **0,09** - 0,11	0,06 - **0,09** - 0,12	0,06 - **0,10** - 0,14	
M	Stainless steel, martensitic / ferritic	200	L/G	ACP300	100 - **150** - 200	0,05 - **0,09** - 0,11	0,05 - **0,09** - 0,11	0,06 - **0,09** - 0,12	0,06 - **0,10** - 0,14	
	Stainless steel, martensitic / tempered	240	L/G	ACP300	90 - **120** - 150	0,05 - **0,09** - 0,11	0,05 - **0,09** - 0,11	0,06 - **0,09** - 0,12	0,06 - **0,10** - 0,14	
	Stainless steel, austenitic / quenched	180	L/G	ACP300	100 - **150** - 200	0,05 - **0,09** - 0,11	0,05 - **0,09** - 0,11	0,06 - **0,09** - 0,12	0,06 - **0,10** - 0,14	
	Stainless steel, austenitic / ferritic (Duplex)	230	L/G	ACP300	80 - **120** - 150	0,05 - **0,09** - 0,11	0,05 - **0,09** - 0,11	0,06 - **0,09** - 0,12	0,07 - **0,12** - 0,18	
K	Cast iron (GG)	180	H	ACK300	120 - **160** - 200	0,08 - **0,15** - 0,21	0,09 - **0,17** - 0,23	0,09 - **0,18** - 0,25	0,11 - **0,20** - 0,28	
		260	H	ACK300	120 - **160** - 200	0,08 - **0,15** - 0,21	0,09 - **0,17** - 0,23	0,09 - **0,18** - 0,25	0,11 - **0,20** - 0,28	
	Nodular cast iron (GGG)	160	H	ACK300	90 - **120** - 250	0,08 - **0,15** - 0,21	0,09 - **0,17** - 0,23	0,09 - **0,18** - 0,25	0,11 - **0,20** - 0,28	
		250	H	ACK300	90 - **120** - 150	0,08 - **0,15** - 0,21	0,09 - **0,17** - 0,23	0,09 - **0,18** - 0,25	0,11 - **0,20** - 0,28	
S	Heat resistant alloy	200	L/G	ACP300	25 - **50** - 70	0,05 - **0,09** - 0,11	0,05 - **0,09** - 0,11	0,06 - **0,09** - 0,12	0,06 - **0,10** - 0,14	
N	Aluminium alloy		G	DL1500	200 - **260** - 320	0,05 - **0,10** - 0,15	0,05 - **0,10** - 0,15	0,06 - **0,11** - 0,16	0,06 - **0,12** - 0,18	
	Copper alloy		G	DL1500	180 - **230** - 280	0,05 - **0,10** - 0,15	0,05 - **0,10** - 0,15	0,06 - **0,11** - 0,16	0,06 - **0,12** - 0,18	



PDL Type / PCT Type



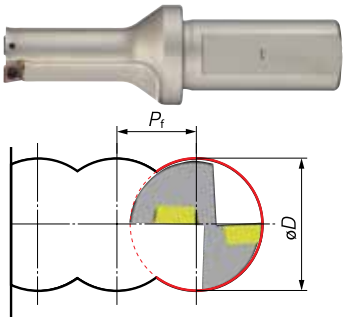
Description

The tool cuts in the Z axis direction where tool rigidity is highest, allowing high efficiency roughing for aeronautic components and dies with long tool overhang must be used to machine deep holes and pockets.

Characteristics

- The flat cutting edge design produces near-flat bottom profiles to reduce depth of cut variation during finishing.
- All sizes come with an air hole for supplying coolant internally to improve chip evacuation.
- Durable body with special surface treatment offers improved tool life and reliability.
- The tools use SumiDrill WDX type inserts for handling a wide range of work materials, from steel to non-ferrous metals and exotic alloys.

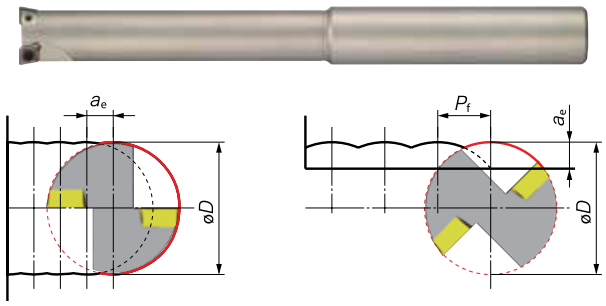
- The PDL type has a central insert making it possible to make radial cuts beyond the tool's radius, pitch feed cutting, and drilling. (Pocket milling, etc.)



Keep the value of P_f for PDL type tools to less than 70% of the tool diameter (øD).

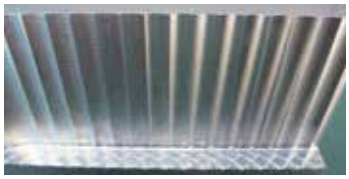


- Although the PCT type has limited radial cutting ability, the tool has many effective teeth enabling it to perform high feed cutting. (Medium finishing of corners, hole expansion, deep grooving, etc.)



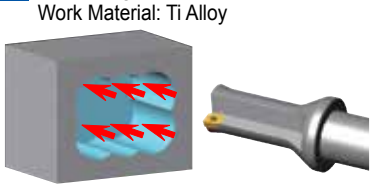
Keep the value of P_f for PCT type tools to less than 50% of the tool diameter (ø*D*).
For a_e (w_{oc}), refer to the dimension under "a_e max" in the stock / dimensions tables titled "Holders Max, Depth: 3D/5D".





Application examples

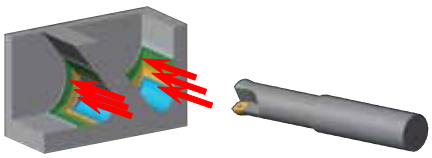
PDL Pocketing
Work Material: Ti Alloy



Tool: PDL400D2S40 (ø40)
Insert: WDXT125012-G
Grade: ACK300

Cutting Conditions:
v_c = 40 m/min
f = 0,07 mm/rev
(v_f = 22,3 mm/min)
P_f = 25 mm

PCT Corner Finishing
Work Material: Ti Alloy

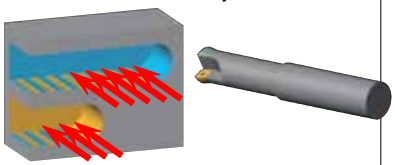


Tool:
PCT320D3S32 (ø32)
PCT250D3S25 (ø25)
PCT200D3S20 (ø20)
Grade: ACK300

Insert:
WDXT094008-G
WDXT073506-G
WDXT063006-G

Cutting Conditions:
v_c = 50 m/min
f_t = 0,08 mm/tooth
(v_f = 80~127 mm/min)
a_e (w_{oc}) = 3,2 ~ 6,5 mm

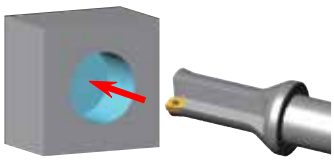
PCT Grooving
Work Material: Ti Alloy



Tool: PCT320D5S32 (ø32)
Insert: WDXT094008-G
Grade: ACK300

Cutting Conditions:
v_c = 40 m/min
f_t = 0,07 mm/tooth
(v_f = 56 mm/min)
a_e (P_f) = 5,0 mm

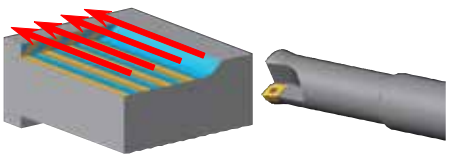
PDL Drilling
Work Material: X4 CrNiMo 17 12 2



Tool: PDL200D3S25 (ø20)
Insert: WDXT063006-G
Grade: ACP300

Cutting Conditions:
v_c = 180 m/min
f = 0,10 mm/rev
(v_f = 286 mm/min)
øD = 20 mm

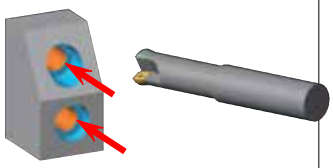
PCT Aeronautic Components
Work Material: X5 CrNi 18 10



Tool: PCT320D3S32 (ø32)
Insert: WDXT094008-G
Grade: ACP300

Cutting Conditions:
v_c = 180 m/min
f_t = 0,15 mm/tooth
(v_f = 537 mm/min)
a_e (w_{oc}) = 7,0 mm, P_f = 5,0 mm

PCT Machine Components
Work Material: 34 Cr Ni 4



Tool: PCT200D5S20 (ø20)
Insert: WDXT063006-G
Grade: ACK300

Cutting Conditions:
v_c = 150 m/min
f_t = 0,15 mm/tooth
(v_f = 716 mm/min)
a_e (w_{oc}) = 3,5 mm

● = Euro stock

Indexable Plunge Drill
PDL Type (2D, 3D)



2D	3D	Carbon Steel, Alloy Steel C≤0,28%	Carbon Steel, Alloy Steel C>0,28%	Tempered Steel	Hardened Steel HRC≤45	Hardened Steel HRC>45	Stainless Steel	Ti Alloy	Heat Resistant Alloy	Cast iron	Ductile Cast Iron	Al Alloy	Cu Alloy	Composite CFRP *
W														

Fig 1

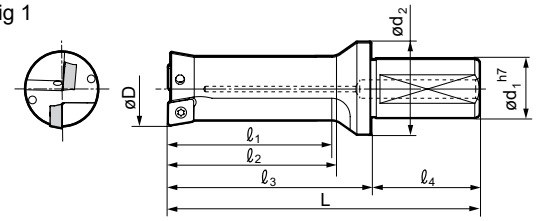
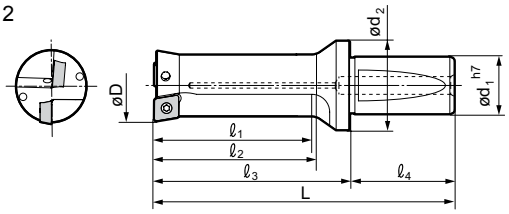


Fig 2



■ Holder (Max D_{oc} : 2 D)

Cat. No.	Stock	Dimensions (mm) øD	L	ℓ1	ℓ2	ℓ3	ℓ4	ød1	ød2	Applicable Insert	Fig.
PDL 160D2S20	●	**16,0**	94	32	35	50	44	**20**	20	WDXT052504	
200D2S25	●	**20,0**	114	40	43	58	56	**25**	25	WDXT063006	1
250D2S25	●	**25,0**	127	50	53	71	56	**25**	25	WDXT073506	
PDL 320D2S40	●	**32,0**	162	64	68	92	70	**40**	40	WDXT094008	2
400D2S40	●	**40,0**	185	80	85	115	70	**40**	40	WDXT125012	

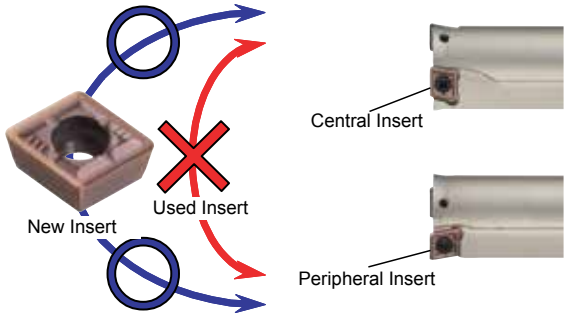
■ Holder (Max D_{oc} : 3 D)

Cat. No.	Stock	Dimensions (mm) øD	L	ℓ1	ℓ2	ℓ3	ℓ4	ød1	ød2	Applicable Insert	Fig.
PDL 160D3S20	●	**16,0**	110	48	51	66	44	**20**	20	WDXT052504	
200D3S25	●	**20,0**	134	60	63	78	56	**25**	25	WDXT063006	1
250D3S25	●	**25,0**	152	75	78	96	56	**25**	25	WDXT073506	
PDL 320D3S40	●	**32,0**	194	96	100	124	70	**40**	40	WDXT094008	2
400D3S40	●	**40,0**	225	120	125	155	70	**40**	40	WDXT125012	

■ Spare Parts

Screw	Wrench	Wrench	Recommended Torque (Nm)	Applicable Holders
BFTX0204N	TRX06	–	**0,5**	PDL 160 D2 S20 160 D3 S20 PCT 160 D3 S16 160 D5 S16
BFTY02206	–	TRD07	**1,0**	PDL 200 D2 S25 200 D3 S25 PCT 200 D3 S20 200 D5 S20
BFTX02506N	–	TRD08	**1,5**	PDL 250 D2 S25 250 D3 S25 PCT 250 D3 S25 250 D5 S25
BFTX03584	–	TRD15	**3,5**	PDL 320 D2 S40 320 D3 S40 PCT 320 D3 S32 320 D5 S32
BFTX0511N	–	TRD20	**5,0**	PDL 400 D2 S40 400 D3 S40 PCT 400 D3 S42 400 D5 S42

● Notes About Mounting Inserts



PDL type: Inserts can be used on either the centre or the outside.
Inserts used on the outside cannot be used in the centre,. Similarly, inserts used in the centre cannot be used on the outside.
PCT type: 2 corners can be used only for the outer inserts.

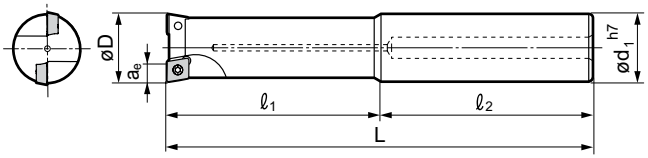
Indexable Plunge Mill
PCT Type (3D, 5D)



3D	5D	Carbon Steel, Alloy Steel C≤0,28%	Carbon Steel, Alloy Steel C>0,28%	Tempered Steel	Hardened Steel HRC≤45	Hardened Steel HRC>45	Stainless Steel	Ti Alloy	Heat Resistant Alloy	Cast iron	Ductile Cast Iron	Al Alloy	Cu Alloy	Composite CFRP *
◎	◎			○		○	◎		◎	◎	◎	○		

* CFRP (Carbon Fibre Reinforced Plastic)

Fig 3



■ Holder (Max D_{oc} : 3 D)

Cat. No.	Stock	Dimensions (mm) øD	ae max	L	ℓ1	ℓ2	ød1	No. of teeth	Applicable Insert	Fig.
PCT 160D3S16	●	**16,0**	*4,0*	123	53	70	**16**	**2**	WDXT052504	
200D3S20	●	**20,0**	*5,0*	145	65	80	**20**	**2**	WDXT063006	
250D3S25	●	**25,0**	*6,5*	160	80	80	**25**	**2**	WDXT073506	3
320D3S32	●	**32,0**	*8,5*	191	101	90	**32**	**2**	WDXT094008	
400D3S42	●	**40,0**	*11,0*	225	125	100	**42**	**3**	WDXT125012	

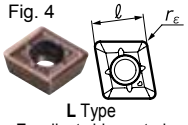
■ Holder (Max D_{oc} : 5 D)

Cat. No.	Stock	Dimensions (mm) øD	ae max	L	ℓ1	ℓ2	ød1	No. of teeth	Applicable Insert	Fig.
PCT 160D5S16	●	**16,0**	*4,0*	155	85	70	**16**	**2**	WDXT052504	
200D5S20	●	**20,0**	*5,0*	185	105	80	**20**	**2**	WDXT063006	
250D5S25	●	**25,0**	*6,5*	210	130	80	**25**	**2**	WDXT073506	3
320D5S32	●	**32,0**	*8,5*	255	165	90	**32**	**2**	WDXT094008	
400D5S42	●	**40,0**	*11,0*	305	205	100	**42**	**3**	WDXT125012	

■ Inserts

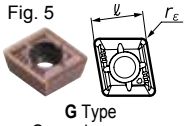
(mm)

Fig. 4



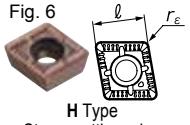
L Type
Excellent chip control at low feed rates

Fig. 5



G Type
General purpose chipbreaker

Fig. 6



H Type
Strong cutting edge at higher feed rates

Application	Grade	Coated ACP300	Coated ACK300	Coated DL1500
	High Speed / Light Cutting			N
	General Purpose	M		
	Roughing	PM	K	

Cat. No.	ACP300	ACK300	DL1500	Fig.	Dimensions (mm) ℓ	Thickness	rε	Applicable Holder
WDXT 052504-L	●	●		4				PDL160D2S20 PDL160D3S20 PCT160D3S16 PCT160D5S16
052504-G	●	●	●	5	5,0	2,5	0,4	
052504-H	●	●		6				
WDXT 063006-L	●	●		4				PDL200D2S25 PDL200D3S25 PCT200D3S20 PCT200D5S20
063006-G	●	●	●	5	6,0	3,0	0,6	
063006-H	●	●		6				
WDXT 073506-L	●	●		4				PDL250D2S25 PDL250D3S25 PCT250D3S25 PCT250D5S25
073506-G	●	●	●	5	7,5	3,5	0,6	
073506-H	●	●		6				
WDXT 094008-L	●	●		4				PDL320D2S40 PDL320D3S40 PCT320D3S32 PCT320D5S32
094008-G	●	●	●	5	9,6	4,0	0,8	
094008-H	●	●		6				
WDXT 125012-L	●	●		4				PDL400D2S40 PDL400D3S40 PCT400D3S42 PCT400D5S42
125012-G	●	●	●	5	12,4	5,0	1,2	
125012-H	●	●		6				

PCT, PDL Type Identification

PCT 250 D3 S25

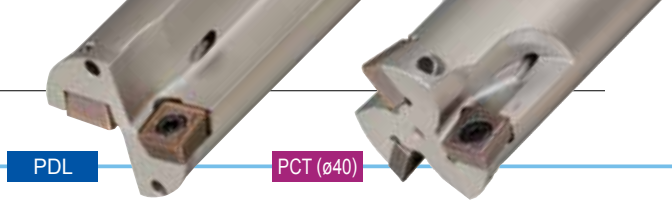
- 250: Tool Diameter (ø25,0)
- D3: Max Depth L/D (3D)
- S25: Shank Size (ø25,0)

PCT, PDL Type Insert Identification

WDXT 07 35 06 -G

- 07: Width Across Flats (7,5)
- 35: Thickness x 10 (3,5)
- 06: Corner Radius x 10 (R0,6)
- -G: Breaker Type

Recommended Cutting Conditions
PDL Type / PCT Type



Recommended Cutting Conditions (2D)

[min. - **optimal** - max.]

ISO	Work material	Hardness (HB)	Chip breaker & Grade		Cutting Speed Vc (m/min)	PDL Type: f (mm/rev) ø16,0	ø20,0 ~ ø25,0	ø32,0	ø40,0
P	Carbon steel	125	G	ACP300	120-**180**-240	0,05-**0,08**-0,10	0,05-**0,08**-0,10	0,05-**0,08**-0,11	0,05-**0,08**-0,12
		125	L	ACP300	130-**170**-220	0,04-**0,08**-0,12	0,04-**0,08**-0,12	0,04-**0,08**-0,13	0,05-**0,10**-0,15
		190	G	ACP300	100-**150**-200	0,08-**0,13**-0,24	0,08-**0,13**-0,24	0,08-**0,14**-0,26	0,09-**0,16**-0,29
		250	G	ACP300	80-**120**-160	0,06-**0,11**-0,18	0,06-**0,11**-0,18	0,06-**0,12**-0,19	0,07-**0,13**-0,22
		270	G	ACP300	100-**130**-160	0,08-**0,13**-0,22	0,08-**0,13**-0,22	0,08-**0,14**-0,23	0,09-**0,16**-0,26
		300	G	ACP300	70-**100**-140	0,06-**0,11**-0,17	0,06-**0,11**-0,17	0,06-**0,12**-0,18	0,07-**0,13**-0,20
	Low alloyed steel	180	L	ACP300	100-**140**-180	0,05-**0,08**-0,14	0,05-**0,08**-0,14	0,05-**0,08**-0,16	0,06-**0,09**-0,17
		275	G	ACP300	80-**120**-160	0,06-**0,11**-0,17	0,06-**0,11**-0,17	0,06-**0,12**-0,18	0,07-**0,13**-0,20
		300	G	ACP300	75-**110**-140	0,06-**0,11**-0,17	0,06-**0,11**-0,17	0,06-**0,12**-0,18	0,07-**0,13**-0,20
		350	G	ACP300	60-**85**-110	0,06-**0,11**-0,17	0,06-**0,11**-0,17	0,06-**0,12**-0,18	0,07-**0,13**-0,20
	High alloyed steel	200	G	ACP300	100-**130**-160	0,08-**0,13**-0,24	0,08-**0,13**-0,24	0,08-**0,14**-0,26	0,09-**0,16**-0,29
		325	G	ACP300	80-**100**-120	0,06-**0,11**-0,18	0,06-**0,11**-0,18	0,06-**0,12**-0,19	0,07-**0,13**-0,22
M	Stainless steel, martensitic / ferritic	200	G	ACP300	100-**140**-180	0,06-**0,11**-0,18	0,06-**0,11**-0,18	0,06-**0,12**-0,19	0,07-**0,13**-0,22
	Stainless steel, martensitic / tempered	240	G	ACP300	90-**120**-150	0,06-**0,11**-0,18	0,06-**0,11**-0,18	0,06-**0,12**-0,19	0,07-**0,13**-0,22
	Stainless steel, austenitic / quenched	180	G	ACP300	100-**140**-180	0,06-**0,08**-0,18	0,06-**0,11**-0,18	0,06-**0,12**-0,19	0,07-**0,13**-0,22
	Stainless steel, austenitic / ferritic (Duplex)	230	G	ACP300	80-**120**-150	0,04-**0,08**-0,18	0,06-**0,11**-0,18	0,06-**0,12**-0,19	0,07-**0,13**-0,22
K	Cast iron (GG)	180	H	ACK300	120-**160**-200	0,09-**0,20**-0,32	0,10-**0,22**-0,36	0,11-**0,24**-0,39	0,12-**0,26**-0,44
	Nodular cast iron (GGG)	260	H	ACP300	90-**120**-150	0,09-**0,20**-0,32	0,10-**0,22**-0,36	0,11-**0,24**-0,39	0,12-**0,26**-0,44
S	Heat resistant alloy	200	G	ACP300	25-**50**-70	0,06-**0,11**-0,18	0,06-**0,11**-0,18	0,06-**0,12**-0,19	0,07-**0,13**-0,22
N	Aluminium alloy		G	DL1500	200-**260**-320	0,06-**0,11**-0,17	0,06-**0,11**-0,17	0,06-**0,12**-0,18	0,07-**0,13**-0,20
	Copper alloy		G	DL1500	180-**230**-280	0,06-**0,11**-0,17	0,06-**0,11**-0,17	0,06-**0,12**-0,18	0,07-**0,13**-0,20

Recommended Cutting Conditions (3D)

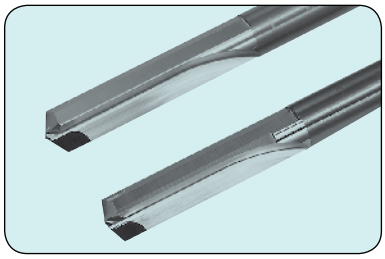
[min. - **optimal** - max.]

ISO	Work material	Hardness (HB)	Chip breaker & Grade		Cutting Speed Vc (m/min)	PDL Type: f (mm/rev) / PCT Type: f_t (mm/tooth) ø16,0	ø20,0 ~ ø25,0	ø32,0	ø40,0
P	Carbon steel	125	G	ACP300	120-**180**-240	0,05-**0,07**-0,10	0,05-**0,07**-0,10	0,05-**0,08**-0,11	0,05-**0,08**-0,12
		125	L	ACP300	130-**170**-220	0,04-**0,07**-0,10	0,04-**0,07**-0,10	0,04-**0,08**-0,11	0,05-**0,09**-0,12
		190	G	ACP300	100-**150**-200	0,08-**0,12**-0,20	0,08-**0,12**-0,20	0,08-**0,13**-0,22	0,09-**0,14**-0,24
		250	G	ACP300	80-**120**-160	0,06-**0,10**-0,15	0,06-**0,10**-0,15	0,06-**0,11**-0,16	0,07-**0,12**-0,18
		270	G	ACP300	100-**130**-160	0,08-**0,12**-0,18	0,08-**0,12**-0,18	0,08-**0,13**-0,19	0,09-**0,14**-0,22
		300	G	ACP300	70-**100**-140	0,06-**0,10**-0,14	0,06-**0,10**-0,14	0,06-**0,11**-0,15	0,07-**0,12**-0,17
	Low alloyed steel	180	L	ACP300	100-**140**-180	0,05-**0,07**-0,12	0,05-**0,07**-0,12	0,05-**0,07**-0,13	0,06-**0,07**-0,15
		275	G	ACP300	80-**120**-160	0,06-**0,10**-0,14	0,06-**0,10**-0,14	0,06-**0,11**-0,15	0,07-**0,12**-0,17
		300	G	ACP300	75-**110**-140	0,06-**0,10**-0,14	0,06-**0,10**-0,14	0,06-**0,11**-0,15	0,07-**0,12**-0,17
		350	G	ACP300	60-**85**-110	0,06-**0,10**-0,14	0,06-**0,10**-0,14	0,06-**0,11**-0,15	0,07-**0,12**-0,17
	High alloyed steel	200	G	ACP300	100-**130**-160	0,08-**0,12**-0,20	0,08-**0,12**-0,20	0,08-**0,13**-0,22	0,09-**0,14**-0,24
		325	G	ACP300	80-**100**-120	0,06-**0,10**-0,15	0,06-**0,10**-0,15	0,06-**0,11**-0,16	0,07-**0,12**-0,18
M	Stainless steel, martensitic / ferritic	200	G	ACP300	100-**140**-180	0,06-**0,10**-0,15	0,06-**0,10**-0,15	0,06-**0,11**-0,16	0,07-**0,12**-0,18
	Stainless steel, martensitic / tempered	240	G	ACP300	90-**120**-150	0,06-**0,10**-0,15	0,06-**0,10**-0,15	0,06-**0,11**-0,16	0,07-**0,12**-0,18
	Stainless steel, austenitic / quenched	180	G	ACP300	100-**140**-180	0,06-**0,10**-0,15	0,06-**0,10**-0,15	0,06-**0,11**-0,16	0,07-**0,12**-0,18
	Stainless steel, austenitic / ferritic (Duplex)	230	G	ACP300	80-**120**-150	0,04-**0,10**-0,15	0,06-**0,10**-0,15	0,06-**0,11**-0,16	0,07-**0,12**-0,18
K	Cast iron (GG)	180	H	ACK300	120-**160**-200	0,09-**0,18**-0,27	0,10-**0,20**-0,30	0,11-**0,22**-0,32	0,12-**0,24**-0,36
	Nodular cast iron (GGG)	260	H	ACP300	90-**120**-150	0,09-**0,18**-0,27	0,10-**0,20**-0,30	0,11-**0,22**-0,32	0,12-**0,24**-0,36
S	Heat resistant alloy	200	G	ACP300	25-**50**-70	0,06-**0,10**-0,15	0,06-**0,10**-0,15	0,06-**0,11**-0,16	0,07-**0,12**-0,18
N	Aluminium alloy		G	DL1500	200-**260**-320	0,06-**0,11**-0,17	0,06-**0,11**-0,17	0,06-**0,12**-0,18	0,07-**0,13**-0,20
	Copper alloy		G	DL1500	180-**230**-280	0,06-**0,11**-0,17	0,06-**0,11**-0,17	0,06-**0,12**-0,18	0,07-**0,13**-0,20

Recommended Cutting Conditions (5D)

[min. - **optimal** - max.]

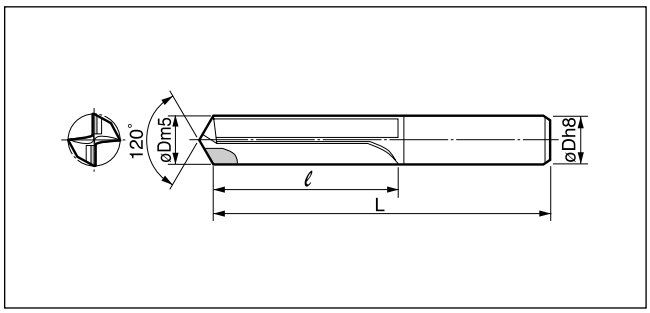
ISO	Work material	Hardness (HB)	Chip breaker & Grade		Cutting Speed Vc (m/min)	PCT Type: f_t (mm/tooth) ø16,0	ø20,0 ~ ø25,0	ø32,0	ø40,0
P	Carbon steel	125	G	ACP300	120-**180**-240	0,05-**0,06**-0,09	0,05-**0,06**-0,09	0,05-**0,06**-0,09	0,05-**0,07**-0,09
		125	L	ACP300	130-**170**-220	0,04-**0,06**-0,08	0,04-**0,06**-0,08	0,04-**0,06**-0,08	0,05-**0,07**-0,09
		190	G	ACP300	100-**150**-200	0,07-**0,10**-0,15	0,07-**0,10**-0,15	0,08-**0,11**-0,17	0,09-**0,12**-0,19
		250	G	ACP300	80-**120**-160	0,05-**0,09**-0,11	0,05-**0,09**-0,11	0,06-**0,09**-0,12	0,06-**0,10**-0,14
		270	G	ACP300	100-**130**-160	0,07-**0,10**-0,14	0,07-**0,10**-0,14	0,08-**0,11**-0,15	0,09-**0,12**-0,17
		300	G	ACP300	70-**100**-140	0,05-**0,09**-0,11	0,05-**0,09**-0,11	0,06-**0,09**-0,12	0,06-**0,10**-0,13
	Low alloyed steel	180	L	ACP300	100-**140**-180	0,05-**0,06**-0,09	0,05-**0,06**-0,09	0,05-**0,06**-0,10	0,05-**0,07**-0,11
		275	G	ACP300	80-**120**-160	0,05-**0,09**-0,11	0,05-**0,09**-0,11	0,06-**0,09**-0,12	0,06-**0,10**-0,13
		300	G	ACP300	75-**110**-140	0,05-**0,09**-0,11	0,05-**0,09**-0,11	0,06-**0,09**-0,12	0,06-**0,10**-0,13
		350	G	ACP300	60-**85**-110	0,05-**0,09**-0,11	0,05-**0,09**-0,11	0,06-**0,09**-0,12	0,06-**0,10**-0,13
	High alloyed steel	200	G	ACP300	100-**130**-160	0,07-**0,10**-0,15	0,07-**0,10**-0,15	0,08-**0,11**-0,17	0,09-**0,12**-0,19
		325	G	ACP300	80-**100**-120	0,05-**0,09**-0,11	0,05-**0,09**-0,11	0,06-**0,09**-0,12	0,06-**0,10**-0,14
M	Stainless steel, martensitic / ferritic	200	G	ACP300	100-**140**-180	0,05-**0,09**-0,11	0,05-**0,09**-0,11	0,06-**0,09**-0,12	0,06-**0,10**-0,14
	Stainless steel, martensitic / tempered	240	G	ACP300	90-**120**-150	0,05-**0,09**-0,11	0,05-**0,09**-0,11	0,06-**0,09**-0,12	0,06-**0,10**-0,14
	Stainless steel, austenitic / quenched	180	G	ACP300	100-**140**-180	0,05-**0,09**-0,11	0,05-**0,09**-0,11	0,06-**0,09**-0,12	0,06-**0,10**-0,14
	Stainless steel, austenitic / ferritic (Duplex)	230	G	ACP300	80-**120**-150	0,05-**0,09**-0,11	0,05-**0,09**-0,11	0,06-**0,09**-0,12	0,06-**0,10**-0,14
K	Cast iron (GG)	180	H	ACK300	120-**160**-200	0,08-**0,15**-0,21	0,09-**0,17**-0,23	0,09-**0,18**-0,25	0,11-**0,20**-0,28
	Nodular cast iron (GGG)	260	H	ACP300	90-**120**-150	0,08-**0,15**-0,21	0,09-**0,17**-0,23	0,09-**0,18**-0,25	0,11-**0,20**-0,28
S	Heat resistant alloy	200	G	ACP300	25-**50**-70	0,05-**0,09**-0,11	0,05-**0,09**-0,11	0,06-**0,09**-0,12	0,06-**0,10**-0,14
N	Aluminium alloy		G	DL1500	200-**260**-320	0,05-**0,10**-0,15	0,05-**0,10**-0,15	0,06-**0,11**-0,16	0,06-**0,12**-0,18
	Copper alloy		G	DL1500	180-**230**-280	0,05-**0,10**-0,15	0,05-**0,10**-0,15	0,06-**0,11**-0,16	0,06-**0,12**-0,18



From general to High Precision Drilling of Aluminum Alloys!

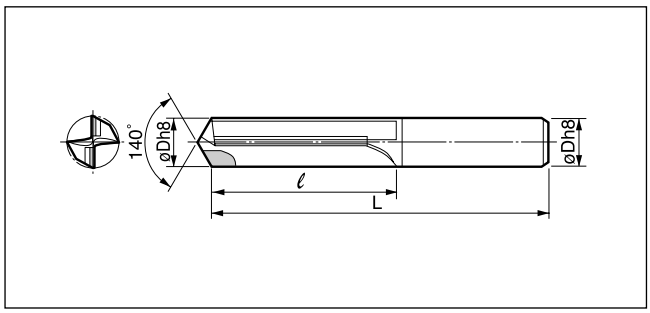
- High precision DAL type is able to produce holes of IT Class of 7~8.
- General DDL type is able to produce holes of IT class of 11~12, mainly for drilling of pre-tap holes.
- DML type is DDL type with a chamfer edge, incorporating 2 processes in one operation.

■ DAL Type



Cat. No.	Stock DA2200	øD	L	ℓ
DAL 0500H ~ 0600H		ø5 ≤ D ≤ ø6	80	30
DAL 0601H ~ 0700H		ø6 < D ≤ ø7	90	35
DAL 0701H ~ 0800H		ø7 < D ≤ ø8	90	35
DAL 0801H ~ 0900H		ø8 < D ≤ ø9	100	40
DAL 0901H ~ 1000H		ø9 < D ≤ ø10	100	40
DAL 1001H ~ 1100H		ø10 < D ≤ ø11	110	50
DAL 1101H ~ 1200H		ø11 < D ≤ ø12	110	50

■ DDL Type



Cat. No.	Stock DA2200	øD	L	ℓ
DDL 050V ~ 060V		ø5 ≤ D ≤ ø6	80	30
DDL 061V ~ 070V		ø6 < D ≤ ø7	90	35
DDL 071V ~ 080V		ø7 < D ≤ ø8	90	35
DDL 081V ~ 090V		ø8 < D ≤ ø9	100	40
DDL 091V ~ 100V		ø9 < D ≤ ø10	100	40
DDL 101V ~ 110V		ø10 < D ≤ ø11	110	50
DDL 111V ~ 120V		ø11 < D ≤ ø12	110	50

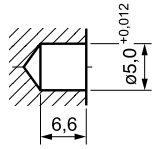
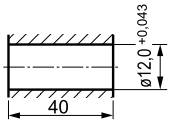
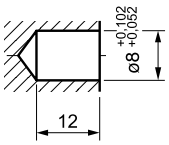
■ Recommended Conditions

	Cutting Speed (m/min)	Feed Rate (mm/rev)	Drilling Length L/D	Oil
øD < 8	80 ~ 250	0,05 ~ 0,2	Below 3 x D	Water soluble
8 ≤ øD		0,1 ~ 0,3		

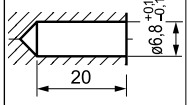
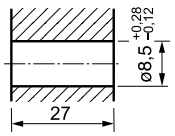
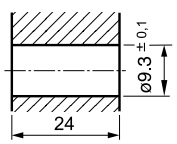
■ Important Notes

- Select a high rigidity machine and high precison tool holder.
- Enough coolant to drilled hole.

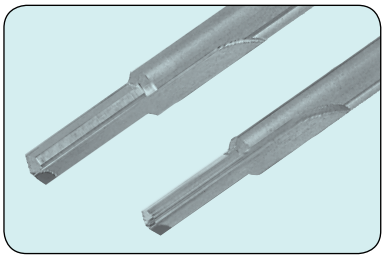
■ Application Examples (DAL Type)

Work Shape	Work	Conditions	Results
	A390 High silicon Aluminum	Vc=100m/min f=0,1mm/rev	• Holes by carbide drill was out of specifications after 2.000 holes/reg. • SumiDia drill could drill up to 30.000 holes/reg. •15 times tool life that of carbide drills.
	A390 High silicon Aluminum (pre-cast hole of ø10)	Vc=120m/min f=0,12mm/rev	• Average 40,000 holes/reg • Surface roughness Ry = 1µm
	ADC10 Aluminum Die Cast	Vc=90m/min f=0,08mm/rev	• More than 50.000 holes and still running

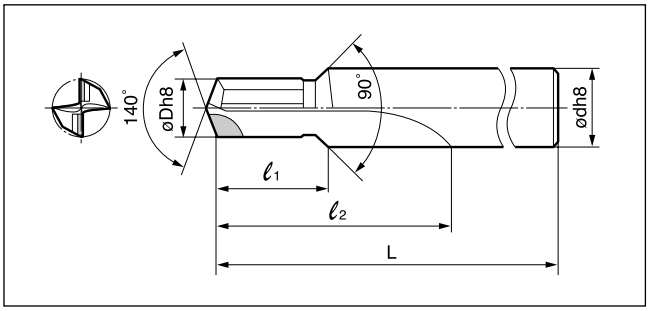
■ Application Examples (DDL Type)

Work Shape	Work	Conditions	Results
	ADC12 Aluminum Die Cast M8 Pre-tap holes	Vc=214m/min f=0,14mm/rev	• Regrind after 100.000 holes
	ADC12 Aluminum Die Cast	Vc=200m/min f=0,17mm/rev	• Regrind after 74.000 holes (2.000m) (Preset tool change)
	AC2A Aluminum Casting	Vc=234m/min f=0,28mm/rev	• Regrind after 80.000 holes (Preset tool change)

DAL/DDL/DML Type

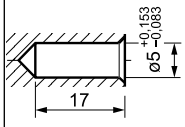
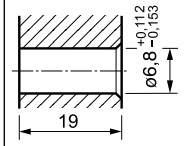
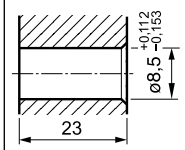


■ DML Type

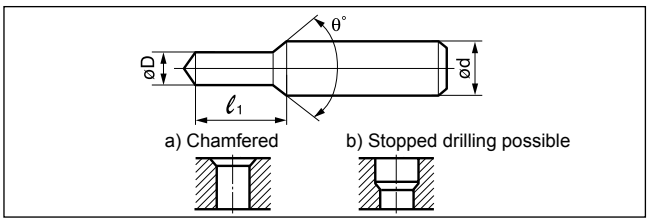


Applicable Tap Size	Cat. No.	Stock DA2200	øD	ød	L	ℓ1	ℓ2
M6	**DML 050V**		5	8	90	18	36
M8	**DML 068V**		6,8	10	104	24	48
M10	**DML 085V**		8,5	12	122	30	60
M12	**DML 103V**		10,3	14	136	36	72

■ Application Examples (DML Type)

Work Shape	Work	Conditions	Results
	AC4C-T6 Aluminum Casting M6 Pre-tap holes	Vc=100m/min f=0,1mm/rev m/c=6 spindles	• Regrind after 150.000 holes • Life for carbide drill is 500 holes. • 30 times tool life that of carbide drills
	AC2C-T2 Aluminum Casting M8 Pre-tap holes	Vc=210m/min f=0,15mm/rev	• 100.000 holes/reg (2.000m) and still running. • Dilling and chamfering in the same process
	AC4C-T6 Aluminum Casting M10 Pre-tap holes	Vc=250m/min f=0,2mm/rev	• 80.000 holes/reg (1,840m) and still running. • Drilling and chamfering in the same process

■ DML Type Possible Profiles



(1) Tolerance for dimension L is more than 0,2mm.
(2) θ° is less than 180°.

SUMIBORON
SUMIDIA

L1 ~ L26



CBN Grades	**SUMIBORON Series**	L2
	Recommended Grades	L3
	ISO Identification	L4
Insert types and cutting edge geometries	**LF / LS / HS** Types	L5
SUMIBORON Chipbreaker "Break Master" Type	**FV / LV & SV** Types	L6
One-Use "Wiper" Insert Type	**WG / WH & W** Types	L7
Uncoated SUMIBORON Grades	**BN1000** / **BN2000**	L8-9
	BN350	L13
Coated SUMIBORON Grades	**BNC2010 / BNC2020** New	L10-L13
	BNC100	L14
	BNC160	L15
	BNC200	L16
	BNC300	L17
	BNC500	L18
Uncoated SUMIBORON Grades	**BN7000**	L19
	BN7500	L20
	BNS800	L21
SUMIBORON / SUMIDIA	**Production Process**	L22
SUMIDIA PCD Grades	**DA1000 / DA2200 / DA150**	L23
SUMIDIA Insert	**NF** Type	L24
SUMIDIA Chipbreaker "Break Master"	**LD / GD** Type New	L25
	DM Type	L26

Second generation Sumiboron inserts – an even better way to machine hardened steels



General

Building on its global success machining hardened steels with Sumiboron inserts the addition of heat and wear resistant coatings to a variety of tough new CBN substrates has resulted in a new generation of high performance inserts. With economy in mind the new inserts are multi cornered.

Choose the coated insert suitable for your application and take your hard part machining operations to the new industry standard.

Types and application

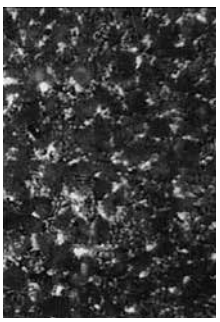
Microstructure





Type	ISO	Grade	Application	Characteristic	Hardness(Hv) (GPa)	TRS (GPa)
Uncoated CBN	H	BN1000	High speed Continuous cutting	Best wear resistance grade and suitable for high speed continuous cutting	27 ~ 31	0,90 ~ 1,00
		BN2000	Continuous and Interrupted cutting	Micro-grain CBN with Ceramic binder improves fracture toughness and wear resistance	31 ~ 34	1,05 ~ 1,15
		BNX20	High efficiency cutting (Continuous~Interrupted)	Binder with high heat resistance improves tool life during high speed machining	31 ~ 33	0,95 ~ 1,10
		BNX25	High speed Interrupted cutting	Superior fracture toughness in high speed cutting and suitable for high speed interrupted hard turning	29 ~ 31	1,00 ~ 1,10
		BN350	Interrupted cutting (Heavy)	Micro-grain CBN with higher fracture toughness that improves cutting edge strength	33 ~ 35	1,20 ~ 1,30
Coated CBN	H	New BNC2010	High precision continuous cutting	New generation TiCN layer improves notch wear resistance and provides an excellent surface finish.	30 ~ 32	1,10 ~ 1,20
		BNC100	High speed continuous and light interrupted cutting	High speed finishing grade for continuous and light interrupted cutting applications	29 ~ 32	1,00 ~ 1,10
		BNC160	High precision continuous cutting	High precision grade for continuous cutting - ideal when an excellent surface finish is required	31 ~ 33	1,10 ~ 1,20
		New BNC2020	High efficiency general purpose	New coating technology offers excellent adhesion during both continuous and interrupted cut applications.	34 ~ 36	1,20 ~ 1,30
		BNC200	Continuous and Interrupted cutting (Light-Medium Interrupted)	General purpose grade with low to high speed cutting capability and extended tool life - removes the carburised layer on heat treated components	33 ~ 35	1,10 ~ 1,20
		BNC300	Interrupted cutting (Heavy)	Tough grade for heavy interrupted cutting applications	33 ~ 35	1,15 ~ 1,25
		BNC500	GG and GGG machining	For Cast Iron machining with a good balance of wear and fracture resistance	32 ~ 34	1,00 ~ 1,10

Microstructure



Type	ISO	Grade	Application	Characteristic	Hardness(Hv) (GPa)	TRS (GPa)
Uncoated CBN	S PM	BN7000	High speed machining of GG Cast Iron machining Iron based products Rolls of high hardness Heat resistant alloy	First choice for high speed finishing of grey cast iron	41 ~ 44	1,25 ~ 1,35
	PM	BN7500	High efficiency machining of powdered metal	Less burrs when machining sintered parts due to excellent edge sharpness	41 ~ 44	1,40 ~ 1,50
	K S	BNS800	High speed machining of GG Machining rolls of high hardness Sintered component roughing Special cast Iron machining	High thermal impact resistance with high heat transfer ability and higher CBN content ratio	39 ~ 42	0,95 ~ 1,10

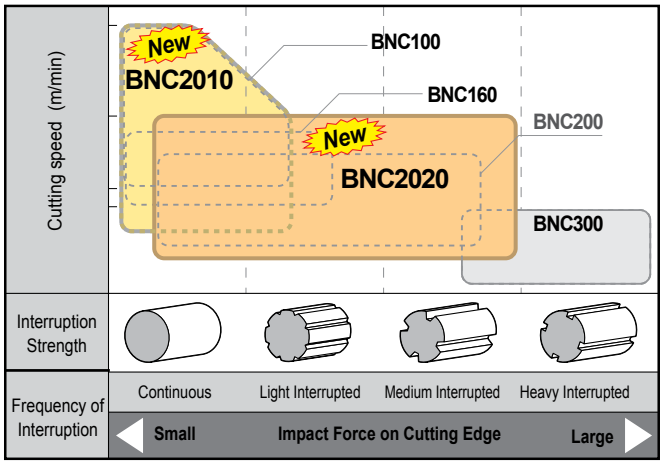
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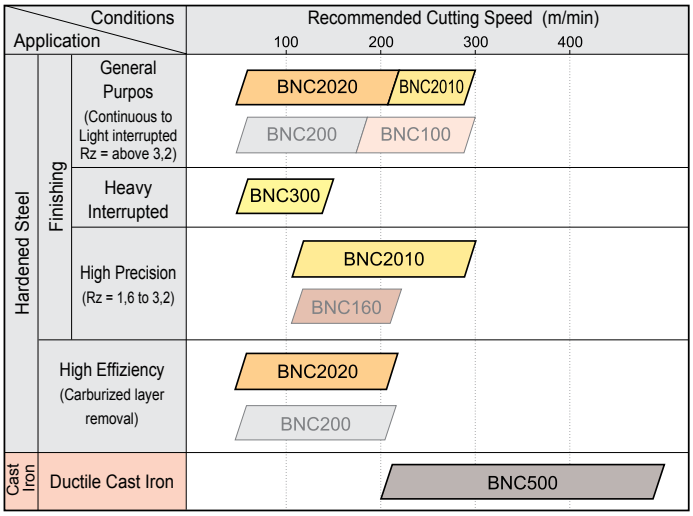
HARDENED STEEL MACHINING

● Advantages of using CBN

In terms of cost investment, it is much lower in machine cost and overhead cost due to the fact that a CNC lathe is cheaper than a grinding machine.
As for the quality of finish, inserts can machine different profiles and the finishing is also commendable as compared to grinding.
Environmentally, sludge treatment for grinding is a hazard to the environment but for turning, the chips can be collected and recycled.

■ Application Range





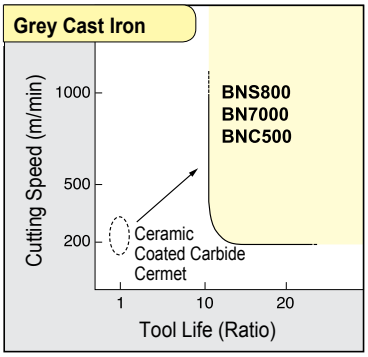
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CAST IRON MACHINING

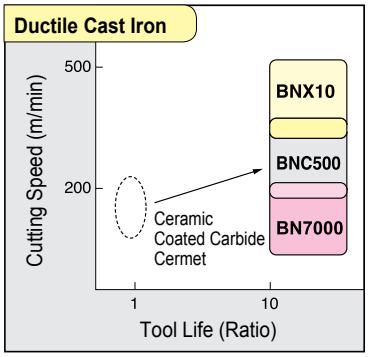
● Advantages of using CBN

Following chart shows merits of using CBN in cast iron machining compared with conventional tool, such as carbide, cermet or ceramics.
SumiBoron performs longer tool life than conventional tools in high speed machining and brings higher efficiency and superior precision.

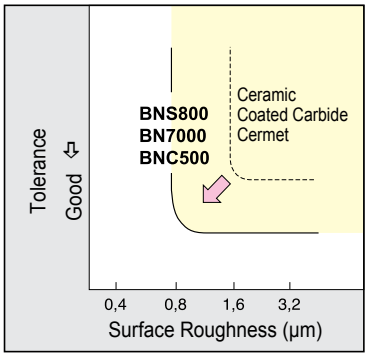
● High Speed Machining



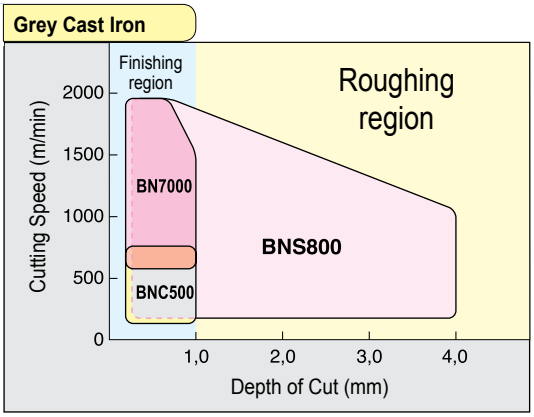
● High Speed Machining

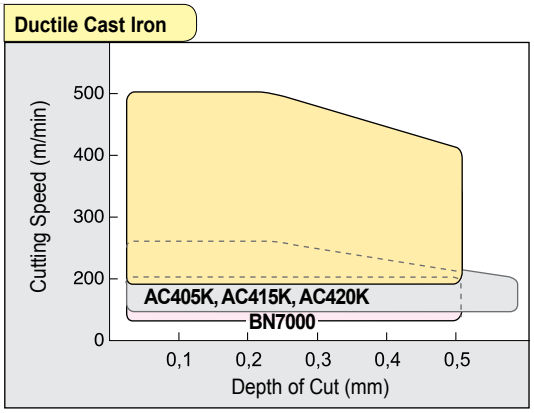


● High Precision Machining



■ Application Range





Insert Identification

Regrindable Type

CNMA120408(-)B

① Insert Identification: ISO ☞ C2/C3

② Additional Information: Table 2

Table 2, Additional Information

Code	Code Description
(–) B	Full-top CBN insert

One-Use Type

CNGG 120408 N-SV NC-WG-4

① Chip Breaker: Table 2*

② One-Use Type: Table 3

③ Wiper Insert: Table 4

④ No. of Cutting Edge: Table 5

*) Additional Information

Table 2*

Code	Code Description
–	Standard Type
LF	Sharp cutting edge
LS	Low cutting force
HS	Strong cutting edge
N-FV N-LV N-SV	Chipbreaker Type

Table 3

Code	One-Use Type	Grade
NC	Coated SUMIBORON	BNC2010, 2020 BNC100, 160 BNC200, 300 BNC500
NU	Uncoated CBN	BNX10, 20 BN1000, 2000 BN350, 700 BN7000, 7500
NS		BNX25

Table 4

Code	Wiper Insert
WG	Finishing 0,05 ≤ f ≤ 0,20
WH	High feed cutting 0,20 ≤ f < 0,40
W	Surface Roughness Standard: R_z 1,6~3,2µm

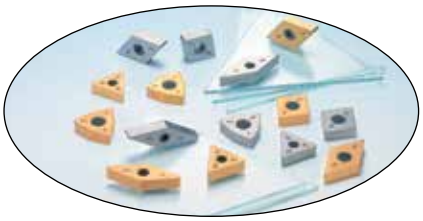
f : Feed Rate (mm/rev)

Table 5

Code	No. of Cutting Edges	
–	1 cutting edge	Single-corner
2	2 cutting edges	Multi-corner
3	3 cutting edges	
4	4 cutting edges	
6	6 cutting edges	

Insert types and cutting edge geometries

Multi Cornered One-Use Type Inserts



■ Characteristics

- One-use type inserts improve machining efficiency by using each cutting edge to its full potential following the numbering system on each cutting edge then throwing the insert away.
- Multi cornered inserts have a single piece of Sumiboron mounted on every useable corner. Single sided inserts use the top corners whilst double sided inserts use both top and bottom corners. Diamond shaped inserts have 4 corners and triangular inserts have 6 corners.
- A variety of Sumiboron coated grades readily replace expensive grinding operations for high precision tolerances outstanding surface finish, heavy interrupted cutting and efficient cost effective machining of hardened parts.

Cutting Edge Preparation

LF type: Sharp cutting edge

For cutting non-ferrous metals

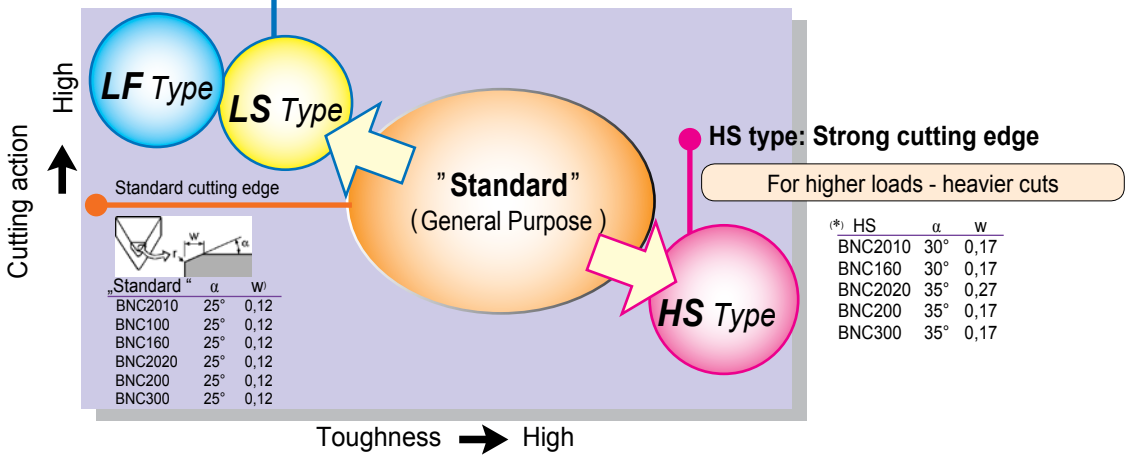
(*) LF	α	w
BN7500	0°	–

LS type: Low cutting force (Negative land + Honing)

(*) LS	α	w
BNC100	15°	0,17
BNC160	20°	0,10
BNC200	15°	0,10

Improved surface finish

For higher dimensional accuracy



„Standard "	α	w)
BNC2010	25°	0,12
BNC100	25°	0,12
BNC160	25°	0,12
BNC2020	25°	0,12
BNC200	25°	0,12
BNC300	25°	0,12

HS type: Strong cutting edge

For higher loads - heavier cuts

(*) HS	α	w
BNC2010	30°	0,17
BNC160	30°	0,17
BNC2020	35°	0,27
BNC200	35°	0,17
BNC300	35°	0,17

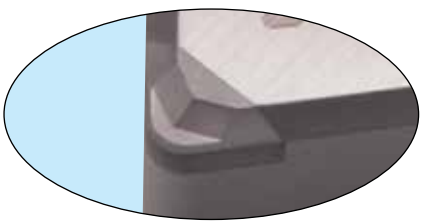
One-Use Wiper Insert



■ Characteristics

- New lineup includes:
  - **WG** Type ⇨ for low-feed cutting
  - **WH** Type ⇨ for high-feed cutting
- SUMIBORON one-use insert with wiper edge for hardened steel machining
- Excellent surface finish similar to grinding
- Improved efficiency with higher speeds and feeds

Break Master N-FV, N-LV

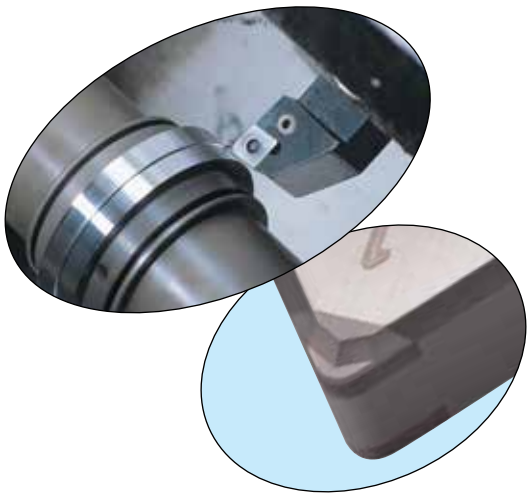


Break Master N-SV Type

■ Characteristics

- N-SV type is perfect for carburised layer removal while N-FV / N-LV types are best suited to finishing of hardened steel.
- First CBN insert to feature an integral chipbreaker
- Ideal for removing carburised layer - can be used on both hardened and unhardened materals.
- Effective chip control solution protects component from swarf damage.

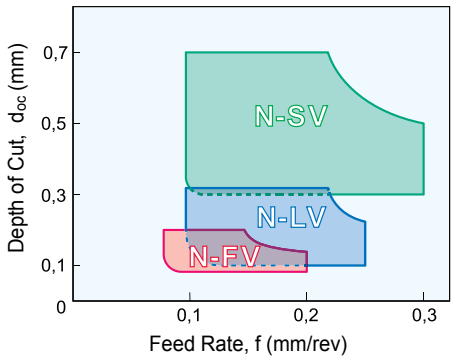
Break Master N-FV /-LV /-SV

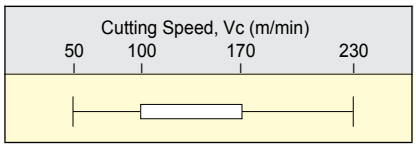


Characteristics

- SUMIBORON one-use insert with chipbreaker.
- N-SV type is perfect for carburised layer removal while N-FV / N-LV types are best suited to finishing of hardened steel.
- Breaker included on the CBN edge, chipbreaking effect can be maintained throughout machining process.
- Unique breaker design can be applied to both hardened and non-hardened parts with effective chip control.
- SV type lineup now includes BNC2010 / BNC160 for good wear resistance, while Coated SUMIBORON BNC2020 / BNC200 allows high efficiency machining.
- In addition to general purpose Coated SUMIBORON BNC2020 / BNC200, the N-FV / N-LV type lineup includes BNC2010 / BNC160 for excellent wear resistance and general purpose uncoated SUMIBORON BN2000.

Application Range

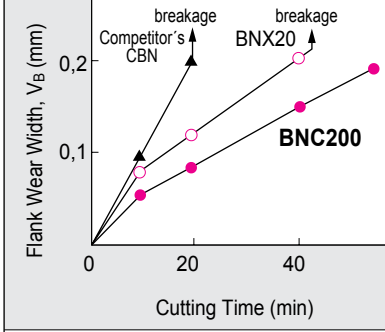




* When machining heat treated steel harder than H_RC50 the depth of cut should not exceed 0,5 mm.

Cutting Performance

Carburised Layer Removal

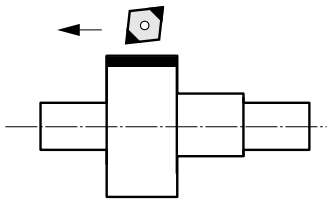


Work material: 42CrMo4
Insert: CNGG120408N-SV NC4
Cutting conditions:
v_c=100m/min, f=0,13mm/rev
d_{oc}=0,4mm, x3 passes, Dry

● Stable tool life with BNC200

Application Examples

External Carburised Layer Removal



No constant stopages or incorrect part dimention problem and the chips are small.

Double the tool life of competitor's CBN



Break Master N-SV
Tool life = 200pcs



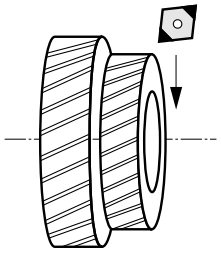
BNC200 (no breaker)
Tool life = 200pcs



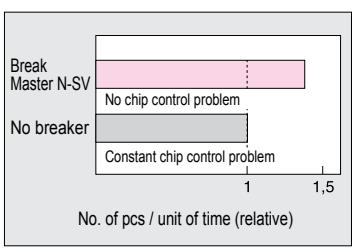
Comp. CBN (no breaker)
Tool life = 100pcs

Work material: 42CrMo4, Carburised steel (shaft)
Insert: CNGG 120408 N-SV NC4 (BNC200)
Conditions: v_c=150m/min, f=0,15mm/rev, d_{oc}=0,5mm, x 2 passes, Wet

Carburised Face Layer Removal



Break Master N-SV type improves chip control with increased productivity until the pre-set tool life.



Work material: 42CrMo4 (HRC30-62)
Insert: CNGG 120408 N-SV NC4 (BNC200)
Conditions: v_c=140m/min, f=0,15mm/rev, d_{oc}=0,3mm, Wet

SUMIBORON
One-Use Wiper Inserts

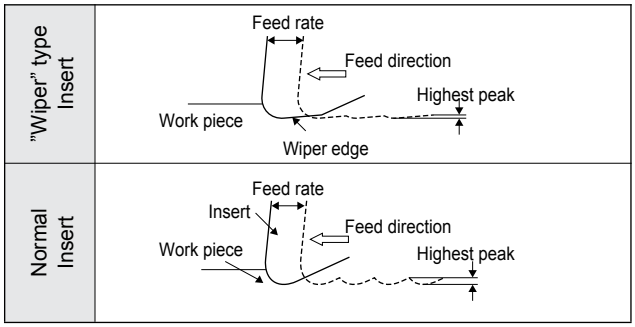


■ Characteristics

- SUMIBORON one-use insert with wiper edge for hardened steel machining
- Excellent surface finish similar to grinding
- Improved efficiency with higher speeds and feeds
- New lineup includes:
  WG type ⇨ for low-feed cutting
  WH type ⇨ for high-feed cutting



■ Purpose of Wiper Edge



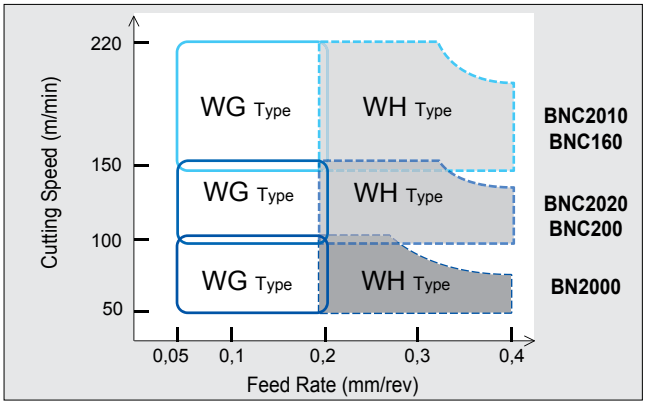
■ Surface Roughness of Wiper Insert

	"Wiper" Insert (r=0,8)		Standard Insert (r=0,8)	
	Finishing (f=0,10mm/rev)	High feed cutting (f=0,30mm/rev)	Finishing (f=0,10mm/rev)	High feed cutting (f=0,30mm/rev)
Surface Roughness Profile	**WG** Type	**WH** Type		
Surface Roughness R_z	0,63µm	1,39µm	1,98µm	9,20µm

■ Recommended Cutting Conditions
(Surface Roughness Standard: R_z = 1,6 ~ 3,2µm)

- For optimum effectiveness, use wiper inserts for continuous cutting.
- For copy turning, inserts with nose-radius is recommended.
- Chattering and undulation may occur, please use work and machine with high rigidity.

Two types are available depending on the feed rate:
WG type: Recommended feed rate: less than **f ≤ 0,20mm/rev**
WH type: Recommended feed rate: more than **f ≥ 0,20mm/rev**
Range of good surface roughness: **R_z=1,6µm to 3,2µm**
Available grades: BN2000, BNC2010, BNC160, BNC2020,BNC200

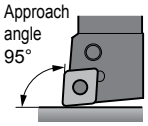


■ Tool-Setup WG / WH Wiper

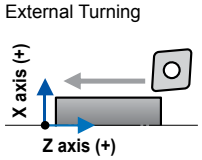
CNGA / CCGW / WNGA Type Wiper

1. Use a holder with a 95° approach angle.
2. Tool **compensation required**.

CNGA / CCGW / WNGA type wiper inserts do not follow the ISO standard. Correction of the tool offset of the cutting edge as explained on the right.



Cutting Edge Position Compensation, Outer Processing

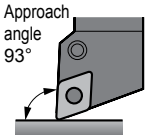


Nose Radius	Type	X-Direction	Z-Direction
R0,4	WG	-0,02	-0,02
	WH	-0,06	-0,06
R0,8/R1,2	WG	-0,01	-0,01
	WH	-0,06	-0,06

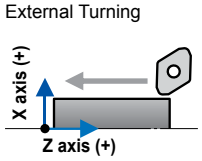
DNGA / DCGW Type Wiper

1. Use a holder with a 93° approach angle.
2. Tool **compensation required**.

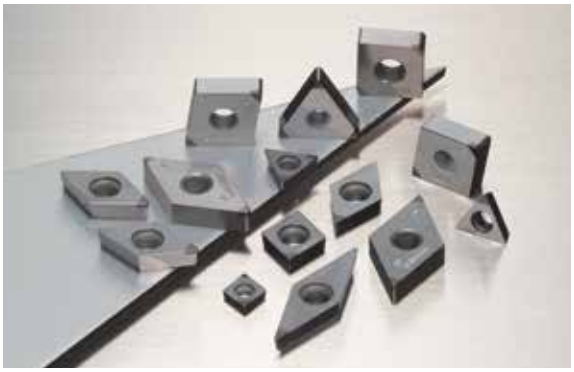
DNGA / DCGW type wiper inserts do not follow the ISO standard. Correction of the tool offset of the cutting edge as explained on the right.
Note: DNGA/DCGW type wiper inserts are only possible for external and internal turning, not for facing.



Cutting Edge Position Compensation, Outer Processing



Nose Radius	Type	X-Direction	Z-Direction
R0,4	WG	-0,17	-0,01
	WH	-0,70	-0,06
R0,8	WG	-0,05	0
	WH	-0,58	-0,05



Uncoated CBN grades for hardened steel machining

■ General Features

A new uncoated type of SUMIBORON that has a newly developed high-purity ceramic binder.
Both fracture and wear resistance are combined to achieve a stable tool life in a wide variety of hardened steel machining.

Available in single corner and multi-corner type inserts.

■ Characteristics

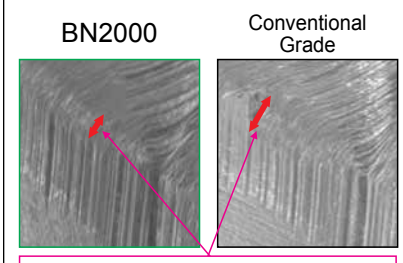
● BN1000

- **Superior high-speed machining grade with the highest wear resistance of any uncoated SUMIBORON.**
  Delivers excellent tool life in continuous cutting to light-interrupted cutting.
- **Improved fracture resistance while also emphasizing wear resistance.**
  Improved hardness and heat resistance from the high-purity TiCN ceramic binder.

● BN2000

- **General purpose grade suitable for typical hardened steel machining applications.**
  Provides stable tool life in everything from continuous cutting to light-to-medium interrupted cutting.
- **High degrees of both fracture resistance and wear resistance.**
  Significant improvements in the performance of both by employing a high-purity ceramic binder.
- **Stable surface roughness by increasing sharpness (Figure on right).**

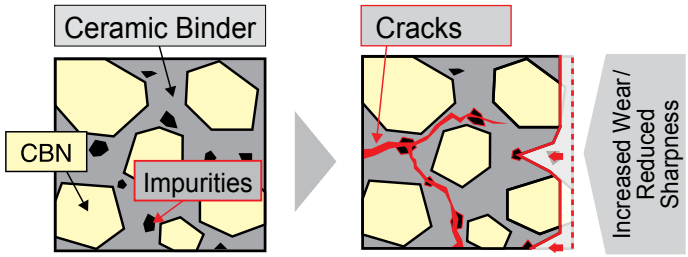
Sharpness Comparison



Compared to conventional grades, small cutting edge roundness

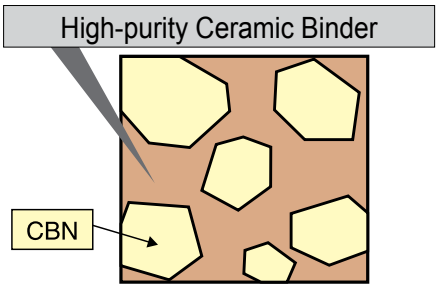
■ Newly Developed High-Purity Ceramic Binder

● Conventional Grade



The impurities contained in the ceramic binder for conventional grades cause a weakening in the sintered body and a decrease in heat resistance, which becomes the cause of cracks (chipping) and wear.

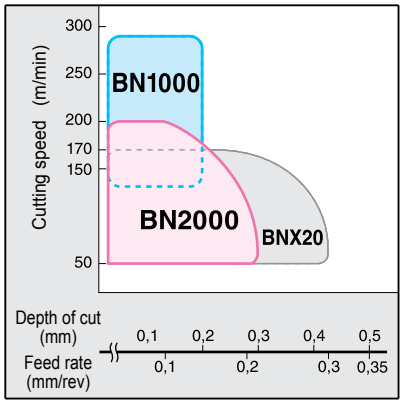
● BN1000 / BN2000



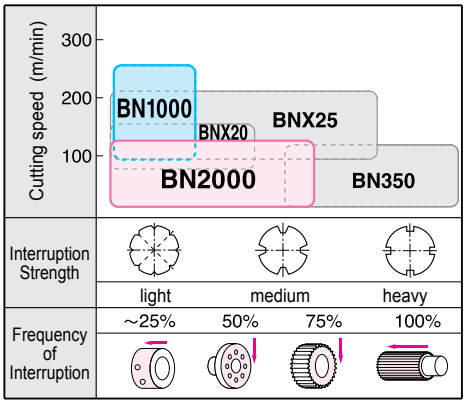
With the newly developed high-purity **ceramic binder**, the BN1000 / BN2000 achieve toughness and improved heat resistance by decreasing impurities to an extreme!

■ Recommended Application Range

● Continuous Cutting



● Interrupted Cutting



■ Cutting Conditions

● BN1000

v_c (m/min)	f (mm/rev)	d_{oc} (mm)
100 150 200 250 300 120	0,03-0,15	0,03-0,2

● BN2000

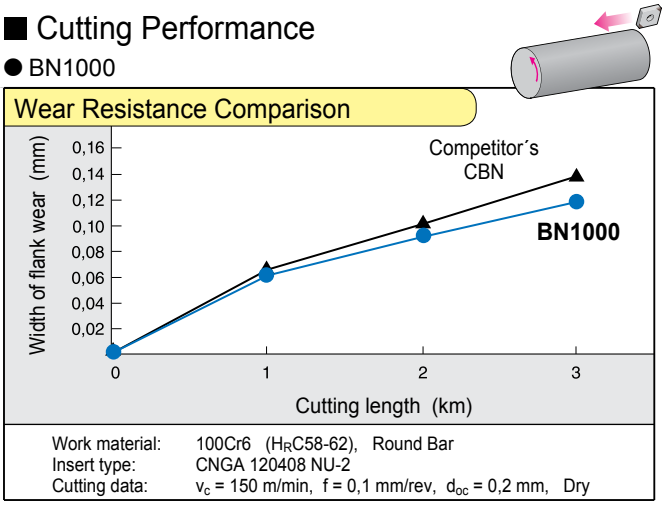
v_c (m/min)	f (mm/rev)	d_{oc} (mm)
50 100 150 200 250 80 120	0,03-0,2	0,03-0,3

* Coolant ... Continuous cutting: Dry or Wet
Interrupted cutting: Dry

Uncoated SUMIBORON
BN1000 / BN2000

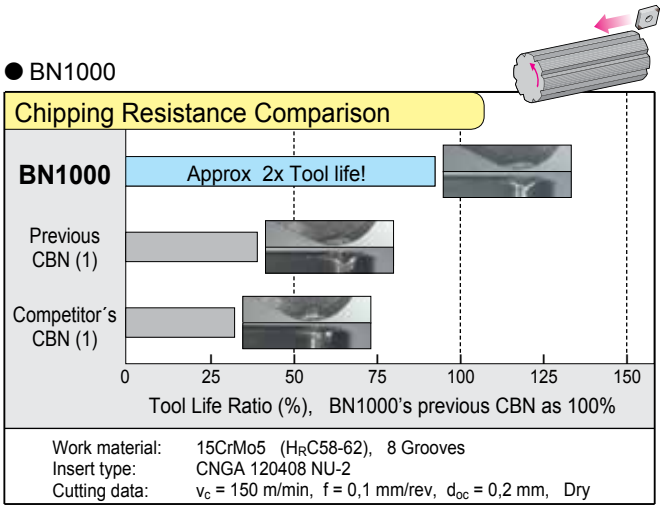
■ Cutting Performance

● BN1000



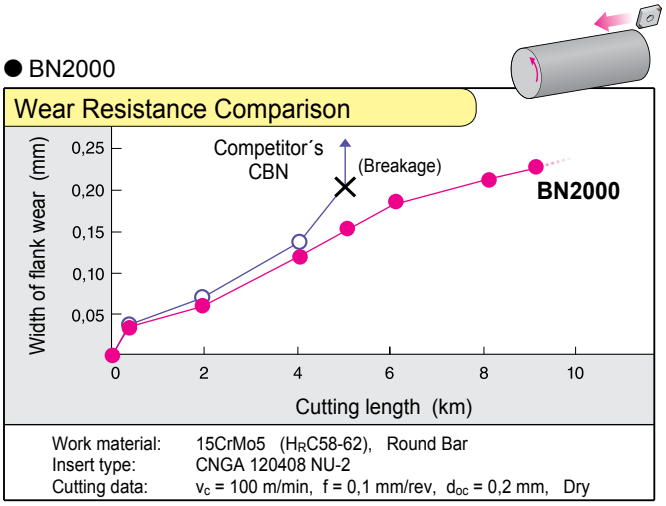
Work material: 100Cr6 (H_RC58-62), Round Bar
Insert type: CNGA 120408 NU-2
Cutting data: v_c = 150 m/min, f = 0,1 mm/rev, d_{oc} = 0,2 mm, Dry

● BN1000



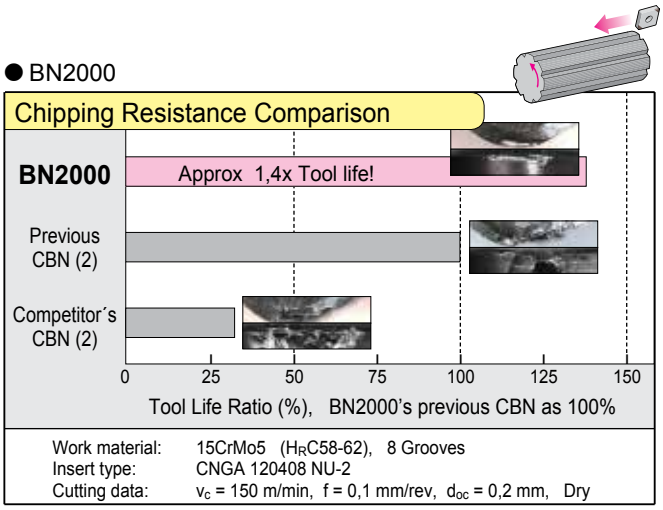
Work material: 15CrMo5 (H_RC58-62), 8 Grooves
Insert type: CNGA 120408 NU-2
Cutting data: v_c = 150 m/min, f = 0,1 mm/rev, d_{oc} = 0,2 mm, Dry

● BN2000



Work material: 15CrMo5 (H_RC58-62), Round Bar
Insert type: CNGA 120408 NU-2
Cutting data: v_c = 100 m/min, f = 0,1 mm/rev, d_{oc} = 0,2 mm, Dry

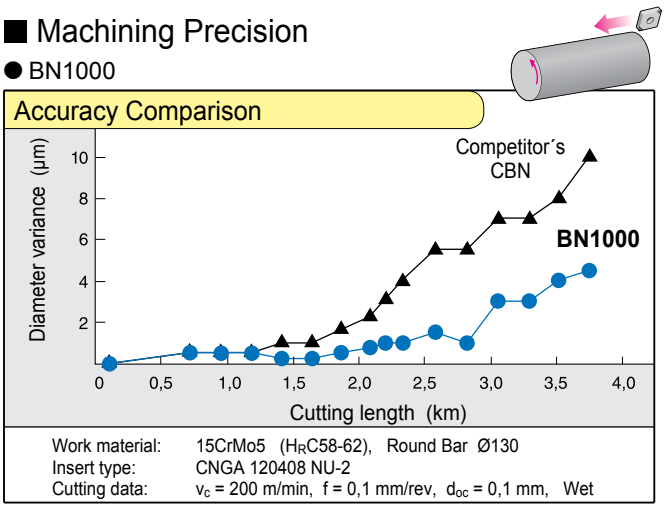
● BN2000



Work material: 15CrMo5 (H_RC58-62), 8 Grooves
Insert type: CNGA 120408 NU-2
Cutting data: v_c = 150 m/min, f = 0,1 mm/rev, d_{oc} = 0,2 mm, Dry

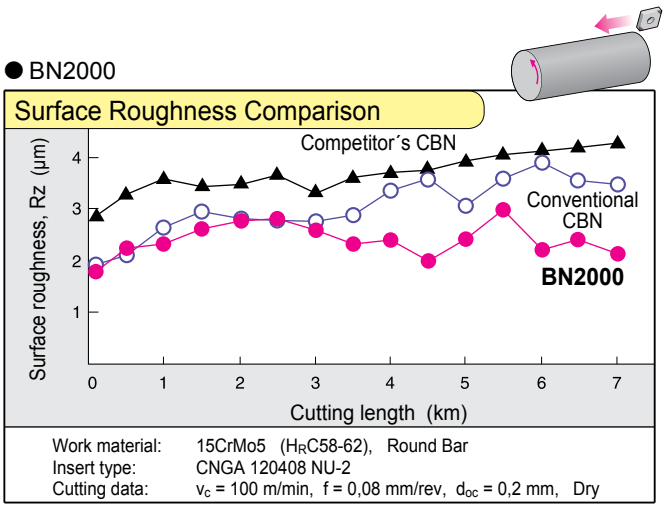
■ Machining Precision

● BN1000



Work material: 15CrMo5 (H_RC58-62), Round Bar Ø130
Insert type: CNGA 120408 NU-2
Cutting data: v_c = 200 m/min, f = 0,1 mm/rev, d_{oc} = 0,1 mm, Wet

● BN2000



Work material: 15CrMo5 (H_RC58-62), Round Bar
Insert type: CNGA 120408 NU-2
Cutting data: v_c = 100 m/min, f = 0,08 mm/rev, d_{oc} = 0,2 mm, Dry



BNC2010 BNC2020



BNC100 BNC160 BNC200 BNC300 BNC500

New Coated SUMIBORON Series, achieving higher speed, higher efficiency and higher precision.

General Features

Using a high heat resistant and tough CBN substrate coupled with a special ceramic coating, this series caters to a wide variety of applications with improved precision and longer tool life as compared to conventional CBN.

There is a comprehensive lineup of economical and easy-to-use insert selection, such as the cost effective double-sided, multi-cornered, one-use type inserts.

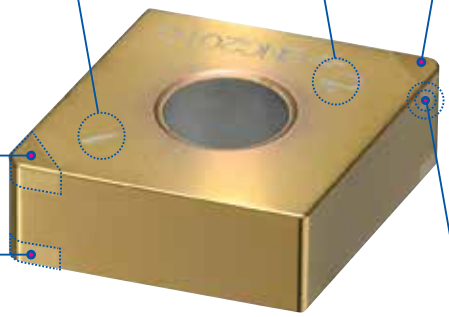
BNC2010 and BNC2020 are the latest additions to the Coated SUMIBORON series, to provide even better stability and longer tool life for hardened steel machining.

Characteristics

Easy Edge Management
Numbering of cutting edges.

Strong Brazing
Utilizing a new brazing method with improved strength.

Double sided, Multi-cornered One-use Insert
More cost effective than conventional one-use inserts.



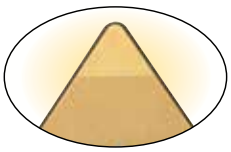
Special Ceramic Coating and Newly Developed CBN Substrate
Provides longer tool life.

Cutting Performance

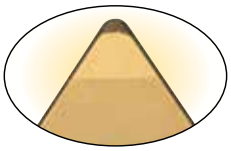
Application \ Conditions			Recommended Cutting Speed (m/min) 100 200 300 400
Hardened Steel	Finishing	General Purpos (Continuous to Light interrupted Rz = above 3,2)	BNC2020 / BNC2010; BNC200 / BNC100
		Heavy Interrupted	BNC300
		High Precision (Rz = 1,6 to 3,2)	BNC2010; BNC160
		High Effiziency (Carburized layer removal)	BNC2020; BNC200
Cast Iron		Ductile Cast Iron	BNC500

Cutting Edge Management

Before use



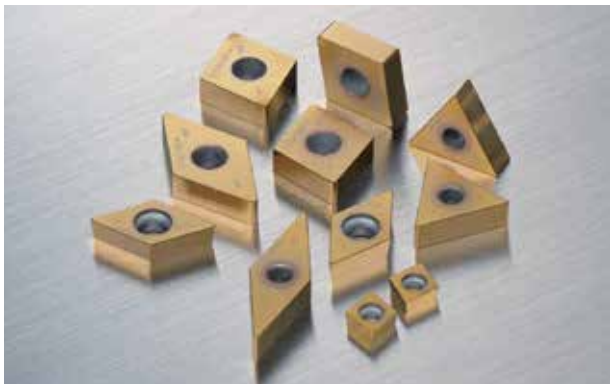
After use

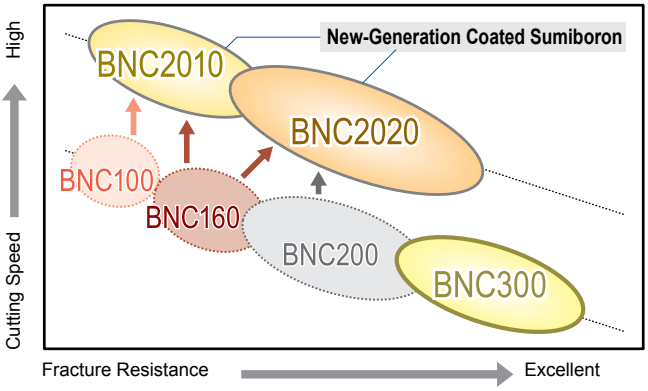


The edge numbers are still visible after machining, which makes the management of used cutting edges easy.

BNC2010 and BNC2020 are coated in gold, which makes it easy to distinguish used edges.

Coated SUMIBORON Characteristics





■ Characteristics of Grades

BNC2010

New

Carbon Content: 50~55%
Grain Size: 2μm
Hardness HV: 30~32GPa
TRS: 1,10~1,20GPa
Main Coating Components: Multi-layered TiCN
Coating Thickness: 1,5μm



High Precision Machining

Newly developed CBN substrate with high crater wear resistance coated with special multi-layered TiCN, which exhibits excellent notch wear resistance.
Ideal for finishing of hardened steel requiring excellent accuracy or surface roughness. Able to stably maintain 1,6R_z finishing.

BNC2020

New

Carbon Content: 70~75%
Grain Size: 5μm
Hardness HV: 34~36GPa
TRS: 1,20~1,30GPa
Main Coating Components: Multi-layered TiAlN
Coating Thickness: 1,5μm



General and High Efficiency Cutting

Newly developed tough CBN substrate with highly wear resistant TiAlN coating. Provides improved stability by inserting a highly adhesive layer between the substrate and the TiAlN layer.
Ideal for general machining including finishing and interrupted cutting as well as high-efficiency machining such as carburised layer removal.

BNC100

Carbon Content: 40~45%
Grain Size: 1μm
Hardness HV: 29~32GPa
TRS: 1,05~1,15GPa
Main Coating Components: TiAlN/TiCN
Coating Thickness: 2,5μm



High Speed Cutting

BNC160

Carbon Content: 60~65%
Grain Size: 3μm
Hardness HV: 31~33GPa
TRS: 1,10~1,20GPa
Main Coating Components: TiAlN/TiCN
Coating Thickness: 2,0μm



High Precision Machining

BNC200

Carbon Content: 65~70%
Grain Size: 4μm
Hardness HV: 33~35GPa
TRS: 1,15~1,25GPa
Main Coating Components: TiAlN
Coating Thickness: 2,0μm



General and High Efficiency Cutting

BNC300

Carbon Content: 60~65%
Grain Size: 1μm
Hardness HV: 33~35GPa
TRS: 1,15~1,25GPa
Main Coating Components: TiAlN
Coating Thickness: 1,0μm



Heavy Interrupted Cutting

■ Recommended Cutting Conditions

Grade	Cutting Speed v_c (m/min) 50 100 (120) 150 (180) 200 (220) 250 300
BNC2010	
BNC2020	
BNC300	
BNC100	
BNC160	
BNC200	

Grade	Feed Rate (mm/rev) / Depth of Cut (mm) 0 0,1 0,2 0,3 0,4 0,5
BNC2010	0,03–0,25 / 0,03–0,35
BNC2020	0,03–0,40 / 0,03–0,50
BNC300	0,03–0,20 / 0,03–0,30
BNC100	0,03–0,20 / 0,03–0,30
BNC160	0,03–0,20 / 0,03–0,35
BNC200	0,05–0,35 / 0,05–0,50

BNC2010/BNC2020

New



Characteristics

BNC2010 - High Precision

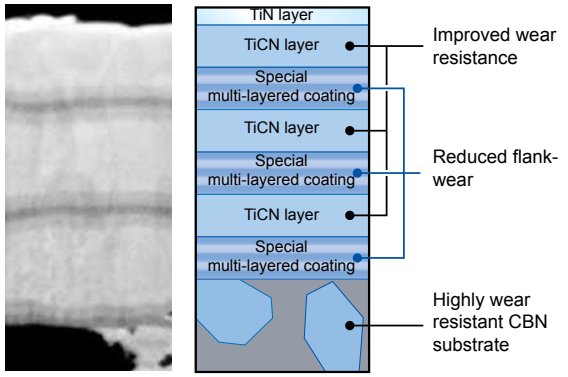
A grade for high-precision machining applicable for finishing requiring good surface roughness and dimensional accuracy.
Provides further improved wear resistance thanks to a newly developed CBN substrate coated with a TiCN layer.
Reduces flank wear and achieves excellent surface finish thanks to newly developed special stable multi-layered coating.

BNC2020 - General Purpose & High Efficiency

A general-purpose grade applicable to general hardened steel machining.
A newly developed tough CBN-substrate coated with a highly wear-resistant TiAlN layer.
Achieves more stable machining and longer tool life by employing a highly adhesive layer for high chipping resistance.

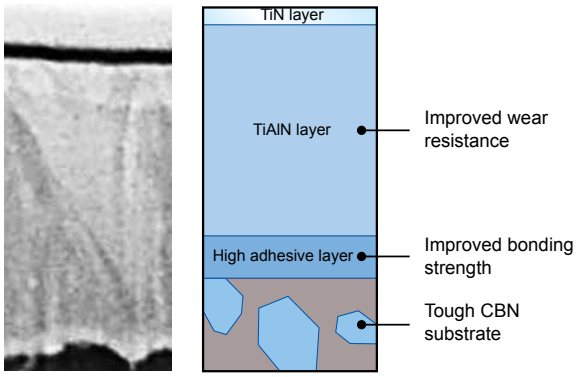
CBN-Substrate and Coating Structure of BNC2010 and BNC2020

BNC2010



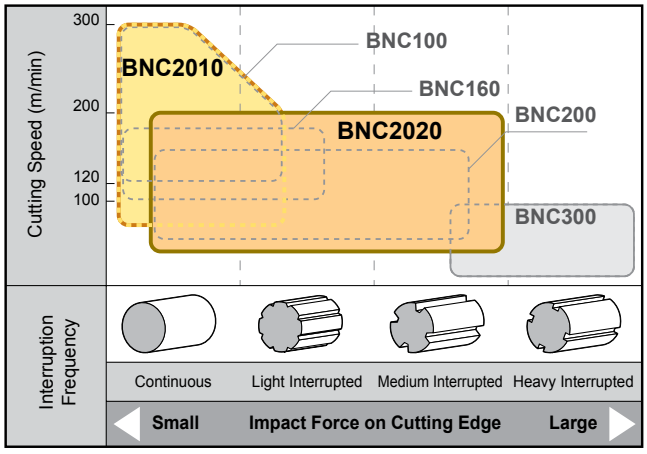
Achieves excellent flank wear resistance thanks to a laminated structure of a TiCN-layer and special multi-layer coating.

BNC2020



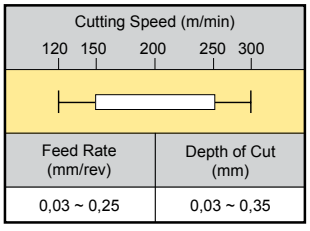
Achieves further stability thanks to TiAlN coating layers with high bonding strength.

Application Range



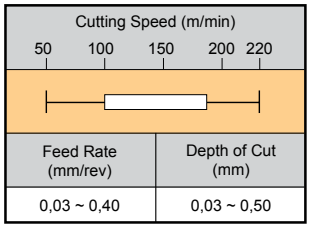
Recommended Cutting Conditions

BNC2010



Feed Rate (mm/rev)	Depth of Cut (mm)
0,03 ~ 0,25	0,03 ~ 0,35

BNC2020



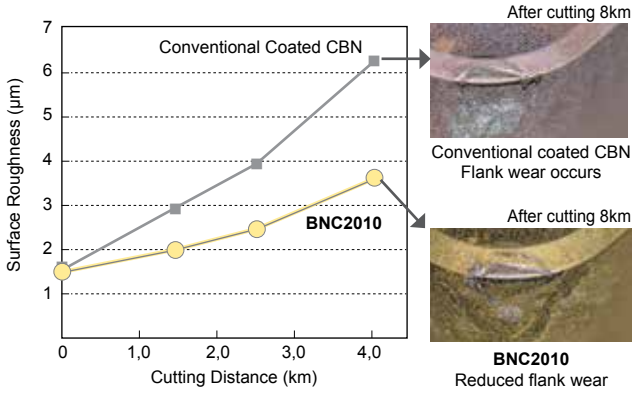
Feed Rate (mm/rev)	Depth of Cut (mm)
0,03 ~ 0,40	0,03 ~ 0,50

New

Coated SUMIBORON BNC2010/BNC2020

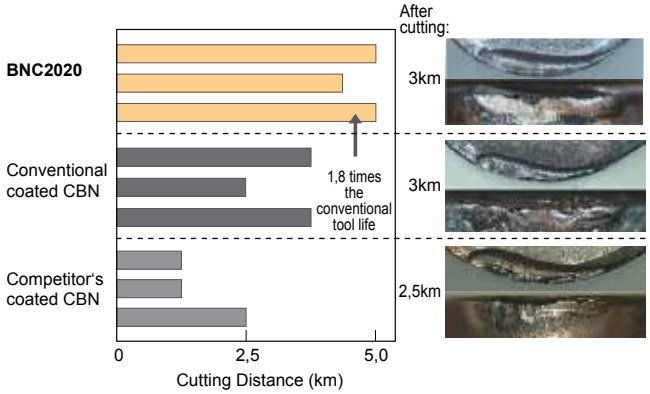
Cutting Performance

BNC2010



Work Material:	15CrMo5, 58-62HRC, Continuous
Insert:	DNGA150408NC4 (BNC2010)
Cutting Edge Treatment:	S01225
Cutting Conditions:	v_c=160m/min, f=0,08mm/rev, a_p=0,1mm, Wet

BNC2020

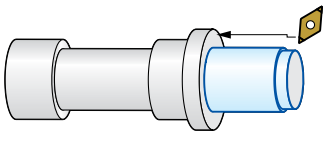


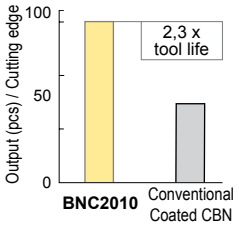
Work Material:	SCM415-5V, 58-62HRC, Interrupted
Insert:	CNGA120412NC4 (BNC2020)
Cutting Edge Treatment:	S01225
Cutting Conditions:	v_c=130m/min, f=0,1mm/rev, a_p=0,6mm, Dry

Application Example

Continuous External Turning of Main Shaft

BNC2010 provides excellent wear resistance and achieves excellent surface roughness.

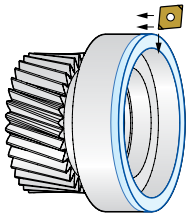


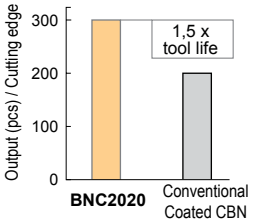


Insert:	DNGA150408NC4 (BNC2010)
Cutting Conditions:	v_c=200m/min, f=0,10mm/rev, a_p=0,35mm, Dry

Carburised Layer Removal for Sun Gears

BNC2020 achieves a longer tool life in high load cutting.

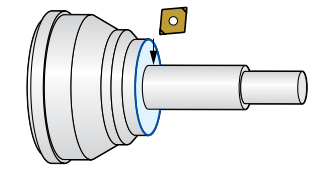


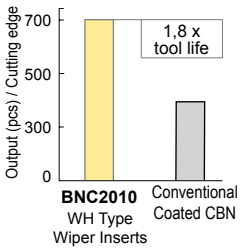


Insert:	DNGA120408NC4 (BNC2020)
Cutting Conditions:	v_c=100m/min, f=0,15mm/rev, a_p=0,5mm, Wet

Facing of CVJ Outer Race

BNC2010 with a WH type wiper insert maintains excellent surface finish for an extended time.

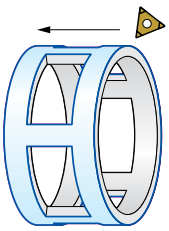


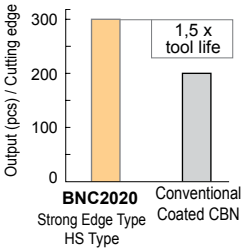


Insert:	CNGA120412NCWH2 (BNC2010)
Cutting Conditions:	v_c=150m/min, f=0,2mm/rev, a_p=0,2mm, Dry

Interrupted Machining of CVJ Cage Window

BNC2020 strong edge HS type provides stable performance in interrupted cutting.

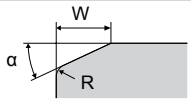




Insert:	TNGA160420HSNC3 (BNC2020)
Cutting Conditions:	v_c=120m/min, f=0,10mm/rev, a_p=0,15mm, Dry

Cutting Edge Preparation

Grade	General Edge Treatment	Strong Edge Type: HS
	Edge Treatment	Edge Treatment
BNC2010	S01225	S01730
BNC2020	S01225	S02735



Edge Treatment Identification Code

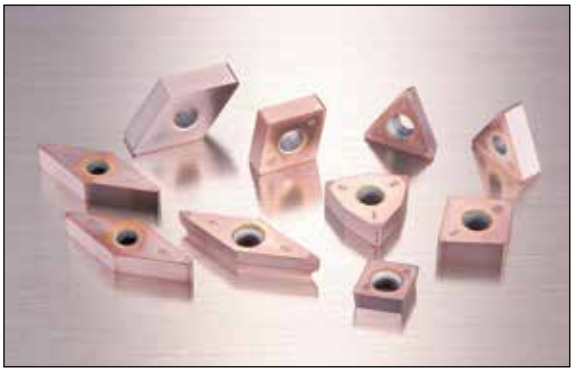
S 0 1 2 2 5

W: Negative Land Width

α: Negative Land Angle

Cutting Edge: **T** - Negative Land
S - Negative Land + **R** - Honing

Coated Sumiboron premium grade for high speed machining of hardened steels



General Features

Our copper coloured Sumiboron grade BNC 100 resists premature plastic deformation of the cutting edge by withstanding the high temperatures that occur when machining hardened steels. This new grade features a heat resistant CBN substrate and a special TiCN based ceramic coating to enhance surface finish across a broad range of finishing applications at elevated cutting speeds.

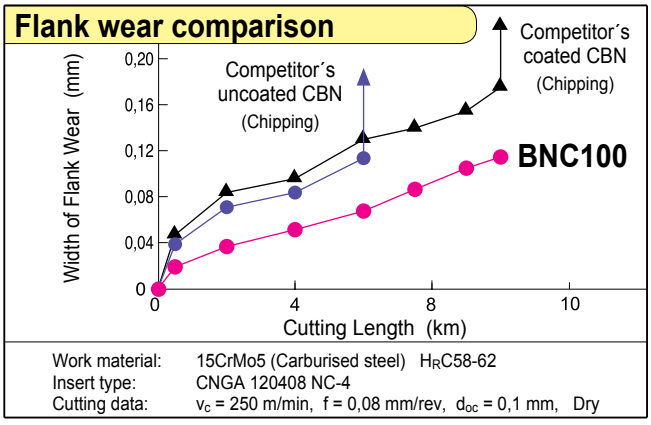
Ideal for higher speed machining and suitable for continuous or light interrupted cuts BNC100 delivers reliable performance and excellent tool life

Advantages

- **High speed machining!**
  Suitable for continuous to light interrupted high speed cutting with v_c = 150 ~ 300 m/min.
- **Extended tool life!**
  Wear resistant ceramic coating and tough CBN substrate considerably extends tool life.
- **Excellent surface finish!**
  A consistent surface finish to values less than 6,3 Rz is easily achieved on both continuous and light interrupted cut applications.

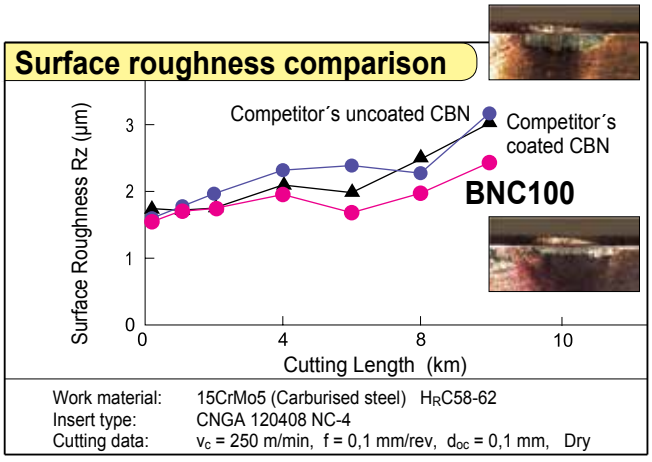
Performance

Flank wear comparison



Work material: 15CrMo5 (Carburised steel) H_RC58-62
Insert type: CNGA 120408 NC-4
Cutting data: v_c = 250 m/min, f = 0,08 mm/rev, d_{oc} = 0,1 mm, Dry

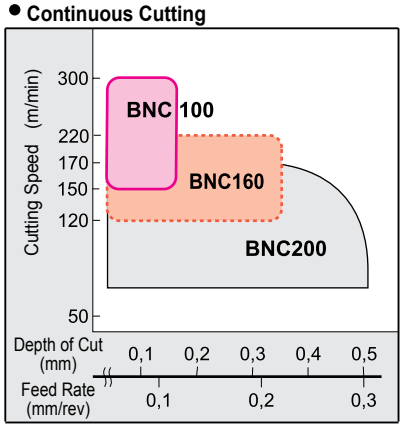
Surface roughness comparison



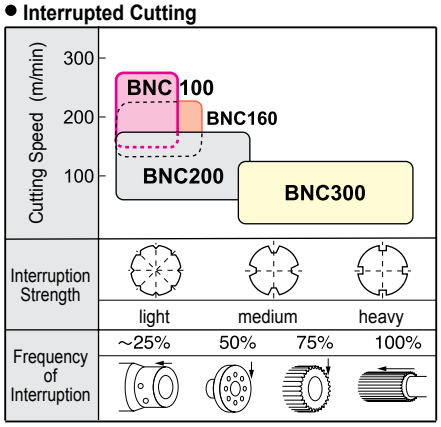
Work material: 15CrMo5 (Carburised steel) H_RC58-62
Insert type: CNGA 120408 NC-4
Cutting data: v_c = 250 m/min, f = 0,1 mm/rev, d_{oc} = 0,1 mm, Dry

Application Range

● **Continuous Cutting**



● **Interrupted Cutting**



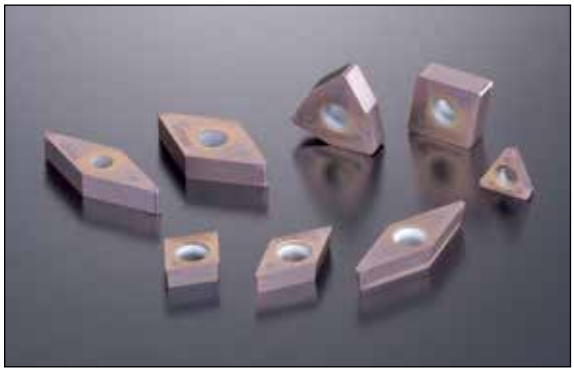
Recommended Cutting Conditions

v_c (m/min) 100 150 200 250 300	f (mm/rev)	d_{oc} (mm)
	0,03-0,2	0,03-0,3

Coolant ... Continuous cutting: Dry or Wet
Interrupted cutting: Dry

Coated SUMIBORON BNC160

High precision machining with surface finishes down to 1,6 Rz possible thanks to smooth coating!



■ General

Use the copper coloured Sumiboron grade BNC160 to improve surface integrity as well as machining accuracy.
The TiCN based smooth surface ceramic coating and the newly developed Sumiboron substrate enhances edge strength and wear resistance making high precision machining with surface finishes as low as 1,6Rz readily achievable.

This new grade is ideal for turning components that previously relied on precision grinding machines for final machining.

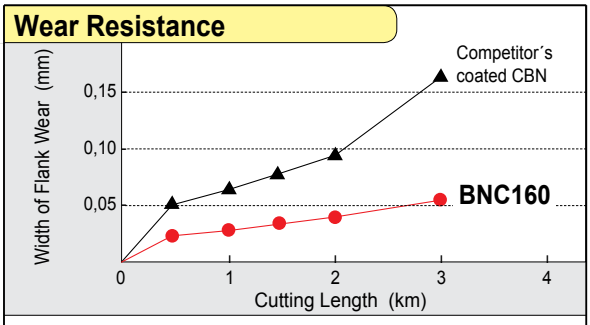
■ Advantages

- **Excellent surface roughness!**
  A consistent surface roughness is maintained for hours because wear at the boundary is so gradual.
- **High Precision Machining**
  High precision work previously ground, can now be turned.
- **Enlarged scope of application!**
  A wider range of hardened steels can be cut using Sumiboron the result being high productivity on close tolerance machining applications.

■ Performance

● **Continuous Cutting**

Wear Resistance



Work material: 15CrMo5 (H_RC60)
Insert type: CNGA 120408 NC-4
Cutting data: v_c = 200 m/min, f = 0,1 mm/rev, d_{oc} = 0,1 mm, Dry

● **Machining Accuracy**

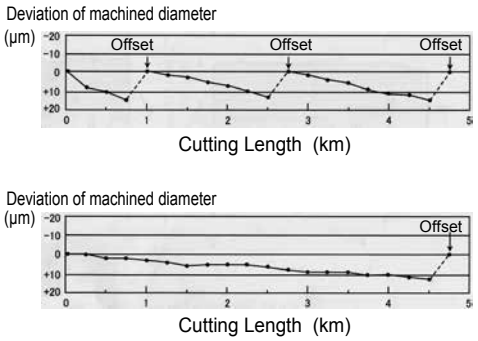
Competitor´s coated CBN



BNC160

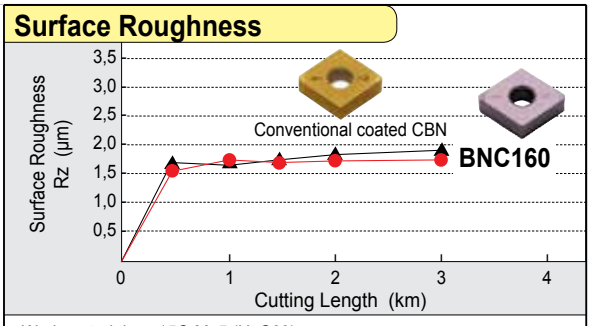


Machining after 3 km



● **Continuous Cutting**

Surface Roughness



Work material: 15CrMo5 (H_RC60)
Insert type: CNGA 120408 NC-4
Cutting data: v_c = 200 m/min, f = 0,1 mm/rev, d_{oc} = 0,1 mm, Dry

■ Recommended cutting Conditions

v_c (m/min) 120 150 200 220 250	f (mm/rev)	d_{oc} (mm)
	0,03-0,2	0,03-0,35

Feed rate and nose radius are set such that the theoretical surface roughness is 1/2 to 1/3 of the required surface roughness.

Coolant ... Continuous cutting: Dry or Wet
Interrupted cutting: Dry

Most suitable for high speed finishing !

Excellent wear and fracture resistance!
Predictable tool life on a wide range of applications!



■ General

Our silver coloured Sumiboron insert grade BNC200 offers safe reliable cutting and predictable tool life.

The newly developed cutting material with enhanced edge strength is coated with TiAlN based ceramic for excellent wear resistance and realises extended tool life even when interrupted cutting.
This grade is especially suitable for medium speed machining of carburised surfaces.

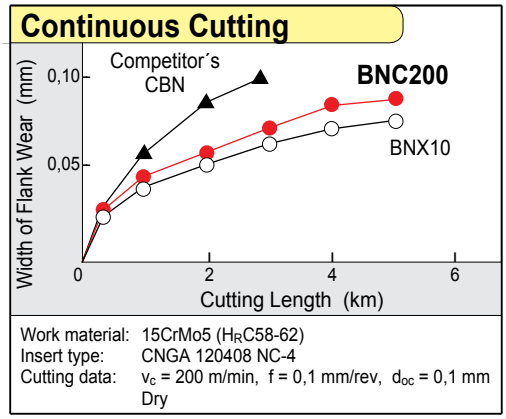
■ Advantages

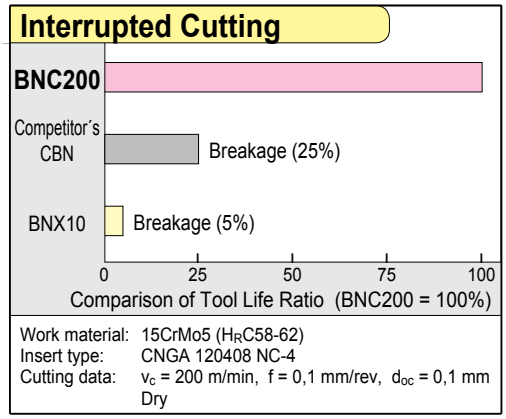
- **Predictable tool life!**
  Extended tool life is realised even when high speed cutting thanks to excellent wear resistance.

- **Wide range of applications!**
  Sumiboron is suitable for a wide range of applications eg. from low to high speed interrupted cutting.

- The newly developed brazing technology maximises edge strength making Sumiboron suitable for interrupted and continuous cutting.

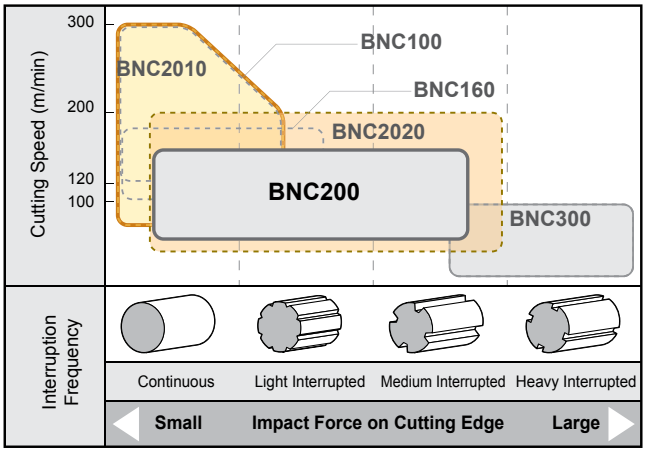
■ Performance





- **BNC200 features excellent wear resistance comparable with BNX10, plus outstanding fracture resistance.**

■ Application Range



■ Recommended Cutting Conditions

vc (m/min) 50 80 170 220	f (mm/rev)	doc (mm)
	0,03-0,25	0,05-0,5

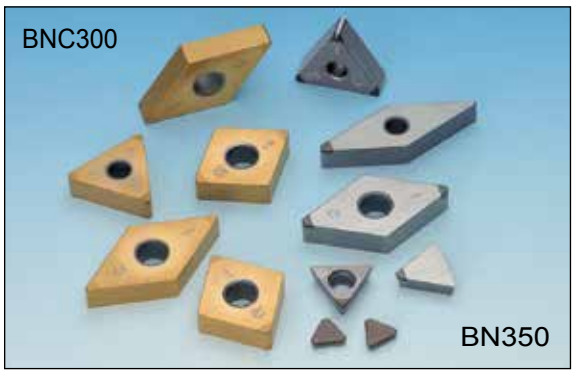
Coolant ... Continuous cutting: Dry or Wet
Interrupted cutting: Dry

Can be used in a wide range of applications from low to high speed operation.

Coated / Uncoated SUMIBORON

BNC300 / BN350

The ultimate grades BNC300 and BN350 in interrupted machining of hardened steel



General Features

● BNC300

Newly developed CBN substrate that emphasizes on toughness coupled with a highly wear resistant TiAlN based coating layer that has improved adhesion strength. With a good balance of fracture and wear resistance, stable and longer tool life can be achieve in interrupted cut or in a mixture of continuous and interrupted cutting.

● BN350

SUMIBORON series highest fracture resistance and toughest CBN. Reliable grade for achieving stable tool life in heavy interrupted cutting conditions.

Characteristics

BNC300

● **Stable and long tool life in interrupted cutting**
Achieving stable and long tool life in heavy interrupted cutting, with superior fracture resistance.

● **Superior dimensional precision**
Good adhesion strength, TiAlN based, high wear resistance coating. Achieving superior dimensional precision even in interrupted cutting.

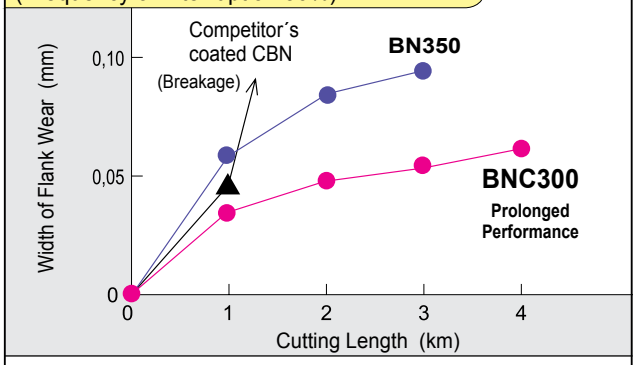
● **Suitable for different types of workpieces**
Achieving significantly longer tool life even on workpieces that have a mixture of continuous and interrupted cutting.

BN350

● **Stable and long tool life in interrupted cutting**
Stable and long tool life with superior fracture resistance, that prevents fractures which commonly occurs during interrupted cutting.

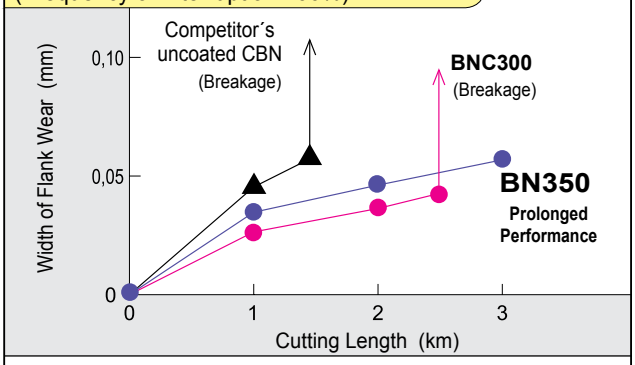
Performance

Continuous ~ Light Interrupted Machining (Frequency of Interruption 50%)



Work material: 15CrMo5 (H_RC58-62)
Insert type: CNGA 120408 NC-4
Cutting data: v_c = 120 m/min, f = 0,1 mm/rev, d_{oc} = 0,2 mm, Dry

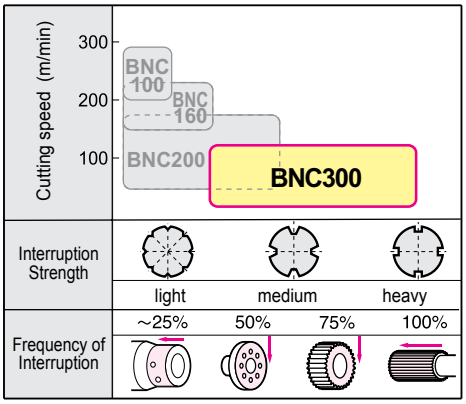
Heavy Interrupted Machining (Frequency of Interruption 100%)



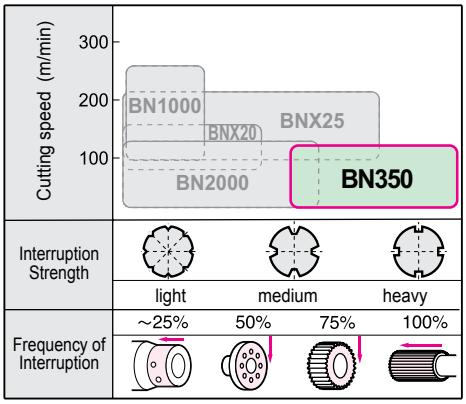
Work material: 15CrMo5 (H_RC58-62)
Insert type: CNGA 120408 NU-2
Cutting data: v_c = 100 m/min, f = 0,1 mm/rev, d_{oc} = 0,2 mm, Dry

Recommended Application Range

● Coated SUMIBORON



● Uncoated SUMIBORON



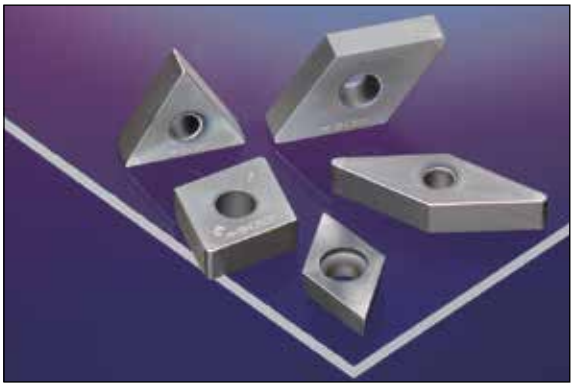
Recommended Cutting Conditions (BNC300, BN350)

v_c (m/min)	f (mm/rev)	d_{oc} (mm)
50 100 150 200 80 120	0,03-0,2	0,03-0,3

■ Coolant ... Interrupted cutting: Dry

SUMIBORON

Coated CBN grade for ductile cast iron machining

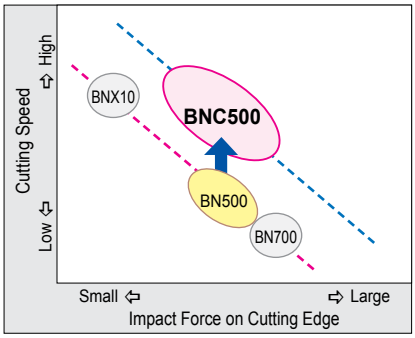


General Features

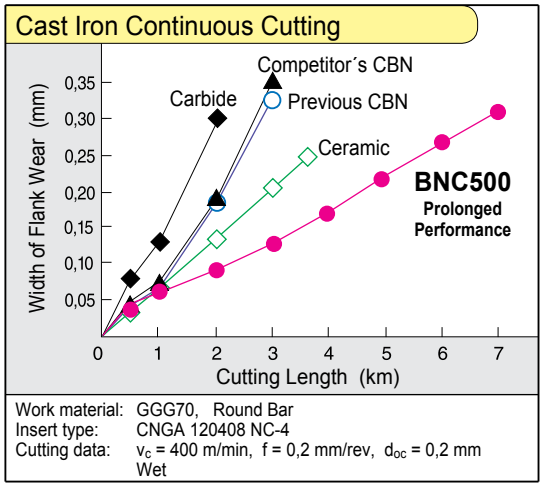
Further improvements in the toughness of the sintered CBN and wear resistance from the application of a newly developed high-purity TiC binder. In addition, it demonstrates exceptional wear resistance by combining a ceramic coating with excellent heat resistance. High-speed and high-precision machining is achieved when finishing ductile cast iron. It also provides a long, stable tool life in machining high-strength ductile cast iron, special cast irons such as vermicular cast iron, and centrifugally cast iron.

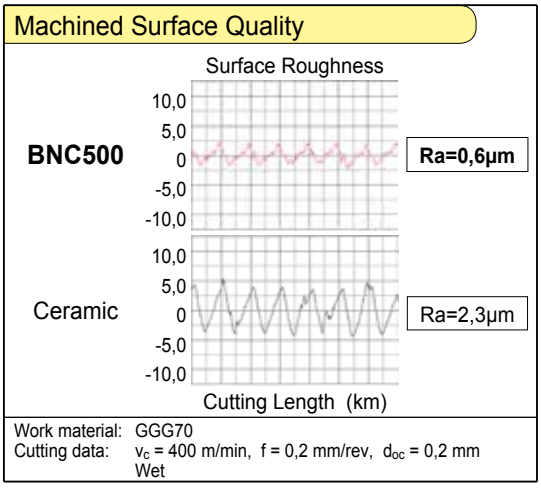
Characteristics

- **Achieves a Long, Stable Tool Life at v_c=400 m/min**
  Superior wear resistance, makes stable machining possible under high-speed conditions.
- **Supports High-precision Machining**
  Can maintain excellent dimensional tolerance and surface roughness.

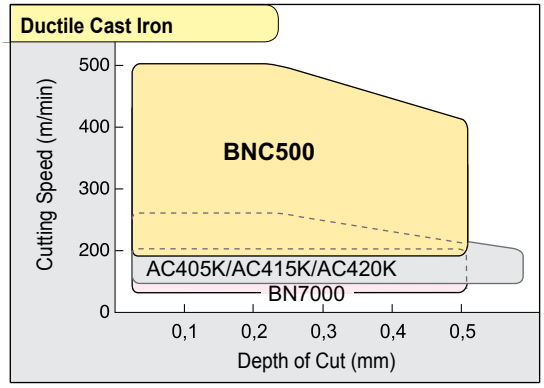


Cutting Performance

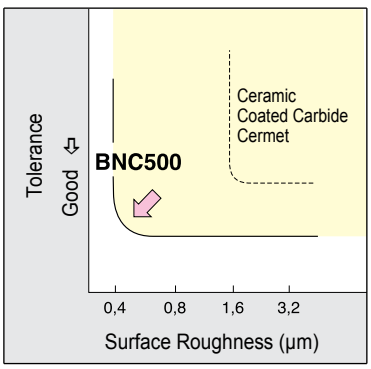




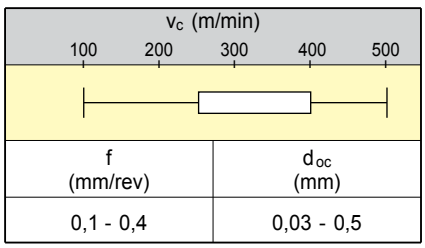
Application Range



High Precision Machining



Recommended Cutting Conditions

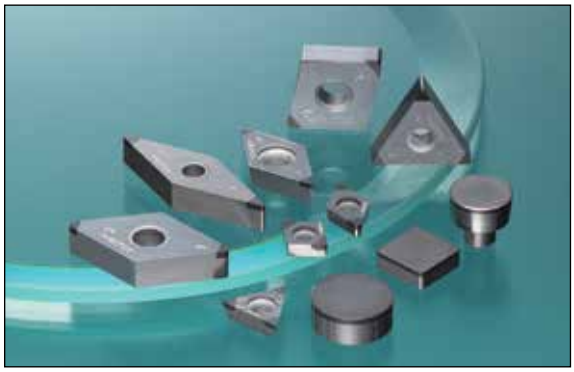


f (mm/rev)	d_{oc} (mm)
0,1 - 0,4	0,03 - 0,5

* Coolant ... Wet

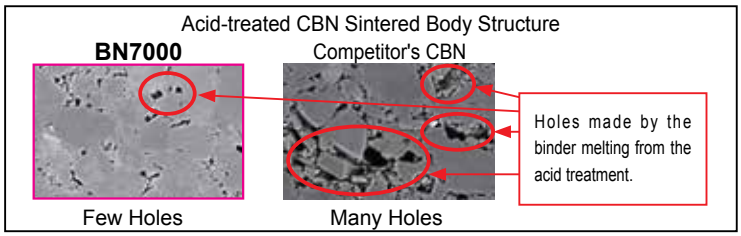
Uncoated SUMIBORON
BN7000

Uncoated CBN grade for high-speed finishing of cast iron, powdered metals, and difficult-to-machine materials!



■ General Features

Medium-grain CBN sintered to a high density to achieve the maximum content percentage.
Also delivers superior fracture resistance by increasing the binding strength between CBN particles. Provides stable, long tool life for high-speed finishing work with cast iron, powdered metals, and difficult-to-machine materials.



■ Characteristics

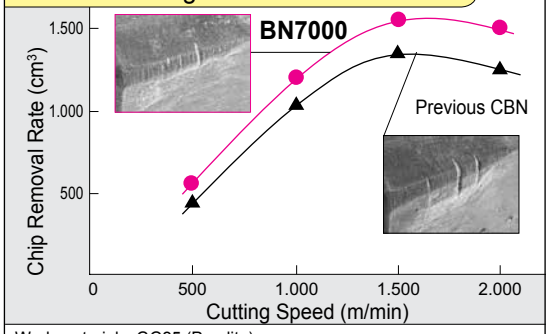
● **Excellent for high speed finishing of Cast Iron!**
Good wear and fracture resistance in high speed machining of Grey Cast Iron.

● **High efficiency machining of powdered metal**
With 4 different types of edge treatment, stable and long tool life can be achieved from machining of Sintered Alloys of any shape or hardness.

● **Able to machine any Exotic Metals.**
Long tool life can also be achieved for the machining of exotic materials such as Roll, HSS and Heat-Resistive Alloy etc.

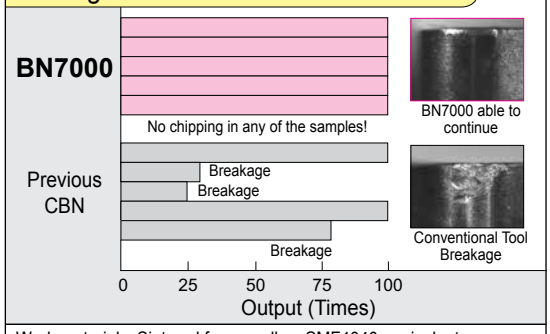
■ Cutting Performance

Cast Iron Milling



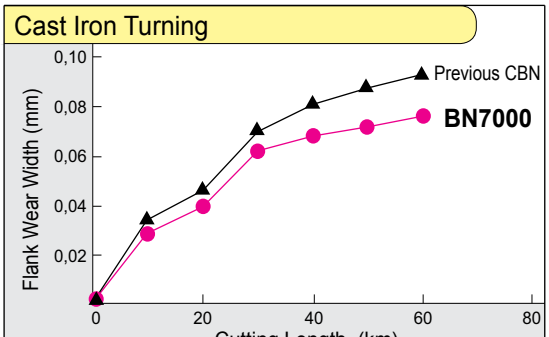
Work material: GG25 (Pearlite)
Insert (Cutter): SNEW 1203 ADTR, (FMU 4100 R)
Cutting data: v_c = 500 ~ 2.000 m/min, f = 0,2 mm/rev
d_{oc} = 0,3 mm, Wet

Turning of Powdered Metal



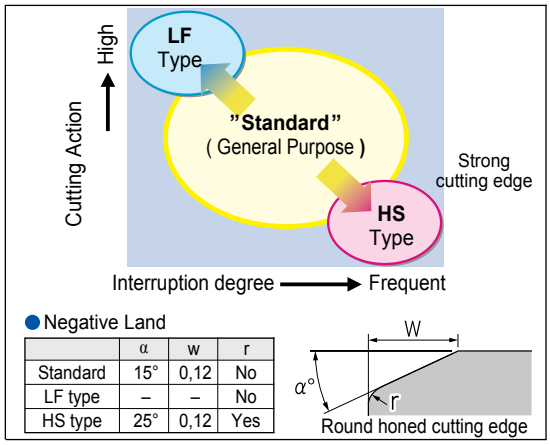
Work material: Sintered ferrous alloy, SMF4040 equivalent (HRB70, Interrupted Machining)
Insert type: CNGA 120408
Cutting data: v_c = 250 m/min, f = 0,1 mm/rev, d_{oc} = 0,3 mm, Wet

Cast Iron Turning



Work material: GG30 (Pearlite)
Insert type: CNGA 120408 NU-2
Cutting data: v_c = 800 m/min, f = 0,15 mm/rev, d_{oc} = 0,2 mm, Wet

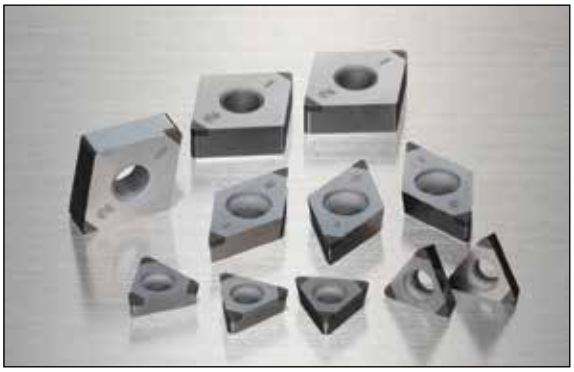
■ Recommended Edge Treatment



● Negative Land

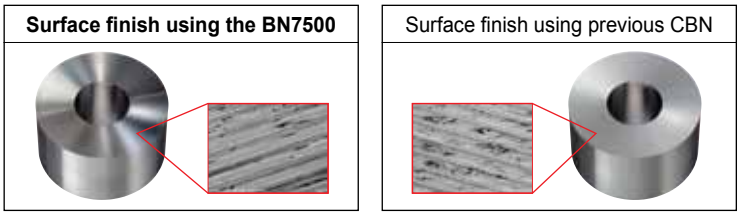
	α	w	r
Standard	15°	0,12	No
LF type	–	–	No
HS type	25°	0,12	Yes

Uncoated CBN grade for high precision and high efficiency machining of powdered metal



■ General Features

High density sintered material made of micro-grained CBN grains provide excellent sharpness and wear resistance for high quality surfaces in sintered alloy finishing.



The previous CBN left white blemishes on the finished surface whereas the BN7500 leaves a better, glossy surface finish.

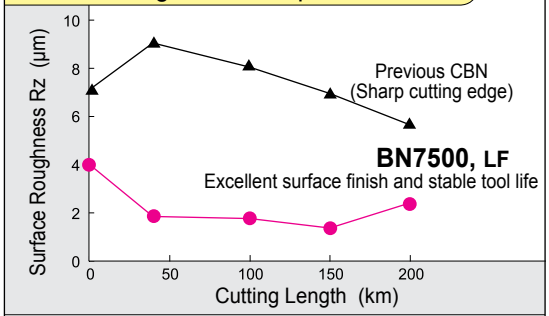
■ Characteristics

● **Excellent for finishing of powdered metal**
Excellent machined surface finish and surface appearance.

● **Available with 3 different types of edge treatment for machining sintered alloys of any shape or hardness**
The LF type has a sharper edge designed specifically for machining sintered alloys with minimal burr and improved machining precision.
The HS Type has a strengthened cutting edge for stable chipping resistance during interrupted cutting and finishing.

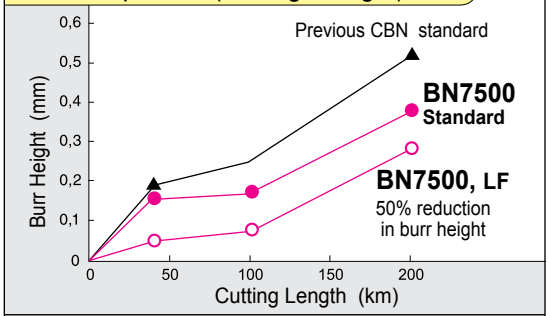
■ Cutting Performance

Surface Roughness Comparison



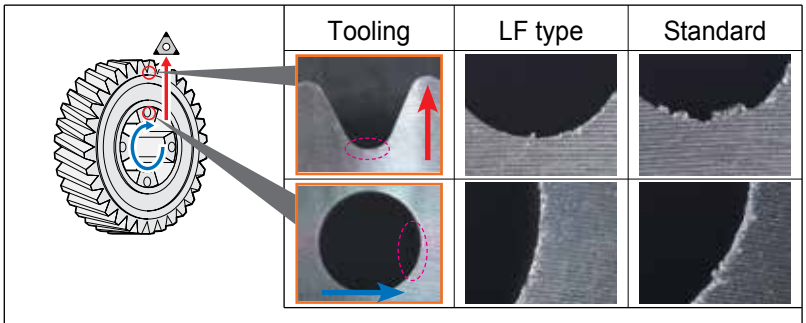
Work material: Sintered ferrous alloy, SMF4040 equivalent (HRB70, Continuous cut)
Insert type: CNGA 120408 LF-NU2
Cutting data: v_c = 200 m/min, f = 0,1 mm/rev, d_{oc} = 0,1 mm, Wet

Burr Comparison (Average Height)



Work material: Sintered ferrous alloy, SMF4040 equivalent (HRB70, Continuous cut)
Insert type: CNGA 120408 LF-NU2
Cutting data: v_c = 200 m/min, f = 0,1 mm/rev, d_{oc} = 0,1 mm, Wet

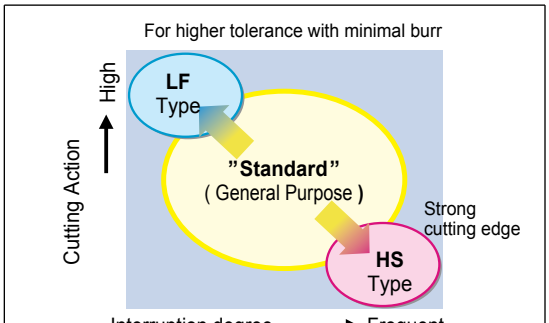
● Feed and Burr Relationship



The LF Type without negative land has a cutting edge sharpness superior to the standard type and can control burrs better.

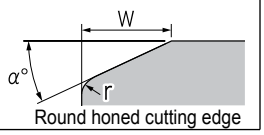
Work material: VVT Facing
Insert type: TNGA 160404 NU3
Cutting data: v_c = 200 m/min, f = 0,1 mm/rev, d_{oc} = 0,1 mm, Wet

■ Recommended Edge Treatment



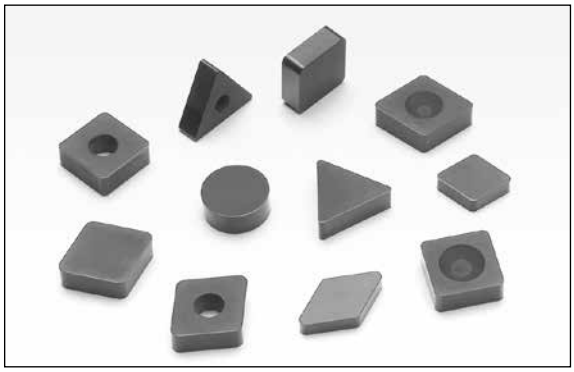
● Negative Land

	α	w	r
Standard	15°	0,12	No
LF type	–	–	No
HS type	25°	0,05	Yes



Uncoated SUMIBORON
BNS800

Solid CBN grade for high speed rough and finish machining of cast cron



■ General

Solid CBN grade with high content CBN and special binder phase provide high fracture toughness and high thermal conductivity.

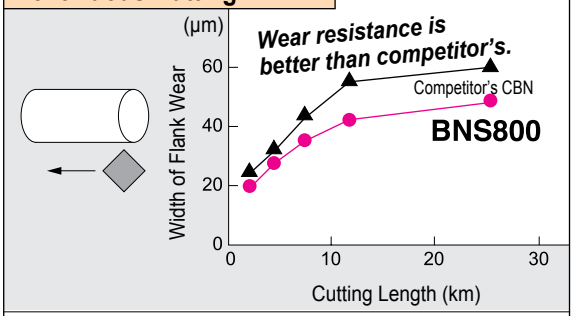
Solid inserts for roughing with high depth of cut and also for finishing of cast iron and alloyed cast iron at wet and dry conditions.

■ Advantages

- **High wear resistance !**
  High CBN-content and special binder phase provide a excellent wear resistance and a tight dimensional control in finish machining.
- **High edge stability !**
  High thermal conductivity of BNS800 and high edge stability provide a long tool life at wet and dry machining.

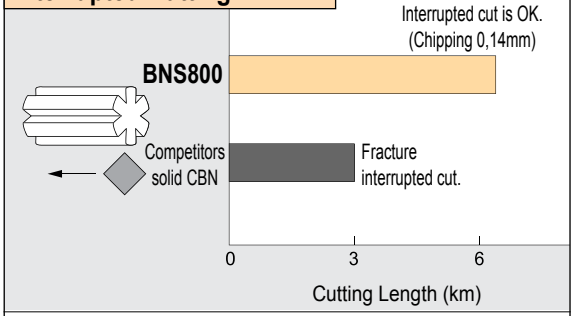
■ Performance

Continuous Cutting



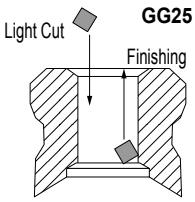
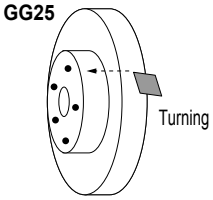
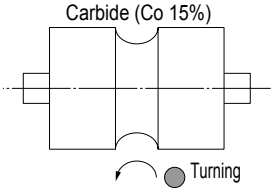
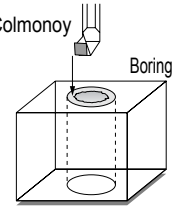
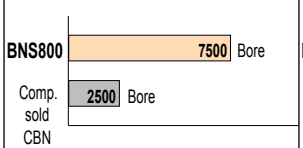
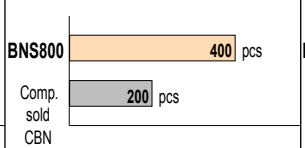
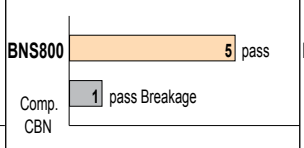
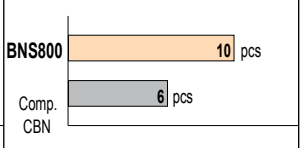
Work material: Round Bar (GG30)
Insert type: SNGN 090308
Cutting data: v_c = 800 m/min, f = 0,2 mm/rev, d_{oc} = 0,5 mm, Dry

Interrupted Cutting



Work material: Round Bar- 6V, grooved (GG30)
Insert type: SNGN 090308
Cutting data: v_c = 600 m/min, f = 0,3 mm/rev, d_{oc} = 0,5 mm, Dry

■ Application Example

● Cylinder Bore	● Brake Disc	● Carbide Roll	● Sprayed Face Bore
			
(Tool life criteria : Finishing)	(Tool life criteria : Breakage)	(Tool life criteria : Breakage)	(Tool life criteria : Breakage)
			

Tooling	Light Cut	Finishing
Grade	BNS800	
Insert	SNGN090308	
v_c	1000m/min	
f	0,3mm/rev	0,25mm/rev
d_{oc}	0,2mm	
Coolant	Wet	

Tooling	Finishing
Grade	BNS800
Insert	DNGN110312
v_c	600m/min
f	0,3mm/rev
d_{oc}	0,5mm
Coolant	Dry

Tooling	Finishing
Grade	
Insert	RNGN090300
v_c	40m/min
f	0,15mm/rev
d_{oc}	0,2mm
Coolant	Wet

Tooling	Roughing	Finishing
Grade	BNS800	
Insert	SNGN090312	SNGN090308
v_c	80m/min	
f	0,04mm/rev	0,03mm/rev
d_{oc}	~3mm	0,5mm
Coolant	Wet	

Production Process



General

Since 1970s, Sumitomo has pioneered the development of sintered cubic boron nitride (CBN) and sintered diamond (PCD) tools successfully used in the tool making industries. These tool materials can be epoch-making in a sence of broadening the cutting application range.

Production Process

In the production process of **SUMIBORON / SUMIDIA**, CBN powder / diamond powder is firstly synthesized under the ultra - high pressure, and secondly, the synthesized crystalline grains are sintered.

Fig. 2 shows a diagram of high temperature high pressure apparatus for processing the ultra - high pressure sintering operation.
This apparatus is basically composed of a piston and a cylinder to generate ultra - high pressure as high as 5000 N/mm^2 with a special device. The piston and cylinder are made of cemented carbide.

To manufacture final products round discs of SUMIBORON and SUMIDIA material are cut into specific shapes and brazed on to tool bodies made of cemented carbide, or steel, etc., and after that finished by grinding the edge.
In another process the final product can be obtained only by cutting blanks and finishing them.

Fig. 1

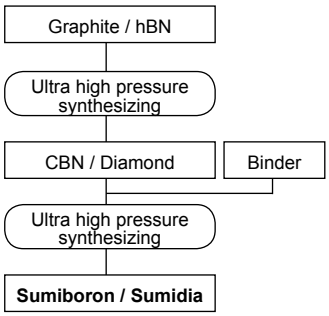
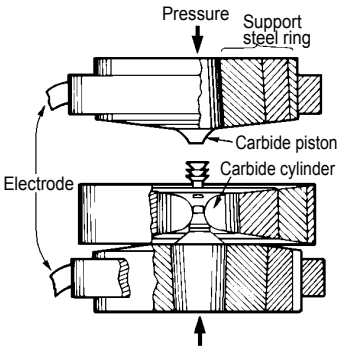
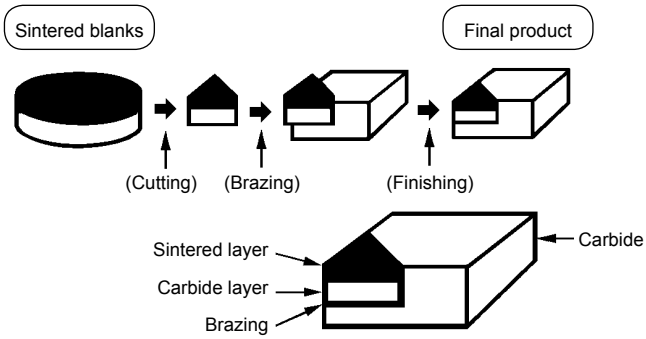


Fig. 2

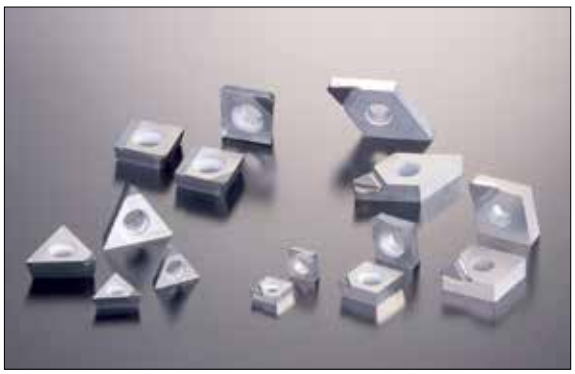




SumiBoron / SumiDia Grinding Method

Items		SumiBoron	SumiDia
Grinding machine	–	1) Carbide grinding machine is applicable. 2) R Pointer should be used. 3) Should be wet grinding.	1) Special-purpose high rigidity grinding machine is desirable. 2) Be sure of applying with wet system.
Wheel	Abrasive	Diamond	Diamond
	Grain size	D 25 - medium, D20 - fine (#400 ~ 800)	Rough grinding: D 35 (#400 mesh) Finish grinding: D 25 (#800 ~ 1500 mesh)
	Bond	Resinoid or vitrified	Special-purpose metal bond for diamond sintered tool or vitrified
	Concentration	100	100 ~ 125
	Dressing	Use #400 WA stick	Execute dressing with a WA stick of about 400 mesh.
Grinding condition	Wheel speed	800 ~ 1000 m/min.	800 ~ 1000 m/min.
	Table cycle	30 ~ 60 cycles/min.	30 ~ 60 cycles/min.
	Grinding oil	Water soluble grinding coolant oil	Water soluble grinding coolant (Solution type)
Others	–	1) Check chipping of the cutting edge with microscope after finishing. 2) Blank surface cut by EDM should be ground more than 0,05 mm	1) Rake surface is lapped generally 2) Inspect with microscope of magnification of 30-50 times if there is edge chipping. 3) Edge treatment of tool should be sharp for cutting non-ferrous metals. 4) Remove the wire-cut surface of blank by 0,05 mm or more in grinding operation.

SUMIDIA DA1000



General Features

SumiDia DA1000 is a high density, ultra fine grained sintered PCD with high toughness similar to that of cemented carbides.

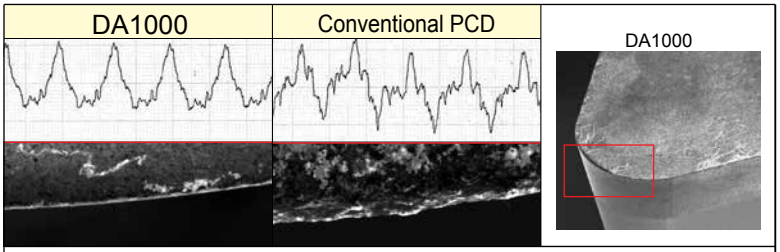
SumiDia DA1000, with its great improvement in fracture resistance, eliminates the breakage problems faced by conventional PCD tools especially during the milling of Aluminium alloys and achieves a longer and more stable tool life.

Furthermore, the NF type inserts maskes it even more cost effective.

■ Series • Features • Application

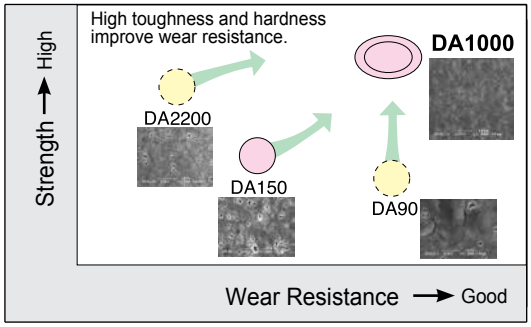
Grade	Features	Application	Average size of Diamond grains (µm)	Hardness Hv	Transverse Rupture Strenghth (kg/mm²)
DA1000	High density sintered material made of ultra-fine diamond particles that demonstrates optimum wear resistance, andexcellent edge sharpness.	• High Silicon Aluminum Alloy Cutting • Rough, Interrupted and Finishing of Al-alloy • Wood or Wooden Board Cutting • Non-Ferrous Metal finishing (Aluminium, Copper Alloy)	~ 0,5	110 ~ 120	≈ 2,6
DA2200	Sintered material made of ultra-micro diamond particles. Superior hardness and wear resistance with sharp edge.	• Rough, Interrupted and Finishing of Al-alloy • Wood or Wooden Board Cutting	0,5	90 ~ 100	≈ 2,45
DA150	Micro-grained sintered diamond grade with strong diamond-to-diamond bonding. It is suitable for the machining of non-ferrous metals and other very hard materials.	• Non-Ferrous Metal finishing (Aluminium, Copper Alloy) • Green or Semi-Sintered Carbide & Ceramic Roughing • FRP, Hard Rubber & Carbon Cutting • Wooden or Inorganic Material Board Cutting	5	100 ~ 120	≈ 1,95

■ Comparison of cutting edges after machining Aluminum alloy

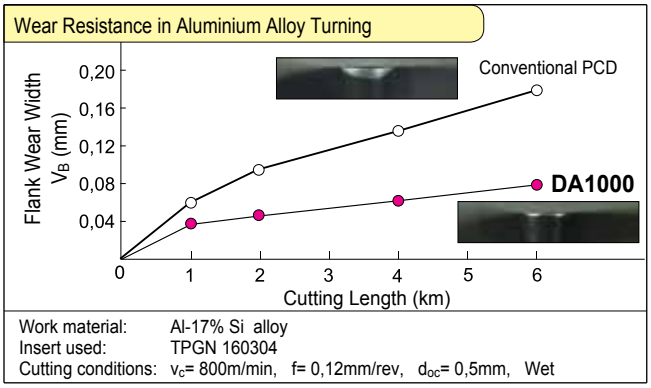


Work material: Al-17% Si alloy
Insert used: TPGW 160308
Cutting conditions: v_c= 1.000m/min, f=0,15mm/rev, d_{oc}= 0,2mm, Wet

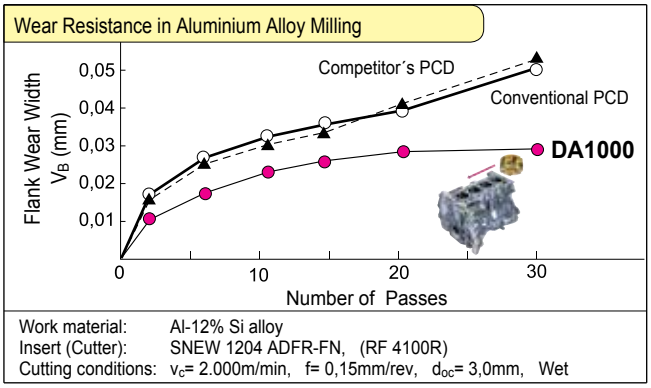
■ Position of DA1000



■ Cutting Performance



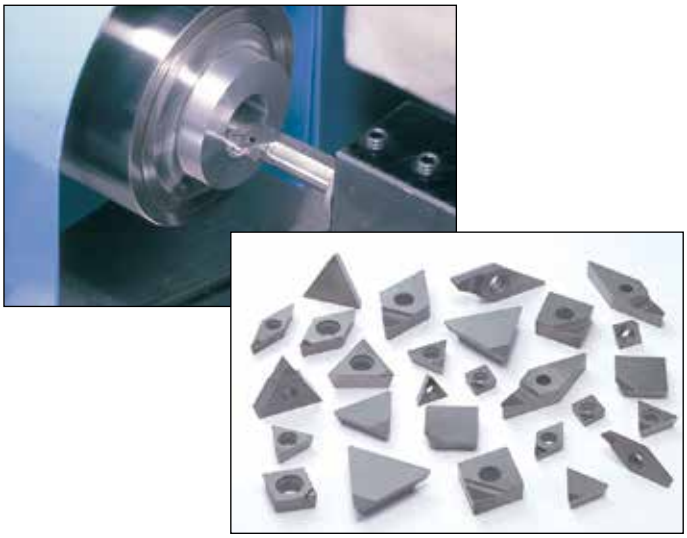
Work material: Al-17% Si alloy
Insert used: TPGN 160304
Cutting conditions: v_c= 800m/min, f= 0,12mm/rev, d_{oc}= 0,5mm, Wet



Work material: Al-12% Si alloy
Insert (Cutter): SNEW 1204 ADFR-FN, (RF 4100R)
Cutting conditions: v_c= 2.000m/min, f= 0,15mm/rev, d_{oc}= 3,0mm, Wet

■ Recommended Cutting Conditions

Cutting Conditions \ Work Materials		Aluminium Alloys	Copper Alloy	Reinforced Plastics	Wood or Organic Materials	Carbide	Carbon
Cutting Speed	v_c (m/min)	~ 3.000	~ 1.000	~ 1.000	~ 4.000	10 ~ 30	100 ~ 600
Feed rate	f (mm/rev)	~ 0,2	~ 0,2	~ 0,4	~ 0,4	~ 0,2	~ 1,0
Depth of cut	d_{oc} (mm)	~ 3,0	~ 3,0	~ 2,0	–	~ 0,5	~ 2,0



General Features

Total Cost Effectiveness with High Performance and Lower Price

- Long, stable tool life and good fracture resistance with high toughness grade DA2200.
- Optimum design utilizing improved mass production techniques provides a relatively lower cost.
- Regrindable type results in huge total cost reduction.

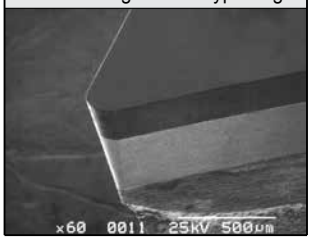
Wide Application Range

- Wide range of stocked items for small hole boring, OD turning to milling processes.
- Nega-posi type inserts that are applicable on standard lever-lock, pin-lock type holders.

Efficiency

SumiDia NF-type inserts uses improved mass production techniques, which maintain the usual good performance yet offering a higher cost efficiency. Coupled with SumiDia DA2200 grade, its exhibits strong cutting edges which gives excellent surfaces finishes.

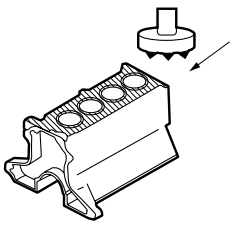
● SEM Image of NF-Type Edge



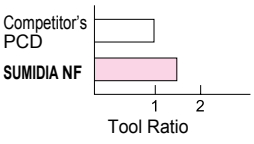
(NF-type is precision ground just like conventional inserts.)

Application Examples

● Milling of Aluminum Cylinder Block

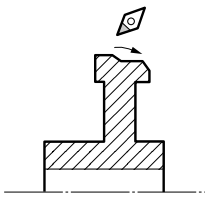


Results:
Burrs are not formed due to the edge sharpness of DA2200.
1,5 times longer tool life than competitor's.

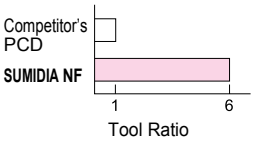


Work material: ADC12 (Al-12% Si alloy)
Insert used: 20° positive milling inserts (12 teeth)
Cutting conditions: v_c= 1.000m/min, f_t = 0,025mm/t, d_{oc}= 1,2mm

● OD Turning of Aluminum Alloy Electronics Part

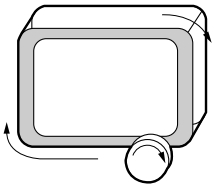


Results:
6 times tool life with relatively no chipping.

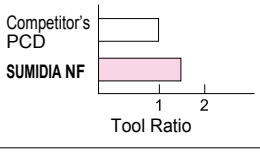


Work material: ADC12 (Al-12% Si alloy)
Insert used: VCMT 110301 NF
Cutting conditions: v_c= 800m/min, f=0,1mm/rev, d_{oc}= 0,02mm

● Milling of Aluminum Oil Pump Cover

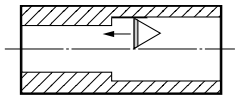


Results:
1,5 times longer tool life than competitor's with higher cost effectiveness.

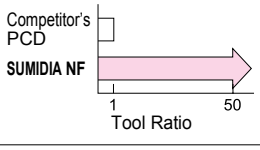


Work material: ADC12 (Al-12% Si alloy)
Insert used: TEEN32R NF
Cutting conditions: v_c= 3.000m/min, f_t = 0,06mm/rev, d_{oc}= 0,2mm

● Boring of Aluminum Valve Bore



Results:
No initial chipping, tool life is more than 50 times that of carbides.



Work material: ADC12 (Al-12% Si alloy)
Insert used: TPGN 110304 NF
Cutting conditions: v_c= 530m/min, f=0,05mm/rev, d_{oc}= 0,2mm

SUMIDIA Inserts
Break Master N-LD / -GD Type

New

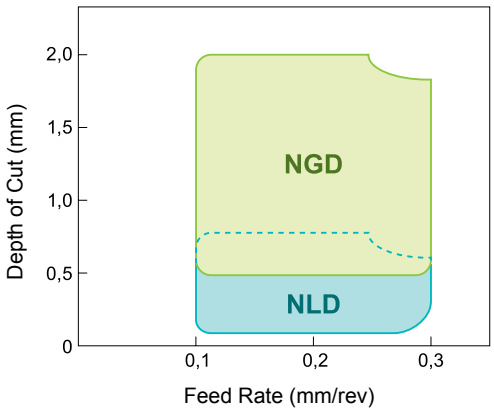


Characteristics

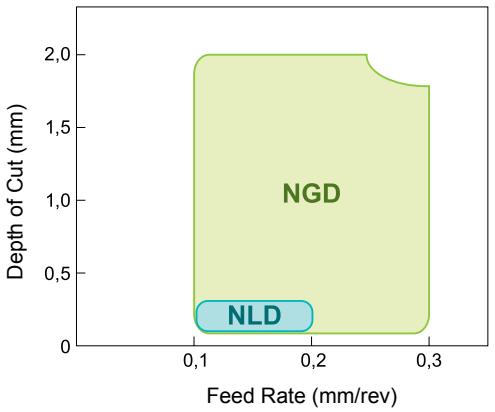
- Provides excellent chip control in semi finishing and finishing of aluminium alloy.
- Solves chip control problems and dramatically impreves work efficiency.
- Achieves stable tool life by employing high toughness grade DA1000.

Applications Range

- Wrought Aluminium Alloy (A6061)

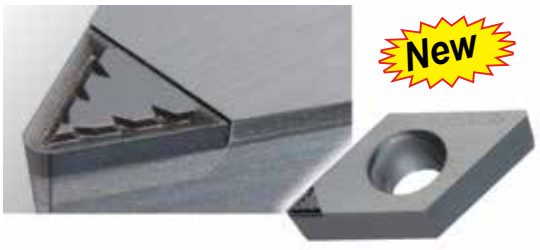


- Casted Aluminium Alloy (ADC12)



NLD Type Chipbreaker

Achieves excellent chip control for finishing.



NGD Type Chipbreaker

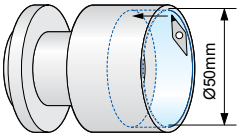
Achieves excellent chip control for semi finishing.



Application Examples

Internal Turning of Machine Component

Provides good chip control in small-depth cutting of wrought Al alloy.





Breakmaster **NLD** type

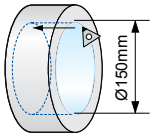


Without chip breaker

Work Material: A6061
Insert: VCMT110302 **NLD** NF (DA1000)
Cutting Conditions: v_c=200m/min, f=0,20mm/rev, a_p=0,10mm, wet

Internal Turning of Transmission Component

Offers good chip control in casted material.
Small chips - easy to remove.



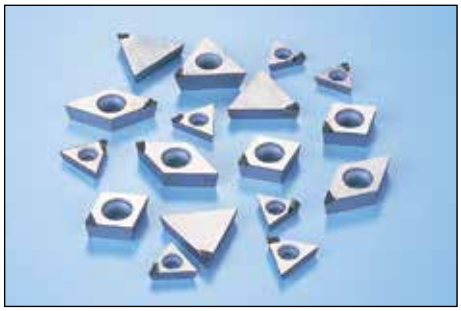


Breakmaster **NGD** type



Without chip breaker

Work Material: ADC12
Insert: TPMT110304 **NGD** NF (DA1000)
Cutting Conditions: v_c=400m/min, f=0,23mm/rev, a_p=1,20mm, wet



General Features

Economy One-Use Insert

- Similar to SumiBoron One-Use type inserts

With Built-in Chipbreaker for Effective Chip Removal

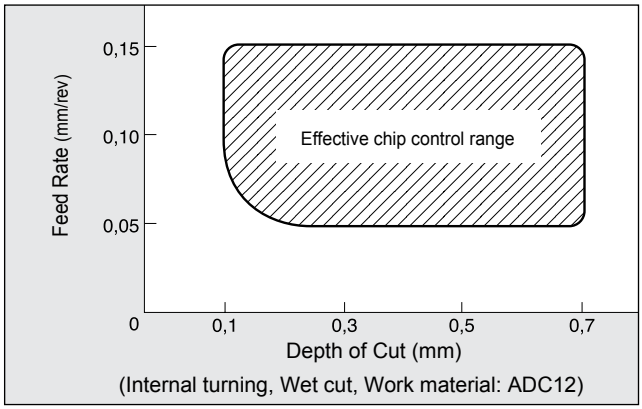
- Solving chip control problems and improving efficiency with DM-type chipbreaker.

Extensive Insert Range for External and Facing Operation

- 80° and 55° diamond shaped inserts are added to expand the application range of this series.

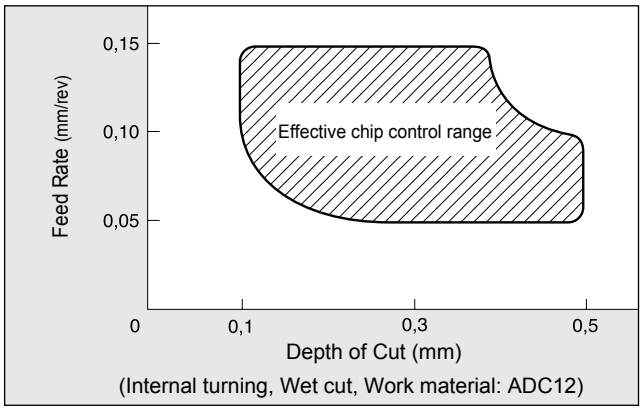
Application Range

● Triangular Type Insert (Boring)



(Internal turning, Wet cut, Work material: ADC12)

● CCMT/DCMT Type (External Turning & Facing)



(Internal turning, Wet cut, Work material: ADC12)

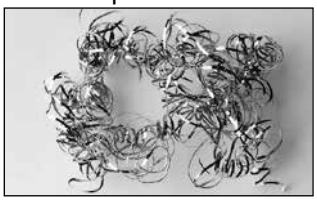


Chip Control

● Break Master



● No Chipbreaker



Application

Types of holder	Cutting Conditions	Results
Work Material: AC2A-T6 Operation: Internal Boring	v_c =300 m/min f =0,06 mm/rev d_{oc} =0,35 mm Wet cut	Surface finish of the bore hole was less than Ra=1µm. Chips formed was of a uniform curl of about 2mm in length. There was almost no chips left inside the bore hole.

Recommended Conditions

● Boring (Triangular Insert)

Feed Rate	Depth of Cut	Type
~ 0.15 mm/rev.	~ 0,7 mm	Wet cut

● External Copying (55°, 80° Diamond Shaped Inserts)

Feed Rate	Depth of Cut	Type
~ 0.15 mm/rev.	~ 0,5 mm	Wet cut

For facing process, D.O.C. should be less than 0,4mm

Series

External Turning & Facing		Boring	
	CCMT 0602_ _ L/R-DM NU		TPMT 0802_ _ L/R-DM NU
	CCMT 09T3_ _ L/R-DM NU		TPMT 0902_ _ L/R-DM NU
	DCMT 0702_ _ L/R-DM NU		TPMR 1103_ _ L/R-DM NU(*)
	DCMT 11T3_ _ L/R-DM NU		TPMR 1603_ _ L/R-DM NU(*)

(*) Stock in Japan
Delivery on request

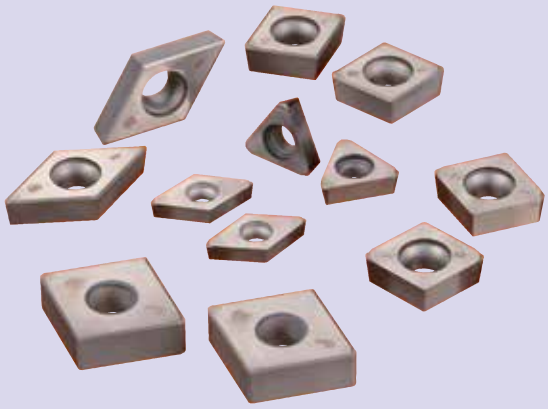
SUMIBORON / SUMIDIA
Indexable Inserts & Tools

M1 ~ M46

M







SUMIBORON / SUMIDIA Insert

C / 80° Diamond
- **CC**_ _ 7° pos. Type ..... M2 - 5
- **CN**_ _ neg. Type ..... M6 - 8
- **CP**_ _ 11° pos. Type M8

D / 55° Diamond
- **DC**_ _ 7° pos. Type ..... M9 -11
- **DN**_ _ neg. Type M12-14

R / Round
- **RN**_ _ neg. Type M14

S / Square
- **SC**_ _ 7° pos. Type M14
- **SN**_ _ neg. Type M15-16

T / Triangle
- **TB**_ _ 5° pos. Type M16
- **TC**_ _ 7° pos. Type M17
- **TN**_ _ neg. Type M18-19
- **TP**_ _ 11° pos. Type (Without Hole) M19
- **TP**_ _ 11° pos. Type (With Hole) M20-21

V / 35° Diamond
- **VB**_ _ 5° pos. Type M22
- **VC**_ _ 7° pos. Type M23
- **VN**_ _ neg. Type M24

W / Polygon
- **WN**_ _ neg. Type M25

Special
- **ZNEX** neg.-pos. Type M25

SUMIBORON / SUMIDIA Precision Tools

SUMIBORON
- Guidance M26-27
- New **BSME / SEXC** Type Small Hole Boring Bars M28-31
- **BNBB** Type Small Hole Boring Bars M32
- **BNZ / BNB** Type Small Hole Boring Bars M33
- **GWB** Type Grooving Holder M34-35

SUMIDIA
- **BNGG** Type Threading Holder M36
- **DABB** Type Small Hole Boring Bars M37
- **RF** Type Face Mill M38
- **SRF** Type Face Mill M39

SUMIBORON "BN Finish Mill"
"Helical Master"
"Mould Finish Master"
- **FMU** Type Face Mill M40-41
- **BNES** Type Endmill M42

SUMIDIA
- **BNBP** Type Micro Ball Nose Endmill M43
- **DAL / DDL / DML** Type Drills M44-45

80° Diamond Type | 7° Relief With Insert Hole

Coated

Dimensions (mm)				
CC_ _	ℓ	ød (IC)	s	d_1
0602--	6,45	6,35	2,38	2,8
09T3--	9,7	9,525	3,97	4,4

H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

CCGT / CCGW ●●●●●●

● G-Class SumiBoron (CBN, One-Use Multi-Corner Type)

Shape		ISO Cat. No.	r	H Coated CBN BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	K Coated CBN BNC500	H Uncoated CBN BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	K Uncoated CBN BN7000	PM BN7500	BNS800	N PCD DA150	DA1000	DA2200
Break Master - FV, LV CBN with chipbreaker	with 2 CBN cutting edges	CCGT 060204 N-FV NC2	0,4	●	●		●	●																	
		CCGT 09T304 N-FV NC2	0,4	●	●		●	●																	
		CCGT 09T308 N-FV NC2	0,8	●	●		●	●																	
		CCGT 09T304 N-LV NC2	0,4	●	●		●	●																	
		CCGT 09T308 N-LV NC2	0,8	●	●		●	●																	
Standard - Normal cut geometry	with 2 CBN cutting edges	CCGW 060202 NC-2	0,2	●	●	●	●	●																	
		CCGW 060204 NC-2	0,4	●	●	●	●	●	●	●															
		CCGW 060208 NC-2	0,8		●			●	●																
		CCGW 09T302 NC-2	0,2		●			●																	
		CCGW 09T304 NC-2	0,4	●	●	●	●	●	●	●															
		CCGW 09T308 NC-2	0,8	●	●	●	●	●	●	●															
	(Wiper Type)	CCGW 09T304 NC-W2	0,4			●	●	●																	
		CCGW 09T308 NC-W2	0,8			●	●	●																	
		CCGW 09T304 NC-WG2	0,4	●	●		●	●																	
		CCGW 09T308 NC-WG2	0,8	●	●		●	●																	
		CCGW 09T304 NC-WH2	0,4	●	●		●	●																	
		CCGW 09T308 NC-WH2	0,8	●	●		●	●																	
LS - Type Low cutting force	with 2 CBN cutting edges	CCGW 060202 LS-NC2	0,2			●	●	●																	
		CCGW 060204 LS-NC2	0,4			●	●	●																	
		CCGW 09T304 LS-NC2	0,4			●	●	●																	
		CCGW 09T308 LS-NC2	0,8			●	●	●																	
HS - Type Strong cutting edge	with 2 CBN cutting edges	CCGW 09T304 HS-NC2	0,4		●			●	●																
		CCGW 09T308 HS-NC2	0,8		●			●	●																

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

80° Diamond Type | 7° Relief With Insert Hole

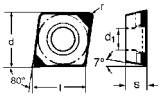
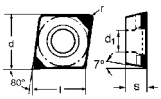
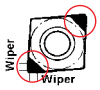
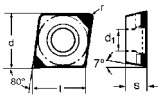
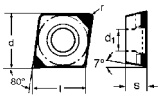
Uncoated

Dimensions (mm)				
CC_ _	ℓ	ød (IC)	s	d_1
0602--	6,45	6,35	2,38	2,8
09T3--	9,7	9,525	3,97	4,4

H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

CCGT / CCGW ●●●●●●

● G-Class SumiBoron (CBN, Regrindable Type)

Shape		ISO Cat. No.	r	H Coated BNC2010	H Coated BNC2020	H Coated BNC100	H Coated BNC160	H Coated BNC200	H Coated BNC300	K Coated BNC500	H Uncoated CBN BN1000	H Uncoated CBN BN2000	H Uncoated CBN BNX10	H Uncoated CBN BNX20	H Uncoated CBN BNX25	H Uncoated CBN BN250	H Uncoated CBN BN300	H Uncoated CBN BN350	H Uncoated CBN BN700	K PM BN7000	K PM BN7500	K PM BNS800	N PCD DA150	N PCD DA1000	N PCD DA2200
Break Master - FV, LV  CBN with chipbreaker	 with 2 CBN cutting edges	CCGT 060204 N-FV NU2	0,4									●													
		CCGT 09T304 N-FV NU2	0,4									●													
		CCGT 09T308 N-FV NU2	0,8									●													
		CCGT 09T304 N-LV NU2	0,4									●													
		CCGT 09T308 N-LV NU2	0,8									●													
	 with 2 CBN cutting edges	CCGW 060204 NU-2	0,4																		●				
		CCGW 060208 NU-2	0,8																		●				
		CCGW 09T304 NU-2	0,4								●	●	▲	●		▲	●	●			●				
		CCGW 09T308 NU-2	0,8								●	●		●		▲	●	●			●				
	 Wiper (Wiper Type)	CCGW 09T304 NU-WG2	0,4									●													
		CCGW 09T308 NU-WG2	0,8									●													
		CCGW 09T304 NU-WH2	0,4									●													
		CCGW 09T308 NU-WH2	0,8									●													
 **LF** - Type Sharp cutting edge	 with 2 CBN cutting edges	CCGW 09T304 LF-NU2	0,4																		○				
		CCGW 09T308 LF-NU2	0,8																		○				
 **HS** - Type Strong cutting edge	 with 2 CBN cutting edges	CCGW 09T304 HS-NU2	0,4																		○				
		CCGW 09T308 HS-NU2	0,8																		○				

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

80° Diamond Type | 7° Relief | With Insert Hole

Uncoated

Dimensions (mm)				
CC_ _	ℓ	ød (IC)	s	d_1
0602--	6,45	6,35	2,38	2,8
09T3--	9,7	9,525	3,97	4,4
1204--	12,9	12,7	4,76	5,5

H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

CCGW ●●●●●●

● G-Class SumiBoron (CBN, Regrindable Type)

Shape		ISO Cat. No.	r	BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	BN7000	BN7500	BNS800	DA150	DA1000	DA2200
		CCGW 09T304	0,4											●			●								
		CCGW 09T308	0,8											●			●								

● G-Class SumiBoron (CBN, One-Use Type)

Shape		ISO Cat. No.	r	BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	BN7000	BN7500	BNS800	DA150	DA1000	DA2200
		CCGW 060204 NS	0,4												●										
		CCGW 060208 NS	0,8												●										
		CCGW 09T304 NS	0,4												●										
		CCGW 09T308 NS	0,8												●										
		CCGW 060202 NU	0,2									●		●					●	●					
		CCGW 060204 NU	0,4								●	●	▲	●		▲	●	●	●	●					
		CCGW 060208 NU	0,8									●		●		▲			●	●					
		CCGW 09T302 NU	0,2											●											
		CCGW 09T304 NU	0,4								●		▲	●		▲	●	●	●	●					
		CCGW 09T308 NU	0,8								●	●	▲	●		▲	●	●	●	●					
		CCGW 120408 NU	0,8								●		▲	●											

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

80° Diamond Type | 7° Relief With Insert Hole

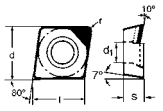
Uncoated

Dimensions (mm)				
CC_ _	ℓ	ød (IC)	s	d_1
0602--	6,45	6,35	2,38	2,8
09T3--	9,7	9,525	3,97	4,4

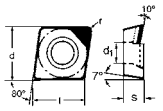
H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

CCMT ●●●●●●

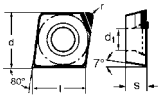
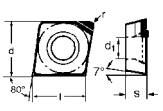
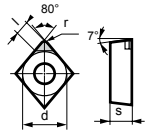
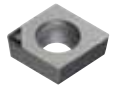
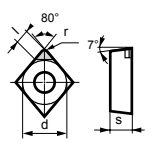
● M-Class SumiDia (PCD, Regrindable Type)

Shape	ISO Cat. No.	r	H Coated BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	K Coated BNC500	H Uncoated CBN BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	K PM BN7000	BN7500	BNS800	N PCD DA150	DA1000	DA2200
 	**CCMT 060202**	0,2																				●		
	CCMT 060204	0,4																				●		
	CCMT 09T302	0,2																				●		

● M-Class SumiDia (PCD, NF Type)

Shape	ISO Cat. No.	r																						
 	**CCMT 060201 NF**	0,1																				●	▲	
	CCMT 060202 NF	0,2																				●	▲	
	CCMT 060204 NF	0,4																				●	▲	
	CCMT 09T301 NF	0,1																				●	▲	
	CCMT 09T302 NF	0,2																				●	▲	
	CCMT 09T304 NF	0,4																				●	▲	
	CCMT 09T308 NF	0,8																				●	▲	

● M-Class SumiDia (PCD, One-Use "Break Master" Type)

Shape	ISO Cat. No.	r																						
Break Master - DM  	**CCMT 060202 L-DM NU**	0,2																						
	CCMT 060204 L-DM NU	0,4																				●		
	CCMT 09T302 L-DM NU	0,2																						
	CCMT 09T304 L-DM NU	0,4																				●		
Break Master - DM  	**CCMT 060202 R-DM NU**	0,2																				○		
	CCMT 060204 R-DM NU	0,4																				●		
	CCMT 09T302 R-DM NU	0,2																				●		
	CCMT 09T304 R-DM NU	0,4																				●		
Break Master - LD  New 	**CCMT 060202 N-LD NF**	0,2																					○	
	CCMT 060204 N-LD NF	0,4																					○	
	CCMT 09T302 N-LD NF	0,2																					○	
	CCMT 09T304 N-LD NF	0,4																					○	
	CCMT 09T308 N-LD NF	0,8																					○	
Break Master - GD  New 	**CCMT 060202 N-GD NF**	0,2																					○	
	CCMT 060204 N-GD NF	0,4																					○	
	CCMT 09T302 N-GD NF	0,2																					○	
	CCMT 09T304 N-GD NF	0,4																					○	
	CCMT 09T308 N-GD NF	0,8																					○	

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

80° Diamond Type | 0° Relief / With Insert Hole

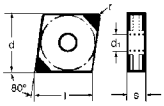
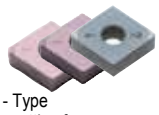
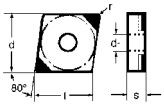
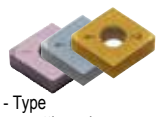
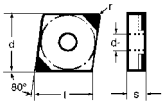
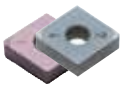
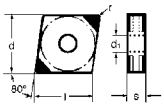
Coated

Dimensions (mm)				
CN_ _	ℓ	ød (IC)	s	d_1
1204--	12,9	12,7	4,76	5,16

H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

CNGA / CNGG

● G-Class SumiBoron (CBN, One-Use Multi-Corner Type)

Shape		ISO Cat. No.	r	H Coated BNC2010	H Coated BNC2020	H Coated BNC100	H Coated BNC160	H Coated BNC200	H Coated BNC300	K Coated BNC500	H Uncoated CBN BN1000	H Uncoated CBN BN2000	H Uncoated CBN BNX10	H Uncoated CBN BNX20	H Uncoated CBN BNX25	H Uncoated CBN BN250	H Uncoated CBN BN300	H Uncoated CBN BN350	H Uncoated CBN BN700	K PM BN7000	K PM BN7500	K PM BNS800	N PCD DA150	N PCD DA1000	N PCD DA2200
 Standard - Normal cut geometry	 with 4 CBN cutting edges	**CNGA 120404 NC-4**	0,4	●	●	●	●	●	●	○															
		CNGA 120408 NC-4	0,8	●	●	●	●	●	●	○															
		CNGA 120412 NC-4	1,2	●	●	●	●	●	●	○															
	 (Wiper Type)	**CNGA 120404 NC-W4**	0,4			●	●	●																	
		CNGA 120408 NC-W4	0,8				●	●		○															
		CNGA 120412 NC-W4	1,2					●																	
		CNGA 120404 NC-WG4	0,4	●	●		●	●																	
		CNGA 120408 NC-WG4	0,8	●	●		●	●																	
		CNGA 120412 NC-WG4	1,2	●	●		●	●																	
		CNGA 120404 NC-WH4	0,4	●	●		●	●																	
		CNGA 120408 NC-WH4	0,8	●	●		●	●																	
		CNGA 120412 NC-WH4	1,2	●	●		●	●																	
 **LS** - Type Low cutting force	 with 2 CBN cutting edges	**CNGA 120404 LS-NC2**	0,4			●	●	●																	
		CNGA 120408 LS-NC2	0,8			●	●	●																	
		CNGA 120412 LS-NC2	1,2			●	●	●																	
 **HS** - Type Strong cutting edge	 with 2 CBN cutting edges	**CNGA 120404 HS-NC2**	0,4	●	●		●	●	●																
		CNGA 120408 HS-NC2	0,8	●	●		●	●	●																
		CNGA 120412 HS-NC2	1,2	●	●		●	●	●																
Break Master - FV, LV, SV  CBN with chipbreaker	 with 4 CBN cutting edges	**CNGG 120404 N-FV NC4**	0,4	●	●		●	●																	
		CNGG 120408 N-FV NC4	0,8	●	●		●	●																	
		CNGG 120412 N-FV NC4	1,2	●	●		●	●																	
		CNGG 120404 N-LV NC4	0,4	●	●		●	●																	
		CNGG 120408 N-LV NC4	0,8	●	●		●	●																	
		CNGG 120412 N-LV NC4	1,2	●	●		●	●																	
		CNGG 120404 N-SV NC4	0,4		○																				
		CNGG 120408 N-SV NC4	0,8		●			●																	
		CNGG 120412 N-SV NC4	1,2	●	●			●																	

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

80° Diamond Type | 0° Relief / With Insert Hole

Uncoated

Dimensions (mm)				
CN_ _	ℓ	ød (IC)	s	d_1
1204--	12,9	12,7	4,76	5,16

H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

CNGA / CNGM ●●●●●●

● G-Class SumiBoron (CBN, One-Use Multi-Corner Type)

Shape		ISO Cat. No.	r	H Coated BNC2010	H Coated BNC2020	K Coated BNC100	K Coated BNC160	K Coated BNC200	K Coated BNC300	K Coated BNC500	H Uncoated CBN BN1000	H Uncoated CBN BN2000	H Uncoated CBN BNX10	H Uncoated CBN BNX20	H Uncoated CBN BNX25	H Uncoated CBN BN250	H Uncoated CBN BN300	H Uncoated CBN BN350	H Uncoated CBN BN700	K PM BN7000	K PM BN7500	K PM BNS800	N PCD DA150	N PCD DA1000	N PCD DA2200
	with 2 CBN cutting edges	CNGA 120404 NS-2	0,4												●										
		CNGA 120408 NS-2	0,8												●										
		CNGA 120412 NS-2	1,2												●										
		CNGA 120404 NU-2	0,4									●		●		▲	●	●			❍				
		CNGA 120408 NU-2	0,8								●	●	▲	●		▲	●	●	●	●	●				
		CNGA 120412 NU-2	1,2								●	●	▲	●			●	●			❍				
	(Wiper Type)	CNGA 120404 NU-W2	0,4								●	●													
		CNGA 120408 NU-W2	0,8								●	●													
		CNGA 120404 NU-WG2	0,4									●													
		CNGA 120408 NU-WG2	0,8									●													
		CNGA 120408 NU-WG2	1,2									●													
		CNGA 120404 NU-WH2	0,4									●													
		CNGA 120408 NU-WH2	0,8									●													
		CNGA 120412 NU-WH2	1,2									●													
LF - Type Sharp cutting edge	with 2 CBN cutting edges	CNGA 120404 LF-NU2	0,4																		❍				
		CNGA 120408 LF-NU2	0,8																		❍				
HS - Type Strong cutting edge	with 2 CBN cutting edges	CNGA 120408 HS-NU2	0,8																		●				
Break Master - LV CBN with chipbreaker	with 2 CBN cutting edges	CNGM 120404 N-LV NU2	0,4									●													
		CNGM 120408 N-LV NU2	0,8									●													
		CNGM 120412 N-LV NU2	1,2									●													

● = Euro stock
❍ = Stock item in Japan
▲ = To be replaced by new item

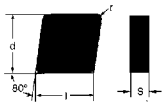
80° Diamond Type | 0° & 11° | —

Dimensions (mm)				
CN/CP__	ℓ	ød (IC)	s	d_1
06	6,45	6,35	2,38	2,8
0903--	9,7	9,525	3,18	4,4
12	12,9	12,7	4,76	5,16

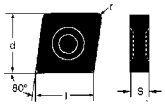
H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

CNGN / CNGX

● G-Class SumiBoron (Solid CBN Type)

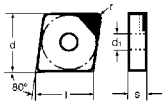
Shape	ISO Cat. No.	r	BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	BN7000	BN7500	BNS800	DA150	DA1000	DA2200
 	**CNGN 090308**	0,8																			●			
	CNGN 090312	1,2																			●			
	CNGN 120412	1,2																			●			
	CNGN 120416	1,6																			●			

● G-Class SumiBoron (Solid CBN, "Dimple" Type)

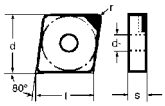
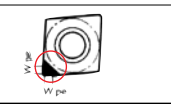
Shape	ISO Cat. No.	r	BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	BN7000	BN7500	BNS800	DA150	DA1000	DA2200
 	**CNGX 120412**	1,2																			●			
	CNGX 120416	1,6																			●			

CNMA / CNMX

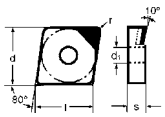
● M-Class SumiBoron (CBN, Regrindable Type)

Shape	ISO Cat. No.	r	BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	BN7000	BN7500	BNS800	DA150	DA1000	DA2200
 	**CNMA 120404**	0,4											●			●		●						
	CNMA 120408	0,8											●			●		●						
	CNMA 120412	1,2											●			●								

● M-Class SumiBoron (CBN, One-use Type)

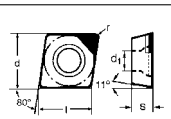
Shape	ISO Cat. No.	r	BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	BN7000	BN7500	BNS800	DA150	DA1000	DA2200
 (Wiper Type) 	**CNMA 120404 NS**	0,4												●										
	CNMA 120408 NS	0,8												●										
	CNMA 120412 NS	1,2												●										
	CNMA 120404 NU	0,4								●	●	▲	●		▲	●	●	●	●					
	CNMA 120408 NU	0,8								●	●	▲	●		▲	●	●	●	●					
	CNMA 120412 NU	1,2								●	●	▲	●		▲	●	●	●	●					
	**CNMA 120408 NU-W**	0,8										▲	●											

● M-Class SumiDIA (PCD, NF Type)

Shape	ISO Cat. No.	r	BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	BN7000	BN7500	BNS800	DA150	DA1000	DA2200
 	**CNMX 120402 NF**	0,2																				●	▲	
	CNMX 120404 NF	0,4																				●	▲	
	CNMX 120408 NF	0,8																				●	▲	

CPMW

● M-Class SumiDIA (PCD, NF Type)

Shape	ISO Cat. No.	r	BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	BN7000	BN7500	BNS800	DA150	DA1000	DA2200
 	**CPMW 060202 NF**	0,2																					●	▲
	CPMW 060204 NF	0,4																					●	▲
	CPMW 060208 NF	0,8																					●	▲

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

55° Diamond Type | 7° Relief | With Insert Hole

Coated

Dimensions (mm)				
DC_ _	ℓ	ød (IC)	s	d_1
0702--	7,75	6,35	2,38	2,8
11T3--	11,6	9,525	3,97	4,4

H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

DCGT / DCGW ●●●●●●

● G-Class SumiBoron (CBN, One-Use Multi-Corner Type)

Shape		ISO Cat. No.	r	H Coated BNC2010	H Coated BNC2020	K Coated BNC100	H Coated BNC160	H Coated BNC200	H Coated BNC300	K Coated BNC500	H Uncoated CBN BN1000	H Uncoated CBN BN2000	H Uncoated CBN BNX10	H Uncoated CBN BNX20	H Uncoated CBN BNX25	H Uncoated CBN BN250	H Uncoated CBN BN300	H Uncoated CBN BN350	H Uncoated CBN BN700	K PM Uncoated CBN BN7000	K PM Uncoated CBN BN7500	K PM Uncoated CBN BNS800	N PCD DA150	N PCD DA1000	N PCD DA2200
Break Master - FV, LV		DCGT 070204 N-FV NC2	0,4	●	●		●	●																	
		DCGT 11T304 N-FV NC2	0,4	●	●		●	●																	
		DCGT 11T308 N-FV NC2	0,8	●	●		●	●																	
CBN with chipbreaker	with 2 CBN cutting edges	DCGT 11T304 N-LV NC2	0,4	●	●		●	●																	
		DCGT 11T308 N-LV NC2	0,8	●	●		●	●																	
		DCGW 070202 NC-2	0,2	●	●	●	●	●	●																	
		DCGW 070204 NC-2	0,4	●	●	●	●	●	●																	
	with 2 CBN cutting edges	DCGW 070208 NC-2	0,8		●			●	●																	
		DCGW 11T302 NC-2	0,2	●	●		●	●	●																	
		DCGW 11T304 NC-2	0,4	●	●	●	●	●	●	●																
Standard - Normal cut geometry		DCGW 11T308 NC-2	0,8	●	●	●	●	●	●	●																
		DCGW 11T304 NC-WG2	0,4	●	●		●	●																	
	(Wiper Type)	DCGW 11T308 NC-WG2	0,8	●	●		●	●																	
		DCGW 11T304 NC-WH2	0,4	●	●		●	●																	
		DCGW 11T308 NC-WH2	0,8	●	●		●	●																	
		DCGW 070202 LS-NC2	0,2			●	●	●																	
		DCGW 070204 LS-NC2	0,4			●	●	●																	
LS - Type Low cutting force	with 2 CBN cutting edges	DCGW 11T304 LS-NC2	0,4			●	●	●																	
		DCGW 11T308 LS-NC2	0,8			●	●	●																	
HS - Type Strong cutting edge	with 2 CBN cutting edges	DCGW 11T304 HS-NC2	0,4		●			●	●																
		DCGW 11T308 HS-NC2	0,8		●			●	●																

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

55° Diamond Type | 7° Relief | With Insert Hole

Uncoated

Dimensions (mm)				
DC_ _	ℓ	ød (IC)	s	d_1
0702--	7,75	6,35	2,38	2,8
11T3--	11,6	9,525	3,97	4,4

H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

DCGT / DCGW

● G-Class SumiBoron (CBN, One-Use Multi-Corner Type)

Shape		ISO Cat. No.	r	H Coated CBN BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	K Coated BNC500	H Uncoated CBN BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	K Uncoated CBN BN7000	K PM BN7500	BNS800	N PCD DA150	DA1000	DA2200
Break Master - FV, LV CBN with chipbreaker	with 2 CBN cutting edges	DCGT 070204 N-FV NU2	0,4									●													
		DCGT 11T304 N-FV NU2 DCGT 11T308 N-FV NU2	0,4 0,8									● ●													
		DCGT 11T304 N-LV NU2 DCGT 11T308 N-LV NU2	0,4 0,8									● ●													
	with 2 CBN cutting edges	DCGW 070202 NU-2 DCGW 070204 NU-2 DCGW 070208 NU-2	0,2 0,4 0,8								● ●	● ● ●	▲ ▲	● ●		▲ ▲	● ●	● ●			● ●					
		DCGW 11T304 NU-2 DCGW 11T308 NU-2	0,4 0,8								● ●	● ●	 ▲	● ●		▲ ▲	● ●	● ●	 ●	● ●	● ●					
	(Wiper Type)	DCGW 11T304 NU-WG2 DCGW 11T308 NU-WG2	0,4 0,8									● ●													
		DCGW 11T304 NU-WH2 DCGW 11T308 NU-WH2	0,4 0,8									● ●													
LF - Type Sharp cutting edge	with 2 CBN cutting edges	DCGW 070204 LF-NU2 DCGW 070208 LF-NU2	0,4 0,8																		● ●				
		DCGW 11T304 LF-NU2 DCGW 11T308 LF-NU2	0,4 0,8																		● ●				
HS - Type Strong cutting edge	with 2 CBN cutting edges	DCGW 070204 HS-NU2 DCGW 070208 HS-NU2	0,4 0,8																		● ●				
		DCGW 11T304 HS-NU2 DCGW 11T308 HS-NU2	0,4 0,8																		● ●				

● G-Class SumiBoron (CBN, One-Use Type)

		DCGW 11T304 NS DCGW 11T308 NS	0,4 0,8												● ●											
		DCGW 070202 NU DCGW 070204 NU DCGW 070208 NU	0,2 0,4 0,8								● ● ●	● ● ●	▲ ▲ ▲	● ● ●		 ▲ ▲	● ● 	● ● 	● ● ●	● ● ●							
		DCGW 11T302 NU DCGW 11T304 NU DCGW 11T308 NU	0,2 0,4 0,8								● ● ●	● ● ●	▲ ▲ ▲	● ● ●		▲ 	● ●	● ● ●	● ● ●	● ● ●							

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

55° Diamond Type | 7° Relief With Insert Hole

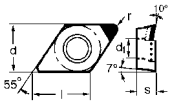
Uncoated

Dimensions (mm)				
DC_ _	ℓ	ød (IC)	s	d_1
0702--	7,75	6,35	2,38	2,8
11T3--	11,6	9,525	3,97	4,4

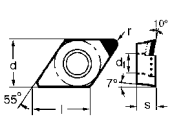
H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

DCMT ●●●●●●

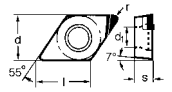
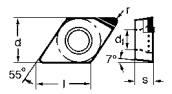
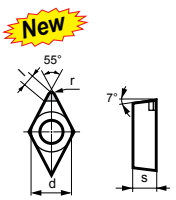
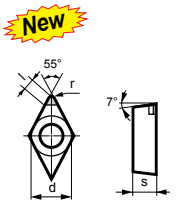
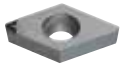
● M-Class SumiDia (PCD, Regrindable Type)

Shape		ISO Cat. No.	r	H Coated CBN BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	K Coated CBN BNC500	H Uncoated CBN BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	K Uncoated CBN BN7000	PM BN7500	BNS800	N PCD DA150	DA1000	DA2200
		**DCMT 070202** **DCMT 070204**	0,2 0,4																				● ●		
		DCMT 11T302 **DCMT 11T304** **DCMT 11T308**	0,2 0,4 0,8																				● ● ●		

● M-Class SumiDia (PCD, NF Type)

		**DCMT 070201 NF** **DCMT 070202 NF** **DCMT 070204 NF** **DCMT 070208 NF**	0,1 0,2 0,4 0,8																					●▲ ●▲ ●▲ ●▲	
		DCMT 11T301 NF **DCMT 11T302 NF** **DCMT 11T304 NF** **DCMT 11T308 NF**	0,1 0,2 0,4 0,8																					●▲ ●▲ ●▲ ●▲	

● M-Class SumiDIA (PCD, One-Use "Break Master" Type)

Break Master - DM		**DCMT 070202 L-DM NU** **DCMT 070204 L-DM NU**	0,2 0,4																				○ ○		
		**DCMT 11T302 L-DM NU** **DCMT 11T304 L-DM NU**	0,2 0,4																				● ●		
Break Master - DM		**DCMT 070202 R-DM NU** **DCMT 070204 R-DM NU**	0,2 0,4																				○ ●		
		**DCMT 11T302 R-DM NU** **DCMT 11T304 R-DM NU**	0,2 0,4																				● ●		
Break Master - LD	New 	**DCMT 070202 N-LD NF** **DCMT 070204 N-LD NF**	0,2 0,4																					○ ○	
		**DCMT 11T302 N-LD NF** **DCMT 11T304 N-LD NF** **DCMT 11T308 N-LD NF**	0,2 0,4 0,8																					○ ○ ○	
Break Master - GD	New 	**DCMT 070202 N-GD NF** **DCMT 070204 N-GD NF**	0,2 0,4																					○ ○	
		**DCMT 11T302 N-GD NF** **DCMT 11T304 N-GD NF** **DCMT 11T308 N-GD NF**	0,2 0,4 0,8																					○ ○ ○	

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

55° Diamond Type | 0° Relief | With Insert Hole

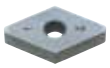
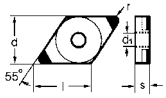
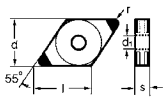
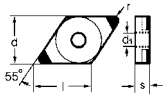
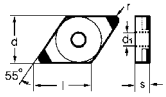
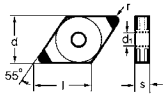
Coated

Dimensions (mm)				
DN_ _	ℓ	ød (IC)	s	d_1
1104--	11,6	9,525	4,76	3,81
1504--	15,5	12,7	4,76	5,16
1506--	15,5	12,7	6,35	5,16

H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

DNGA / DNGG

● G-Class SumiBoron (CBN, One-Use Multi-Corner Type)

Shape		ISO Cat. No.	r	H Coated CBN BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	K Coated CBN BNC500	H Uncoated CBN BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	K PM Uncoated CBN BN7000	BN7500	BNS800	N PCD DA150	DA1000	DA2200
 Standard - Normal cut geometry	 with 2 CBN cutting edges	**DNGA 110404 NC-2**	0,4		●			●																	
		DNGA 110408 NC-2	0,8		●			●																	
		DNGA 150604 NC-2	0,4							●															
	 with 4 CBN cutting edges	**DNGA 150404 NC-4**	0,4	❍	❍																				
		DNGA 150408 NC-4	0,8	❍	❍																				
		DNGA 150412 NC-4	1,2	❍	❍																				
		DNGA 150604 NC-4	0,4	●	●	●	●	●	●																
		DNGA 150608 NC-4	0,8	●	●	●	●	●	●																
		DNGA 150612 NC-4	1,2	●	●		●	●	●	●															
 Standard - Normal cut geometry	 (Wiper Type)	**DNGA 150404 NC-WG4**	0,4				❍	❍																	
		DNGA 150408 NC-WG4	0,8				❍	❍																	
		DNGA 150604 NC-WG4	0,4	●	●		●	●																	
		DNGA 150608 NC-WG4	0,8	●	●		●	●																	
		DNGA 150612 NC-WG4	1,2	●	●		●	●																	
		DNGA 150404 NC-WH4	0,4				❍	❍																	
		DNGA 150408 NC-WH4	0,8				❍	❍																	
		DNGA 150604 NC-WH4	0,4	●	●		●	●																	
		DNGA 150608 NC-WH4	0,8	●	●		●	●																	
		DNGA 150612 NC-WH4	1,2	●	●		●	●																	
 **LS** - Type Low cutting force	 with 2 CBN cutting edges	**DNGA 150604 LS-NC2**	0,4			●	●	●																	
		DNGA 150608 LS-NC2	0,8			●	●	●																	
		DNGA 150612 LS-NC2	1,2			●	●	●																	
 **HS** - Type Strong cutting edge	 with 2 CBN cutting edges	**DNGA 150604 HS-NC2**	0,4	●	●		●	●	●																
		DNGA 150608 HS-NC2	0,8	●	●		●	●	●																
		DNGA 150612 HS-NC2	1,2	●	●		●	●	●																
Break Master - FV, LV, SV  CBN with chipbreaker	 with 4 CBN cutting edges	**DNGG 150404 N-FV NC4**	0,4	❍	❍		❍	❍																	
		DNGG 150408 N-FV NC4	0,8	❍	❍		❍	❍																	
		DNGG 150412 N-FV NC4	1,2	❍	❍		❍	❍																	
		DNGG 150604 N-FV NC4	0,4	●	●		●	●																	
		DNGG 150608 N-FV NC4	0,8	●	●		●	●																	
		DNGG 150612 N-FV NC4	1,2	●	●		●	●																	
		DNGG 150404 N-LV NC4	0,4	❍	❍		❍	❍																	
		DNGG 150408 N-LV NC4	0,8	❍	❍		❍	❍																	
		DNGG 150412 N-LV NC4	1,2	❍	❍		❍	❍																	
		DNGG 150604 N-LV NC4	0,4	●	●		●	●																	
		DNGG 150608 N-LV NC4	0,8	●	●		●	●																	
		DNGG 150612 N-LV NC4	1,2	●	●		●	●																	
		DNGG 150408 N-SV NC4	0,4	❍	❍																				
		DNGG 150412 N-SV NC4	1,2	❍	❍																				
		DNGG 150608 N-SV NC4	0,8		●			●																	
		DNGG 150612 N-SV NC4	1,2		●			●																	

● = Euro stock
❍ = Stock item in Japan
▲ = To be replaced by new item

55° Diamond Type | 0° Relief / With Insert Hole

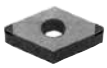
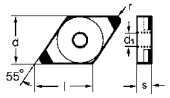
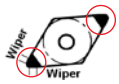
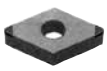
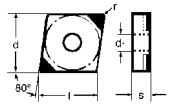
Dimensions (mm)				
DN_ _	ℓ	ød (IC)	s	d_1
1504--	15,5	12,7	4,76	5,16
1506--	15,5	12,7	6,35	5,16

H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

DNGA / DNGM ●●●●●●

Uncoated

● G-Class SumiBoron (CBN, One-Use Multi-Corner Type)

Shape		ISO Cat. No.	r	H Coated BNC2010	H Coated BNC2020	H Coated BNC100	H Coated BNC160	H Coated BNC200	H Coated BNC300	K Coated BNC500	H Uncoated CBN BN1000	H Uncoated CBN BN2000	H Uncoated CBN BNX10	H Uncoated CBN BNX20	H Uncoated CBN BNX25	H Uncoated CBN BN250	H Uncoated CBN BN300	H Uncoated CBN BN350	H Uncoated CBN BN700	K PM BN7000	K PM BN7500	K PM BNS800	N PCD DA150	N PCD DA1000	N PCD DA2200
	 with 2 CBN cutting edges	**DNGA 150604 NU-2**	0,4								●	●		●		▲	●	●							
		DNGA 150608 NU-2	0,8								●	●	▲	●			●	●			●				
		DNGA 150612 NU-2	1,2								●														
	 (Wiper Type)	**DNGA 150404 NU-WG2**	0,4									○													
		DNGA 150408 NU-WG2	0,8									○													
		DNGA 150604 NU-WG2	0,4									●													
		DNGA 150608 NU-WG2	0,8									●													
		DNGA 150612 NU-WG2	1,2									●													
		DNGA 150404 NU-WH2	0,4									○													
		DNGA 150408 NU-WH2	0,8									○													
		DNGA 150604 NU-WH2	0,4									●													
		DNGA 150608 NU-WH2	0,8									●													
		DNGA 150612 NU-WH2	1,2									●													
Break Master - LV 		**DNGM 150404 N-LV NU2**	0,4									○													
		DNGM 150408 N-LV NU2	0,8									○													
		DNGM 150412 N-LV NU2	1,2									○													
		DNGM 150604 N-LV NU2	0,4									●													
		DNGM 150608 N-LV NU2	0,8									●													
		DNGM 150612 N-LV NU2	1,2									●													

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

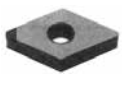
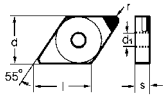
55° Diamond Type — 0° Relief, With Insert Hole

Dimensions (mm)				
DN__	ℓ	ød (IC)	s	d_1
1506--	15,5	12,7	6,35	5,16

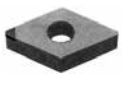
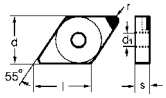
H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

DNMA

● M-Class SumiBoron (CBN, Regrindable Type)

Shape	ISO Cat. No.	r	BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	BN7000	BN7500	BNS800	DA150	DA1000	DA2200
 	**DNMA 150604**	0,4											●			●								
	DNMA 150608	0,8											●			●								
	DNMA 150612	1,2											●			●								

● M-Class SumiBoron (CBN, One-Use Type)

Shape	ISO Cat. No.	r	BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	BN7000	BN7500	BNS800	DA150	DA1000	DA2200
 	**DNMA 150604 NS**	0,4												●										
	DNMA 150608 NS	0,8												●										
	DNMA 150604 NU	0,4									●		●		▲	●	●	●	●					
	DNMA 150608 NU	0,8								●	●	▲	●		▲	●	●	●	●					
	DNMA 150612 NU	1,2										▲	●											

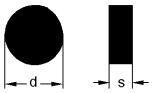
Round Type — 0° Relief, Without Insert Hole

Dimensions (mm)				
RN__	ℓ	ød (IC)	s	d_1
0903--	9,525	9,525	3,18	–
1203--	12,7	12,7	3,18	–
1204--	12,7	12,7	4,76	–

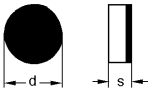
H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

RNGN

● G-Class SumiBoron (Solid CBN Type)

Shape	ISO Cat. No.	r	BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	BN7000	BN7500	BNS800	DA150	DA1000	DA2200
  Solid CBN	**RNGN 090300**	–																			●			
	RNGN 120300	–																			●			
	RNGN 120400	–																			●			

● G-Class SumiBoron (CBN, Full Top Type)

Shape	ISO Cat. No.	r	BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	BN7000	BN7500	BNS800	DA150	DA1000	DA2200
 	**RNGN 090300 B**	–					●	●																

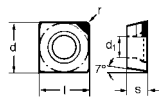
Square Type — 7° Relief, With Insert Hole

Dimensions (mm)				
SC__	ℓ	ød (IC)	s	d_1
09T3--	9,525	9,525	3,97	4,4

H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

SCGW

● G-Class SumiBoron (CBN, One-Use Type)

Shape	ISO Cat. No.	r	BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	BN7000	BN7500	BNS800	DA150	DA1000	DA2200
 	**SCGW 09T304 NU**	0,4											●					●	●					
	SCGW 09T308 NU	0,8											●						●					

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

Square Type — 0° Relief / With Insert Hole

Dimensions (mm)				
SN_ _	ℓ	ød (IC)	s	d_1
1204--	12,7	12,7	4,76	5,16

H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

SNGA

● G-Class SumiBoron (CBN, One-Use Multi-Corner Type)

Shape		ISO Cat. No.	r	BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	BN7000	BN7500	BNS800	DA150	DA1000	DA2200
				H						K	H									K PM			N		
				Coated							Uncoated														
				CBN																			PCD		
Standard - Normal cut geometry	with 4 CBN cutting edges	**SNGA 120408 NC-4**	0,8		●			●	●																
		SNGA 120412 NC-4	1,2		●			●	●																
HS - Type Strong cutting edge	with 2 CBN cutting edges	**SNGA 120408 HS-NC2**	0,8					●	●																
		SNGA 120412 HS-NC2	1,2					●	●																
HS - Type Strong cutting edge	with 4 CBN cutting edges	**SNGA 120408 HS-NC4**	0,8		❍																				
		SNGA 120412 HS-NC4	1,2		❍																				

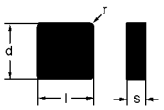
Square Type — 0° Relief / Without Insert Hole

Dimensions (mm)				
SN_ _	ℓ	ød (IC)	s	d_1
0903--	9,525	9,525	3,18	–
1204--	12,7	12,7	4,76	–

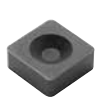
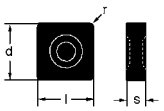
H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

SNGN / SNGX

● G-Class SumiBoron (Solid CBN Type)

Shape		ISO Cat. No.	r	BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	BN7000	BN7500	BNS800	DA150	DA1000	DA2200
				H						K	H									K PM			N		
				Coated							Uncoated														
				CBN																			PCD		
		**SNGN 090308**	0,8																			●			
		SNGN 090312	1,2																			●			
		SNGN 120412	1,2																			●			
		SNGN 120416	1,6																			●			

● G-Class SumiBoron (Solid CBN, "Dimple" Type)

		**SNGX 120412**	1,2																			●			
		SNGX 120416	1,6																			●			

● = Euro stock
❍ = Stock item in Japan
▲ = To be replaced by new item

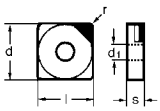
Square Type — 0° Relief / With Insert Hole

Dimensions (mm)				
SN_ _	ℓ	ød (IC)	s	d_1
1204--	12,7	12,7	4,76	5,16

H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

SNMA ●●●●●●

● M-Class SumiBoron (CBN, One-Use Type)

Shape	ISO Cat. No.	r	BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	BN7000	BN7500	BNS800	DA150	DA1000	DA2200
 	**SNMA 120408 NS**	0,8												●										
	SNMA 120412 NS	1,2												●										
	SNMA 120408 NU	0,8									●				▲	●	●	●	●					
	SNMA 120412 NU	1,2									●		●		▲	●	●	●	●					

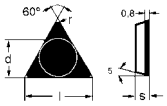
60° Triangle Type — 5° Relief

Dimensions (mm)				
TBGN	ℓ	ød (IC)	s	d_1
0601--	6,9	3,97	1,59	–
TBGW				
0601--	6,9	3,97	1,59	2,8

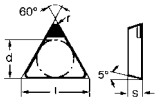
H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

TBGN / TBGW ●●●●●●

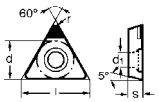
● G-Class SumiBoron (CBN, Full Top Type)

Shape	ISO Cat. No.	r	BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	BN7000	BN7500	BNS800	DA150	DA1000	DA2200
 	**TBGN 060102 B**	0,2					●				●	▲	●											
	TBGN 060104 B	0,4					●				●	▲	●			●								

● G-Class SumiDIA (PCD, NF Type)

 	**TBGN 060102 NF**	0,2																					●	▲
	TBGN 060104 NF	0,4																					●	▲

● G-Class SumiDIA (PCD, NF Type)

 	**TBGW 060102 NF**	0,2																					●	▲
	TBGW 060104 NF	0,4																					●	▲

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

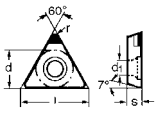
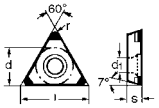
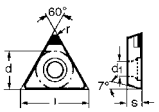
60° Triangle Type | 7° Relief / With Insert Hole

Dimensions (mm)				
TC__	ℓ	ød (IC)	s	d_1
0902--	9,62	5,56	2,38	2,5
1102--	11,0	6,35	2,38	2,8
16T3--	16,5	9,525	3,97	4,3

H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

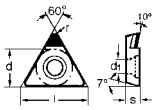
TCGW ●●●●●●

● G-Class SumiBoron (CBN, One-Use Type)

Shape		ISO Cat. No.	r	H Coated BNC2010	H Coated BNC2020	H Coated BNC100	H Coated BNC160	H Coated BNC200	H Coated BNC300	K Coated BNC500	H Uncoated CBN BN1000	H Uncoated CBN BN2000	H Uncoated CBN BNX10	H Uncoated CBN BNX20	H Uncoated CBN BNX25	H Uncoated CBN BN250	H Uncoated CBN BN300	H Uncoated CBN BN350	K Uncoated CBN BN700	K PM BN7000	K PM BN7500	K PM BNS800	N PCD DA150	N PCD DA1000	N PCD DA2200
		**TCGW 090204 NC**	0,4		●			●																
		TCGW 090208 NC	0,8		●			●																
		TCGW 110202 NC	0,2		●			●																
		TCGW 110204 NC	0,4		●			●		●														
		TCGW 110208 NC	0,8		●			●																
	 with 3 CBN cutting edges	**TCGW 16T304 NC-3**	0,4		●			●																
		TCGW 16T308 NC-3	0,8		●			●																
		**TCGW 090204 NU**	0,4															●	●					
		TCGW 090208 NU	0,8															●	●					
		TCGW 110202 NU	0,2								●		▲	●				●	●					
		TCGW 110204 NU	0,4								●	●	▲	●		▲		●	●					
		TCGW 110208 NU	0,8								●		▲					●	●					
		TCGW 16T304 NU	0,4								●		▲	●				●	●					
		TCGW 16T308 NU	0,8											●				●	●					

TCMT ●●●●●●

● M-Class SumiDia (PCD, NF Type)

Shape		ISO Cat. No.	r	H Coated BNC2010	H Coated BNC2020	H Coated BNC100	H Coated BNC160	H Coated BNC200	H Coated BNC300	K Coated BNC500	H Uncoated CBN BN1000	H Uncoated CBN BN2000	H Uncoated CBN BNX10	H Uncoated CBN BNX20	H Uncoated CBN BNX25	H Uncoated CBN BN250	H Uncoated CBN BN300	H Uncoated CBN BN350	K Uncoated CBN BN700	K PM BN7000	K PM BN7500	K PM BNS800	N PCD DA150	N PCD DA1000	N PCD DA2200
		**TCMT 090202 NF**	0,2																				●	▲
		TCMT 090204 NF	0,4																				●	▲
		TCMT 110201 NF	0,1																				●	▲
		TCMT 110202 NF	0,2																				●	▲
		TCMT 110204 NF	0,4																				●	▲

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

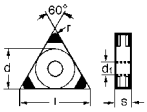
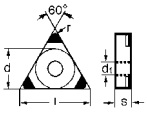
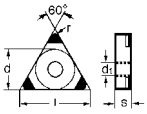
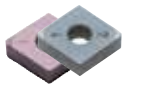
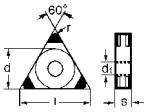
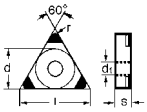
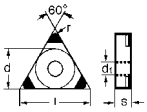
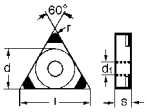
60° Triangle Type | 0° Relief, With Insert Hole

Dimensions (mm)				
TN_ _	ℓ	ød (IC)	s	d_1
1604--	16,5	9,525	4,76	3,81

H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

TNGA / TNGG / TNGM

● G-Class SumiBoron (CBN, One-Use Multi-Corner Type)

Shape		ISO Cat. No.	r	H Coated CBN BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	K Coated CBN BNC500	H Uncoated CBN BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	K PM Uncoated CBN BN7000	BN7500	BNS800	N PCD DA150	DA1000	DA2200
 Standard - Normal cut geometry	 with 6 CBN cutting edges	**TNGA 160404 NC-6**	0,4	●	●		●	●	●																
		TNGA 160408 NC-6	0,8	●	●	●	●	●	●																
		TNGA 160412 NC-6	1,2	●	●	●	●	●	●																
 **LS** - Type Low cutting force	 with 3 CBN cutting edges	**TNGA 160404 LS-NC3**	0,4			●	●	●																	
		TNGA 160408 LS-NC3	0,8			●	●	●																	
		TNGA 160412 LS-NC3	1,2			●	●	●																	
 **HS** - Type Strong cutting edge	 with 3 CBN cutting edges	**TNGA 160404 HS-NC3**	0,4	●	●		●	●																	
		TNGA 160408 HS-NC3	0,8	●	●		●	●	●																
		TNGA 160412 HS-NC3	1,2	●	●		●	●	●																
Break Master - FV, LV, SV  CBN with chipbreaker	 with 6 CBN cutting edges	**TNGG 160404 N-FV NC6**	0,4	●	●		●	●																	
		TNGG 160408 N-FV NC6	0,8	●	●		●	●																	
		TNGG 160412 N-FV NC6	1,2	●	●		●	●																	
		TNGG 160404 N-LV NC6	0,4	●	●		●	●																	
		TNGG 160408 N-LV NC6	0,8	●	●		●	●																	
		TNGG 160412 N-LV NC6	1,2	●	●		●	●																	
		TNGG 160408 N-SV NC6	0,8		●			●																	
		TNGG 160412 N-SV NC6	1,2		●																				
	 with 3 CBN cutting edges	**TNGA 160404 NU-3**	0,4																		○				
		TNGA 160408 NU-3	0,8																		○				
		TNGA 160412 NU-3	1,2																		○				
 **LF** - Type Sharp cutting edge **HS** - Type Strong cutting edge	 with 3 CBN cutting edges	**TNGA 160404 LF-NU3**	0,4																		○				
		TNGA 160408 LF-NU3	0,8																		○				
		TNGA 160404 HS-NU3	0,4																		○				
		TNGA 160408 HS-NU3	0,8																		○				
Break Master - LV 	 with 3 CBN cutting edges	**TNGM 160404 N-LV NU3**	0,4									●													
		TNGM 160408 N-LV NU3	0,8									●													
		TNGM 160412 N-LV NU3	1,2									●													

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

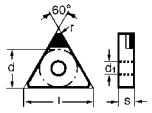
60° Triangle Type — 0° Relief — With Insert Hole

Dimensions (mm)				
TN__	ℓ	ød (IC)	s	d_1
1604--	16,5	9,525	4,76	3,81

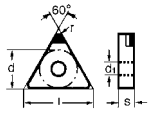
H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

TNMA ●●●●●●

● M-Class SumiBoron (CBN, Regrindable Type)

Shape	ISO Cat. No.	r	H Coated BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	H Uncoated CBN BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	K PM BN7000	BN7500	BNS800	N PCD DA150	DA1000	DA2200
 	**TNMA 160404**	0,4											●			●								
	TNMA 160408	0,8											●			●								

● M-Class SumiBoron (CBN, One-Use Type)

Shape	ISO Cat. No.	r	H Coated BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	H Uncoated CBN BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	K PM BN7000	BN7500	BNS800	N PCD DA150	DA1000	DA2200
 	**TNMA 160404 NU**	0,4									●		●		▲									
	TNMA 160408 NU	0,8								●	●	▲	●		▲	●	●							
	TNMA 160412 NU	1,2								●		▲	●											

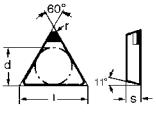
60° Triangle Type — 11° Relief — Without Insert Hole

Dimensions (mm)				
TP__	ℓ	ød (IC)	s	d_1
1103--	11,0	6,35	3,18	–
1603--	16,5	9,525	3,18	–

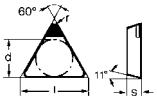
H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

TPGN ●●●●●●

● G-Class SumiBoron (CBN, One-Use Type)

Shape	ISO Cat. No.	r	H Coated BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	H Uncoated CBN BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	K PM BN7000	BN7500	BNS800	N PCD DA150	DA1000	DA2200
 	**TPGN 110304 NU**	0,4											●					●	●					
	TPGN 110308 NU	0,8											●					●	●					
	TPGN 160304 NU	0,4											●					●	●					
	TPGN 160308 NU	0,8											●					●	●					

● G-Class SumiDia (PCD, NF Type)

Shape	ISO Cat. No.	r	H Coated BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	H Uncoated CBN BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	K PM BN7000	BN7500	BNS800	N PCD DA150	DA1000	DA2200
 	**TPGN 110304 NF**	0,4																				●	●	▲
	TPGN 110308 NF	0,8																				●	●	▲
	TPGN 160302 NF	0,2																				●	●	▲
	TPGN 160304 NF	0,4																				●	●	▲
	TPGN 160308 NF	0,8																				●	●	▲

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

60° Triangle Type | 11° Relief With Insert Hole

Dimensions (mm)

TP_ _	ℓ	ød (IC)	s	d1
0802--	8,2	4,76	2,39	2,3
0902--	9,62	5,56	2,38	2,5
1102--	11,0	6,35	2,38	2,8
1103--			3,18	3,4
1604--	16,5	9,525	4,76	4,3

H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

TPGT / TPGW ●●●●●●

● G-Class SumiBoron (CBN, One-Use Type)

Shape		ISO Cat. No.	r	H Coated CBN BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	K Coated CBN BNC500	H Uncoated CBN BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	K PM Uncoated CBN BN7000	BN7500	BNS800	N PCD DA150	DA1000	DA2200
Break Master - FV CBN with chipbreaker	with 3 CBN cutting edges	**TPGT 110304 N-FV NC3**	0,4	●	●		●	●																	
		TPGT 110308 N-FV NC3	0,8	●	●		●	●																	
Standard - Normal cut geometry		**TPGW 080202 NC**	0,2		●			●																	
		TPGW 080204 NC	0,4		●			●																	
		TPGW 110304 NC	0,4		●			●																	
		TPGW 110308 NC	0,8		●			●																	
Break Master - FV CBN with chipbreaker	with 3 CBN cutting edges	**TPGT 110304 N-FV NU3**	0,4								●														
		TPGW 110308 N-FV NU3	0,8								●														
		TPGW 080202 NU	0,2									●		●		▲									
		TPGW 080204 NU	0,4								●	●	▲	●		▲									
		TPGW 110304 NU	0,4									●		●		▲	●	●							
		TPGW 110308 NU	0,8									●		●		▲	●	●							

● M-Class SumiBoron (CBN, Regrindable Type)

		TPGW 110304	0,4											●		▲									
		TPGW 110308	0,8											●		▲									

● G-Class SumiDia (PCD, NF Type)

		TPGW 080202 NF	0,2																				●	▲
		TPGW 080204 NF	0,4																				●	▲
		TPGW 110202 NF	0,2																				●	▲
		TPGW 110204 NF	0,4																				●	▲
		TPGW 110208 NF	0,8																				●	▲
		TPGW 110302 NF	0,2																				●	▲
		TPGW 110304 NF	0,4																				●	▲
		TPGW 110308 NF	0,8																				●	▲
		TPGW 160402 NF	0,2																				●	▲
		TPGW 160404 NF	0,4																				●	▲
		TPGW 160408 NF	0,8																				●	▲

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

60° Triangle Type | 11° Relief With Insert Hole

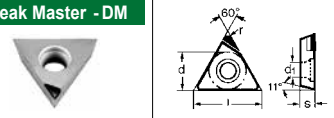
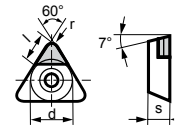
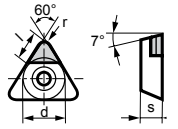
Dimensions (mm)

TP__	ℓ	ød (IC)	s	d_1
0802--	8,2	4,76	2,39	2,3
0902--	9,62	5,56	2,38	2,5
1102--	11,0	6,35	2,38	2,8
1103--			3,18	3,4
1604--	16,5	9,525	4,76	4,3

H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

TPMT ●●●●●●

● M-Class SumiDia (PCD, One-Use "Break Master" Type)

Shape		ISO Cat. No.	r	H Coated BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	K Coated BNC500	H Uncoated CBN BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	K PM BN7000	BN7500	BNS800	N PCD DA150	DA1000	DA2200
Break Master - DM		TPMT 080204 L-DM NU	0,4																				●		
		TPMT 090204 L-DM NU	0,4																				●		
Break Master - LD	 	TPMT 080202 N-LD NF	0,2																					○	
		TPMT 080204 N-LD NF	0,4																					○	
		TPMT 090202 N-LD NF	0,2																					○	
		TPMT 090204 N-LD NF	0,4																					○	
		TPMT 110202 N-LD NF	0,2																					○	
		TPMT 110204 N-LD NF	0,4																					○	
		TPMT 110302 N-LD NF	0,2																					○	
		TPMT 110304 N-LD NF	0,4																					○	
		TPMT 110308 N-LD NF	0,8																					○	
		TPMT 160402 N-LD NF	0,2																					○	
		TPMT 160404 N-LD NF	0,4																					○	
		TPMT 160408 N-LD NF	0,8																					○	
Break Master - GD	 	TPMT 080202 N-GD NF	0,2																					○	
		TPMT 080204 N-GD NF	0,4																					○	
		TPMT 090202 N-GD NF	0,2																					○	
		TPMT 090204 N-GD NF	0,4																					○	
		TPMT 110202 N-GD NF	0,2																					○	
		TPMT 110204 N-GD NF	0,4																					○	
		TPMT 110302 N-GD NF	0,2																					○	
		TPMT 110304 N-GD NF	0,4																					○	
		TPMT 110308 N-GD NF	0,8																					○	
		TPMT 160402 N-GD NF	0,2																					○	
		TPMT 160404 N-GD NF	0,4																					○	
		TPMT 160408 N-GD NF	0,8																					○	

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

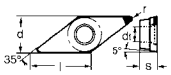
35° Diamond Type | 5° Relief With Insert Hole

Dimensions (mm)				
VB_ _	ℓ	ød (IC)	s	d_1
1102--	11,0	6,35	2,38	2,8
1103--			3,18	
1604--	16,6	9,525	4,76	4,4

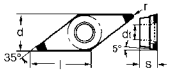
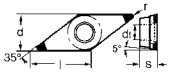
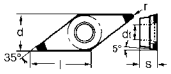
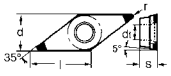
H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

VBGW ●●●●●●

● G-Class SumiBoron (CBN, One-Use Type)

Shape	ISO Cat. No.	r	H Coated BNC2010	H Coated BNC2020	H Coated BNC100	H Coated BNC160	H Coated BNC200	H Coated BNC300	K Coated BNC500	H Uncoated CBN BN1000	H Uncoated CBN BN2000	H Uncoated CBN BNX10	H Uncoated CBN BNX20	H Uncoated CBN BNX25	H Uncoated CBN BN250	H Uncoated CBN BN300	H Uncoated CBN BN350	H Uncoated CBN BN700	K PM BN7000	K PM BN7500	K PM BNS800	N PCD DA150	N PCD DA1000	N PCD DA2200
 Standard - Normal cut geometry	**VBGW 110202 NC**	0,2		●			●																	
	VBGW 110204 NC	0,4		●			●																	
	VBGW 110208 NC	0,8		●			●																	
	**VBGW 110202 NU**	0,2											●											
	VBGW 110204 NU	0,4									●		●											
	VBGW 110208 NU	0,8											●											
	**VBGW 160402 NU**	0,2											●											
	VBGW 160404 NU	0,4								●	●	▲	●		▲	●	●	●	●					
	VBGW 160408 NU	0,8								●	●	▲	●		▲	●	●	●	●					

● G-Class SumiBoron (CBN, One-Use Multi-Corner Type)

Shape	ISO Cat. No.	r	H Coated BNC2010	H Coated BNC2020	H Coated BNC100	H Coated BNC160	H Coated BNC200	H Coated BNC300	K Coated BNC500	H Uncoated CBN BN1000	H Uncoated CBN BN2000	H Uncoated CBN BNX10	H Uncoated CBN BNX20	H Uncoated CBN BNX25	H Uncoated CBN BN250	H Uncoated CBN BN300	H Uncoated CBN BN350	H Uncoated CBN BN700	K PM BN7000	K PM BN7500	K PM BNS800	N PCD DA150	N PCD DA1000	N PCD DA2200
 Standard - Normal cut geometry  with 2 CBN cutting edges	**VBGW 160404 NC-2**	0,4	●	●	●	●	●	●	●															
	VBGW 160408 NC-2	0,8	●	●	●	●	●	●	●															
 **LS** - Type Low cutting force  with 2 CBN cutting edges	**VBGW 160404 LS-NC2**	0,4			●	●	●																	
	VBGW 160408 LS-NC2	0,8			●	●																		
 **HS** - Type Strong cutting edge  with 2 CBN cutting edges	**VBGW 160404 HS-NC2**	0,4		●			●	●																
	VBGW 160408 HS-NC2	0,8		●			●	●																
  with 2 CBN cutting edges	**VBGW 160404 NU-2**	0,4								●	●	▲	●		▲									
	VBGW 160408 NU-2	0,8								●	●	▲	●		▲									

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

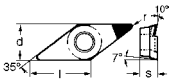
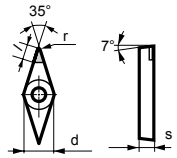
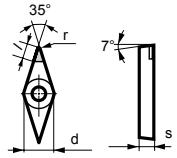
35° Diamond Type | 7° Relief With Insert Hole

Dimensions (mm)				
VB_ _	ℓ	ød (IC)	s	d_1
1102--	11,0	6,35	2,38	2,8
1103--			3,18	
1604--	16,6	9,525	4,76	4,4

H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

VCMT ●●●●●●

● M-Class SumiDia (PCD, NF Type)

Shape		ISO Cat. No.	r	H K Coated: BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	H Uncoated CBN: BN1000	BN2000	BNX10	BNX20	BNX25	BN250	BN300	BN350	BN700	K PM: BN7000	BN7500	BNS800	N PCD: DA150	DA1000	DA2200
		**VCMT 110301 NF**	0,1																				●	▲
		VCMT 110302 NF	0,2																				●	▲
		VCMT 110304 NF	0,4																				●	▲
		VCMT 160404 NF	0,4																				●	▲
		VCMT 160408 NF	0,8																				●	▲
		VCMT 160412 NF	1,2																				●	▲
	New 	**VCMT 110302 N-LD NF**	0,2																				❍	
		VCMT 110304 N-LD NF	0,4																				❍	
		VCMT 160404 N-LD NF	0,4																				❍	
		VCMT 160408 N-LD NF	0,8																				❍	
		VCMT 160412 N-LD NF	1,2																				❍	
	New 	**VCMT 110302 N-GD NF**	0,2																				❍	
		VCMT 110304 N-GD NF	0,4																				❍	
		VCMT 160404 N-GD NF	0,4																				❍	
		VCMT 160408 N-GD NF	0,8																				❍	
		VCMT 160412 N-GD NF	1,2																				❍	

● = Euro stock
❍ = Stock item in Japan
▲ = To be replaced by new item

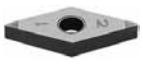
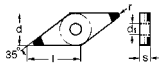
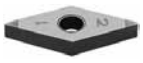
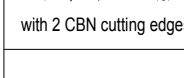
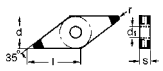
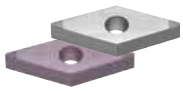
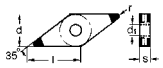
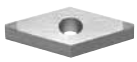
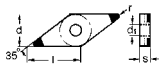
35° Diamond Type | 0° Relief With Insert Hole

Dimensions (mm)				
VN_ _	ℓ	ød (IC)	s	d_1
1604--	16,6	9,525	4,76	3,81

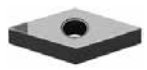
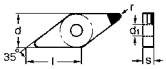
H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

VNGA / VNGG / VNMA

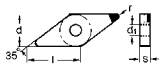
● G-Class SumiBoron (CBN, One-Use Multi-Corner Type)

Shape		ISO Cat. No.	r	BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	BN1000	BN2000	BNX10	BNX20	BNX25	BNX250	BNX300	BN350	BN700	BN7000	BN7500	BNS800	DA150	DA1000	DA2200
				H						K	H									K	PM		N		
				Coated							Uncoated														
				CBN																			PCD		
	 with 2 CBN cutting edges	**VNGA 160404 NU-2** **VNGA 160408 NU-2**	0,4 0,8								● ●	● ●									○ ○				
	 with 2 CBN cutting edges	**VNGA 160404 NC2** **VNGA 160408 NC2**	0,4 0,8		● ●																				
	 with 4 CBN cutting edges	**VNGA 160404 NC4** **VNGA 160408 NC4**	0,4 0,8		● ●																				
Break Master - FV, - LV  CBN with chipbreaker	 with 4 CBN cutting edges	**VNGG 160404 N-FV NC4** **VNGG 160408 N-FV NC4**	0,4 0,8	● ●	● ●		● ●	● ●																	
		VNGG 160404 N-LV NC4 **VNGG 160408 N-LV NC4**	0,4 0,8	● ●	● ●		● ●	● ●																	
Break Master - LV  CBN with chipbreaker	 with 2 CBN cutting edges	**VNGM 160404 N-LV NU2** **VNGM 160408 N-LV NU2**	0,4 0,8								● ●														

● M-Class SumiBoron (CBN, Regrindable Type)

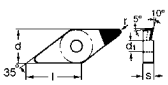
		**VNMA 160404** **VNMA 160408**	0,4 0,8										● ●				● ●								

● M-Class SumiBoron (CBN, One-Use Type)

		**VNMA 160404 NU** **VNMA 160408 NU**	0,4 0,8								● ●	● ●	▲ ▲	● ●		▲ ▲	● ●	● ●							

VNMX ●●●●●●

● M-Class SumiDia (PCD, Regrindable Type)

Shape		ISO Cat. No.	r	BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	BN1000	BN2000	BNX10	BNX20	BNX25	BNX250	BNX300	BN350	BN700	BN7000	BN7500	BNS800	DA150	DA1000	DA2200
				H						K	H									K	PM		N		
				Coated							Uncoated														
				CBN																			PCD		
		**VNMX 160404 NF** **VNMX 160408 NF**	0,4 0,8																				● ●	▲ ▲	

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

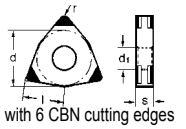
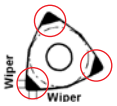
80° Trigon Type — 0° Relief / With Insert Hole

Dimensions (mm)				
VN__	ℓ	ød (IC)	s	d_1
0804--	8,69	12,7	4,76	5,16

H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

WNGA

● G-Class SumiBoron (CBN, One-Use Multi-Corner Type)

Shape		ISO Cat. No.	r	H Coated BNC2010	H Coated BNC2020	H Coated BNC100	H Coated BNC160	H Coated BNC200	H Coated BNC300	K Coated BNC500	H Uncoated CBN BN1000	H Uncoated CBN BN2000	H Uncoated CBN BNX10	H Uncoated CBN BNX20	H Uncoated CBN BNX25	H Uncoated CBN BN250	H Uncoated CBN BN300	H Uncoated CBN BN350	H Uncoated CBN BN700	K PM CBN BN7000	K PM CBN BN7500	K PM CBN BNS800	N PCD DA150	N PCD DA1000	N PCD DA2200
	 with 6 CBN cutting edges	**WNGA 080404 NC-6**	0,4	●			●																	
		WNGA 080408 NC-6	0,8	●			●																	
		WNGA 080412 NC-6	1,2	●			●																	
	 (Wiper Type)	**WNGA 080408 NC-WG6**	0,8	●	●		○	○																
		WNGA 080408 NC-WH6	0,8	●	●		○	○																

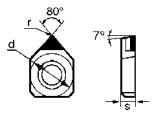
80° Special Type — 7° Relief / With Insert Hole

Dimensions (mm)				
ZN__	ℓ	ød (IC)	s	d_1
0401--	–	4,76	1,59	2,3

H Hardened Steel
K Cast Iron
N Non-Ferrous Metal
PM Sintered Component

ZNEX

● G-Class SumiBoron (CBN, One-Use Type)

Shape		ISO Cat. No.	r	H Coated BNC2010	H Coated BNC2020	H Coated BNC100	H Coated BNC160	H Coated BNC200	H Coated BNC300	K Coated BNC500	H Uncoated CBN BN1000	H Uncoated CBN BN2000	H Uncoated CBN BNX10	H Uncoated CBN BNX20	H Uncoated CBN BNX25	H Uncoated CBN BN250	H Uncoated CBN BN300	H Uncoated CBN BN350	H Uncoated CBN BN700	K PM CBN BN7000	K PM CBN BN7500	K PM CBN BNS800	N PCD DA150	N PCD DA1000	N PCD DA2200
		**ZNEX 040102 NC**	0,2		●	●	●	●																
		ZNEX 040104 NC	0,4		●	●	●	●																
		**ZNEX 040102 NU**	0,2								●	●	▲	●		▲								
		ZNEX 040104 NU	0,4								●	●	▲	●		▲								

● = Euro stock
○ = Stock item in Japan
▲ = To be replaced by new item

Precision Tools



BSME M28-30

Very small boring bar - brazed type

- Solid carbide shank boring bar with brazed CBN tip and inner coolant supply.
- For tiny hole diameter boring in hardened steel.
- Min. boring dia. is ø 2,5 mm.



SEXC M28-31

CBN boring tool for small diameter boring

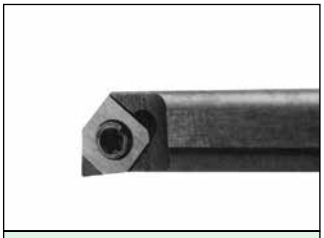
- Solid carbide shank boring bar with indexable CBN insert and inner coolant supply.
- For small hole diameter boring in hardened steel.
- Min. boring dia. is ø 4,0 mm.



BNBB M32

Small hole boring tools

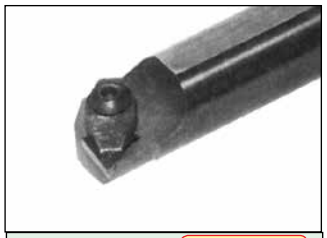
- CBN cutting edge is brazed on to a solid carbide shank.
- Small hole boring for hardened steels.
- Min. boring dia. is ø 3,5 mm.



BNZ M33

Small hole boring bars

- Solid carbide boring bars with economical CBN insert.
- Small hole boring for hardened steels.
- Min. boring dia. is ø 7,0 mm.



BNB M33

Small hole boring bars

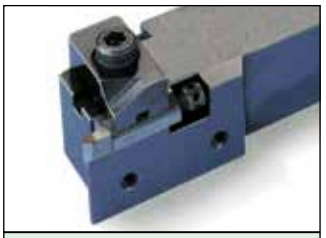
- Solid carbide boring bars with economical CBN and PCD insert.
- Min. boring dia. is ø 10,0 mm.



GWB M34-35

CBN Grooving System for Hardened Steels

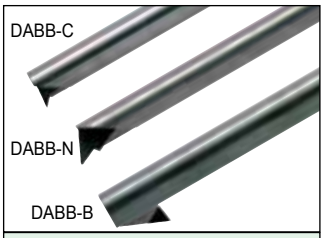
- Tangential Inserts – Double clamp holder
- Groove Widths from 1,5 – 6,0mm
- New CBN grade for interrupted grooving



BNGG M36

Threading holders

- CBN cutting edge for hardened steel
- Adjustable threading after regrinding.



DABB M37

Small hole boring tools

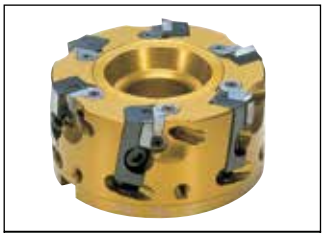
- PCD cutting edge for finishing of small non-ferrous parts
- Min. boring dia. is ø 3,0 mm.
- DABB-C for boring
  DABB-N for profiling and corner grooving
  DABB-B for back boring



DAL / DDL / DML ☞ M44-45

High precision SUMIDIA Drills

- PCD cutting edge is brazed on to a solid carbide shank.
- From general to high precision drilling of Aluminium alloys
- DML type is suitable for chamfering and stepped drilling



RF ☞ M38

High speed face mill for Aluminium

- Finishing and roughing aluminium alloys and non-ferrous materials
- High precision and highspeed machining vc= 5000 m/min
- Alumimum alloy body
- Run-out less than 10µm
- Easy assembling



SRF ☞ M39

High speed face mill for Aluminium

- Small diameter cutter for small machines
- High speed roughing and finishing with SumiDia DA2200
- High speed capability of rpm = 20.000
- Economical PCD insert NF type



FMU ☞ M40-41

"BN Finish Mill" for finishing grey cast iron

- High speed machining vc= 1500 m/min
- Excellent surface roughness Rz=3,2
- Run-out less than 10µm
- Easy assembling



BNES ☞ M42

"Helical Master" SUMIBORON Endmill

- Spiral CBN brazed cutting edge for super finishing hardened steel (HRC50~60)
- Dry machining
- Stable cutting
- High accuracy
- Excellent swarf evacuation



BNBP ☞ M43

"Mould Finish Master" Micro Ball Nose Endmills

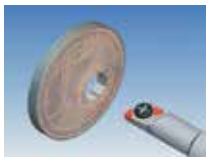
- High precision machining of hardened steels < HRC70 with long tool life
- Super tough grade SUMIBORON BN350 prevents chipping of the cutting edge
- R accuracy : ±0,005mm

BSME/SEXC Series

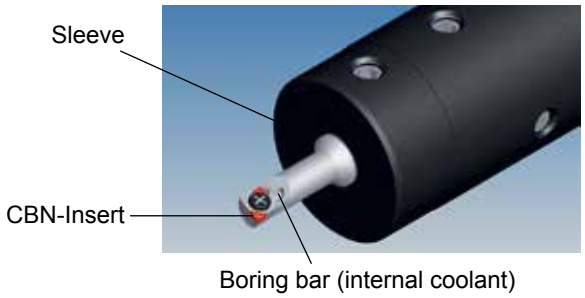
New

Features

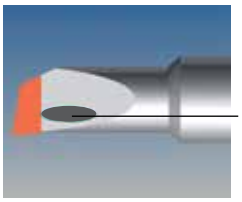
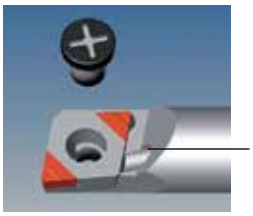
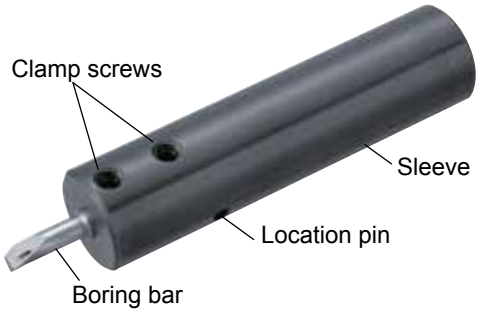
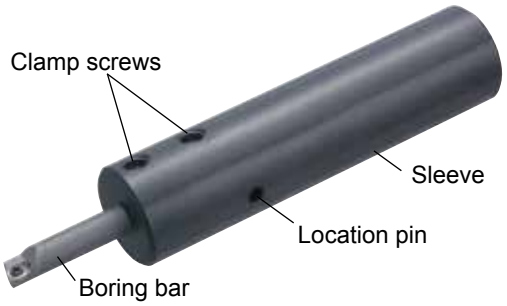
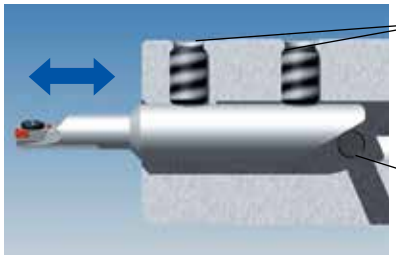
- New ultra small boring bar with CBN cutting edge
- Internal coolant
- Easy setting and handling
- High accuracy
- Carbide body for high rigidity
- One sleeve for different diameters



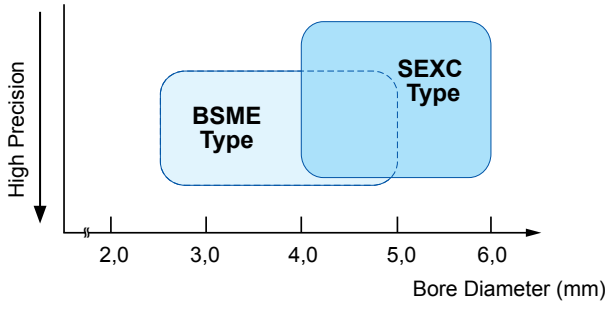
Basic System



2 Types of CBN Small Hole Boring Bar System

BSME - CBN Brazed Cutting Edge Type	SEXC - Indexable CBN Insert Type
Min. bore diameter: Ø2,5-5,0mm	Min. bore diameter: Ø4,0-6,0mm
Unique cutting edge shape with high quality and sharpness  Internal coolant hole (standard)	2 corner inserts  Internal coolant hole (standard)
	
Excellent repeatability of boring bar (deviation within 0,020mm) 	

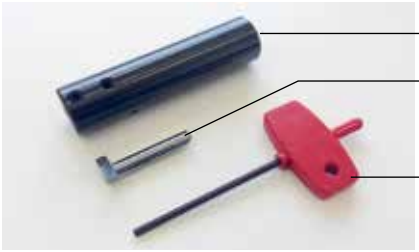
Application Range



Recommended Cutting Conditions

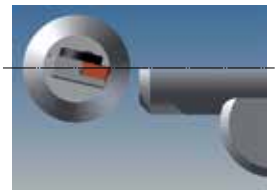
Spindle Speed (*n*)	>2000min^{-1}	Low speed may cause chattering and chipping on the cutting edge.
Depth of Cut (a_p)	0,01 - 0,15mm	Excessive depth of cut may cause larger tool deflection resulting in deterioration of bore accuracy.
Feed Rate (f)	0,01 - 0,1mm/rev	-

Accessories



Sleeve
Alignment Tool
Wrench

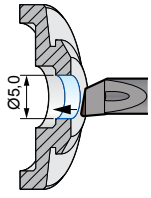
Mounting Instruction

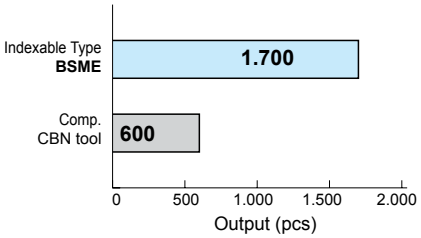
1. Insert alignment tool into the sleeve until you connect with the pin inside. Gently lock the screws to hold.	
2. Locate the sleeve into your tool-holding system. Gently lock the screws to hold.	 
3. Clock the flat of the alignment tool into a straight position. 	After adjustment, equipped boring bar has automatically cutting peak height of zero on the center of tool. 
4. Use pre setting machine to set the diameter of the boring bar.	

Application Example

BSME Hardened Alloy Steel Valve Component

The BSME type provides stable machining.
Tool life is over 2 times longer than competitor´s CBN tool.

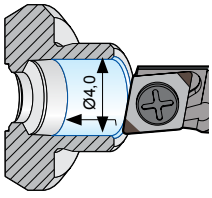


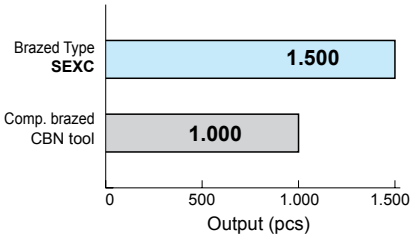


Work Material:	Hardened alloy steel valve component (automotive component)
Tool:	BSME R50020D2S6
Grade:	BN2000
Cutting Conditions:	v_c= 135m/min f = 0,02mm/rev a_p= 0,10mm Dry

SEXC Bearing Steel Small Automotive Component

The SEXC type provides drastically reduced tool costs.
Tool life is 1,5 times longer than competitor´s brazed CBN tool.





Work Material:	Bearing steel small automotive component (60HRC)
Holder:	E06D2 SEXC R/L03-04P
Insert:	ECXA 030X02LF (BN2000)
Cutting Conditions:	v_c= 50m/min (4.000rpm) f = 0,02mm/rev a_p= 0,02mm Wet

BSME Series

New

BSME-Type with Internal Coolant

BSME
General, Facing

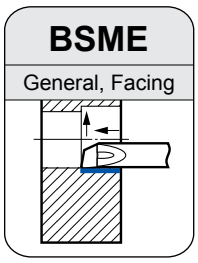


Fig. 1

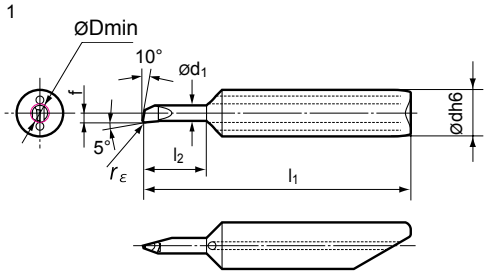
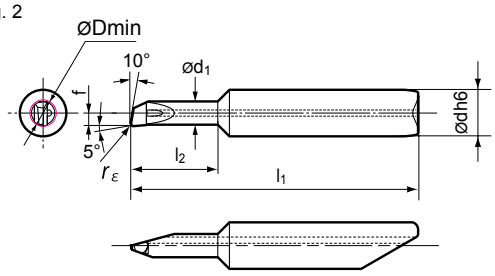


Fig. 2

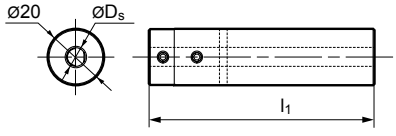


Sharp edge (no honing)

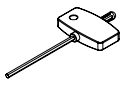
■ Boring Bar

Description	Grade		Dimensions (mm)							Fig.	Applicable Sleeve
	BN2000		ØDmin	Ød1	f	l2	l1	Ødh6	rε		
	R	L									
BSMER/L 25020D2S6	●	●	2,5	2,0	1,20	5,3	32,0	6,0	0,2	1	HBSM6020
BSMER/L 25020D3S6	●	●				7,8	34,5				
BSMER/L 25020D4S6	❑	❑				10,3	37,0				
BSMER/L 30020D2S6	●	●	3,0	2,5	1,45	6,3	32,8			2	
BSMER/L 30020D3S6	●	●				9,3	35,8				
BSMER/L 30020D4S6	❑	❑				12,3	38,8				
BSMER/L 35020D2S6	●	●	3,5	3,0	1,70	7,3	33,5				
BSMER/L 35020D3S6	●	●				10,8	37,0				
BSMER/L 35020D4S6	❑	❑				14,3	40,5				
BSMER/L 40020D2S6	●	●	4,0	3,5	1,95	8,3	33,9				
BSMER/L 40020D3S6	●	●				12,3	37,9				
BSMER/L 40020D4S6	❑	❑				16,3	41,9				
BSMER/L 45020D2S6	●	●	4,5	4,0	2,20	9,3	35,0				
BSMER/L 45020D3S6	●	●				13,8	39,5				
BSMER/L 45020D4S6	❑	❑				18,3	44,0				
BSMER/L 50020D2S6	●	●	5,0	4,5	2,45	10,3	35,8				
BSMER/L 50020D3S6	●	●				15,3	40,8				
BSMER/L 50020D4S6	❑	❑				20,3	45,8				

■ Adapter Sleeve and Parts

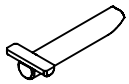






Description	Stock	Dimensions (mm)		Sleeve Screw	Wrench
		ØDs	l1		
HBSM6020	●	6,0	80	BT0506	TH025

■ Alignment Tool



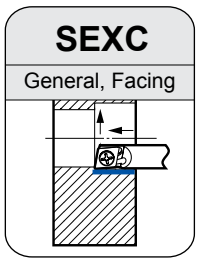
Description	Stock
AFBSM60	●

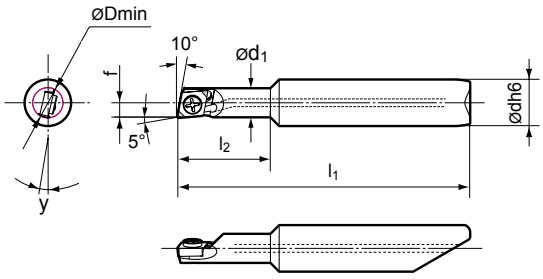
■ Identification

B S M	E	R/L	3 5 0	2 0	D 3	S 6
Sumitomo CBN Product Special Mini	Solid Carbide Bar with Inner Coolant	R: Right Hand L: Left Hand	Minimum Bore Diameter (ø3,5mm)	Nose Radius of Edge (ø0,20mm)	L/D - Ratio of Working Length	Shank Diameter

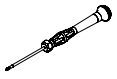
● = Eurostock
❑ = Delivery on request

SEXC-Type with Internal Coolant





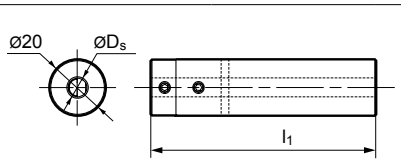
■ Spare Parts

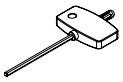



■ Boring Bar

Description	Stock		Dimensions (mm)							Applicable Sleeve	Insert Screw	Tightening Torque (N·m)	Wrench
	R	L	ØDmin	Ød1	f	l2	l1	Ødh6	y				
E06D2 SEXCR/L03-04P	●	●	4,0	3,75	1,95	8	33,75	6,0	13°	HBSM6020	MIB1,6-2,0	0,2	SDBSM
E06D3 SEXCR/L03-04P	●	●				12	37,75						
E06D2 SEXCR/L03-05P	●	●	5,0	4,75	2,45	10	35,25		12°		MIB1,6-2,5		
E06D3 SEXCR/L03-05P	●	●				15	40,25						
E06D2 SEXCR/L03-06P	●	●	6,0	5,75	2,95	12	36,75		11°		MIB1,6-3,0		
E06D3 SEXCR/L03-06P	●	●				18	42,75						

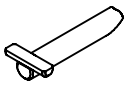
■ Adapter Sleeve and Parts



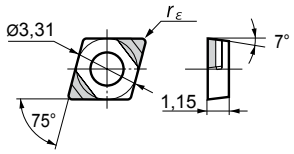
Description	Stock	Dimensions (mm)		Sleeve Screw	Wrench
		ØDs	l1		
HBSM6020	●	6,0	80	BT0506	TH025

■ Alignment Tool



Description	Stock
AFBSM60	●

■ CBN Insert



Description	Grade		Nose Radius rε (mm)	Cutting Edge Preparation
	BN2000	BN7000		
ECXA030X02**LE** NU2	●		0,2	sharp + hone
ECXA030X02**LF** NU2	●	●	0,2	sharp

Notes:

Applicable wrench SDBSM is recommended when fastening the insert screw.
Please check insert screw occasionally and replace it in time.

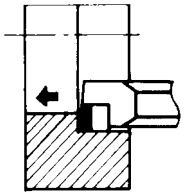
■ Identification

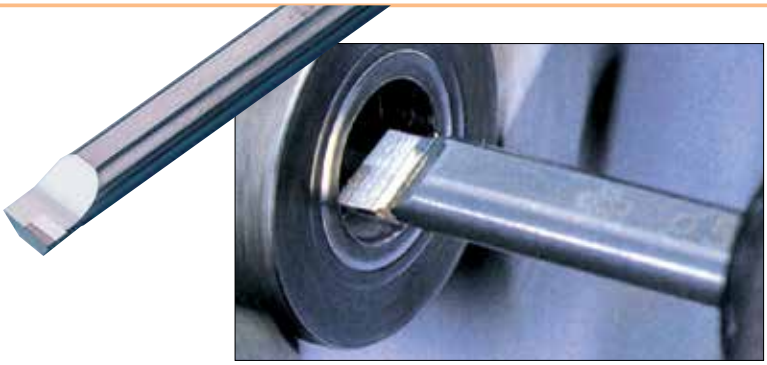
E	06	D2	S	E	X	C	R/L	03	-	04	P
Carbide Bar with Coolant Hole	Shank Diameter (Ø6mm)	L/D Ratio of Working Length	Insert Clamp System S = Screw Type	Insert Shape E = Diamond 75°	Approch Angle of Main Cutting Edge	Insert Relief Angle C = 7°	R: Right Hand L: Left Hand	Insert Size (ØIC)		Minimum Bore Diameter (Ø4,0mm)	Standard Content includes Wrench

BNBB Type

For Hardened Steel

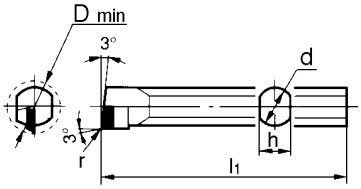
BNBB type small hole boring tools for hardened work pieces up to diameter 3,5 mm



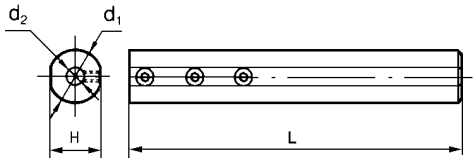


■ „Sumiboron“ Brazed Boring Tools for Small Hole Boring

	Cat. No.	Stock	Dimensions (mm)					Applicable holder	Grade of brazed cutting edge
			D_{min}	d	l_1	h	r		
BNBB (Carbide shank)	**BNBB 03 R**	●	3,5	3	60	2,4	0,2	HBB 316	**SUMIBORON (CBN) BN250**
	BNBB 04 R	●	4,5	4	60	3,4	0,2	HBB 416	
	BNBB 05 R	●	5,5	5	80	4,4	0,2	HBB 516	
	BNBB 06 R	●	6,5	6	80	5,4	0,2	HBB 616	
	BNBB 08 R	●	8,5	8	100	7,4	0,2	HBB 816	

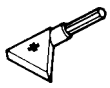


■ Holder



Cat. No.	Stock	Dimensions (mm)			
		d_1	L	d_2	H
HBB 316	●	16	100	3	15
HBB 416	●			4	
HBB 516	●			5	
HBB 616	●			6	
HBB 816	●			8	

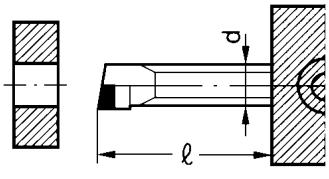
■ Spare Parts

Screw	Wrench
	
BT 0404	TH 020

■ Recommended Cutting Conditions

Work material	SUMIBORON BN250		Notes
Hardened steels (H_RC45~68)	Cutting speed (v_c)	30 ~ 150 m/min	Low speed may cause chattering in cutting process and chipping occurence on the cutting edge.
	Feed rate (f)	0,03 ~ 0,1 mm/rev	-
	Depth of cut (d_{oc})	0,03 ~ 0,2 mm	Excessive depth of cut may cause larger deformation of tool,resulting in deterioration of bore accuracy.

■ Precaution On Use



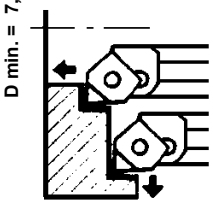
(ℓ max. = 5 x d)

- Adjust overhang to achieve absolute minimum.
- For use of a small diameter brazed boring tool, select high speed and small feed rate, as much as possible.

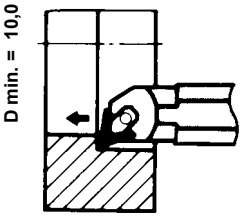
● = Eurostock

SUMIBORON Small Hole Boring Bars
BNZ / BNB Type

BNZ type

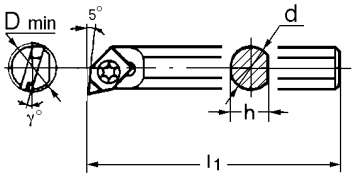
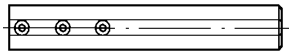
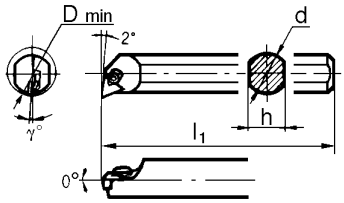


BNB type

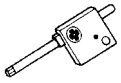




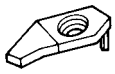
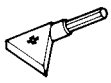
Boring Bars for Small Hole Boring

	Cat. No.	Stock	Dimensions (mm)					Applicable insert	
			D_{min}	d	l_1	h	γ		
BNZ (Carbide shank) 	**BNZ 606 R**	●	7	6	80	5,5	-14°	ZNEX 0401○○	 ZNEX (CBN)
	BNZ 608 R	●	9	8	100	7,5	-12°		
	BNZ 610 R	●	11	10	125	9,5	-10°		
	BNZ 612 R	●	13	12	130	11	-8		
	Holder "HBB616" for BNZ606 (ød=6mm) 								
BNB (Carbide shank) 	**BNB 508 R/L**	● ●	10	8	140	7	-9°	TBGN 0601○○	 TBGN (CBN)
	BNB 512 R/L	● ●	14	12	160	11	-6°		
	BNB 516 R/L	● ●	18	16	180	14	-5°		
	BNB 520 R/L	● ●	22	20	180	18	-4°		

Spare Parts for BNZ

Holder	Screw	Wrench
		
BNZ 606 R		
BNZ 608 R	BFTX 0204 N	TRX 06
BNZ 610 R	**0,5** (N·m)	

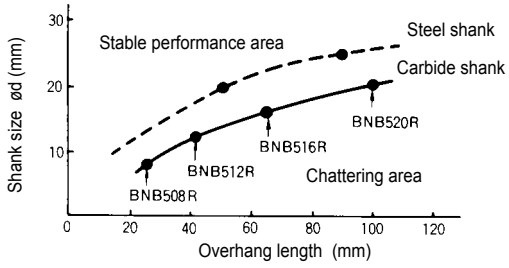
Spare Parts for BNB

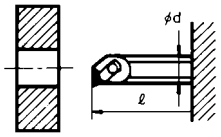
Holder	Clamp	Clamp bold	Nut	Wrench
				
BNB 508 R/L	BNBC	BH 0306	BNBW-2	TH 020
BNB 512 R/L	BNBC	FBUP-3-A0-9	BNBW-4	TH 020
BNB 516 R/L	BNBC	BH 0310	BNBW-4	TH 020
BNB 520 R/L	BNBC	BH 0310	BNBW-7	TH 020

Recommended Cutting Conditions

Cutting speed	80 ~ 120 m/min
Feed rate	0,03 ~ 0,1 mm/rev
Depth of cut	0,03 ~ 0,2 mm

Holders Performance Area





Work material: Alloy steel (H_RC 60)
Cutting conditions: v_c = 100 m/min
f = 0,1 mm/rev
d_{oc} = 0,2 mm

GWB Type



New CBN Grooving System for Hardened Steels

Features

Tangential insert

80 degree tangentially mounted insert improves rigidity



Double clamping system

The double clamping system increases stability so even axial feeds are possible.

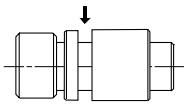
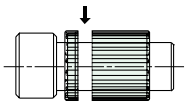
New coated CBN grade BNC30G

Tough new coated CBN grade for interrupted hard grooving

Wide insert range 1,5 – 6,0mm

Wide range of width's and grades for continuous and interrupted cut grooving operations

Grades

Grade	Application	Features
BN250 	Continuous grooving 	Uncoated CBN grade for continuous cut grooving applications
BNC30G 	Interrupted grooving 	Tough new CBN coated grade developed for interrupted cut grooving applications

Recommended cutting Conditions

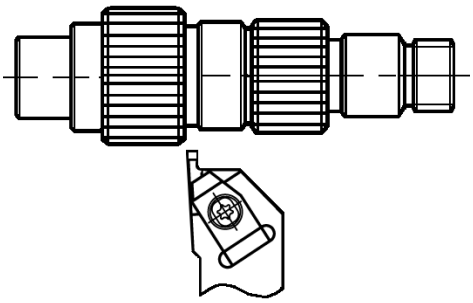
Material	Hardened steel
Cutting speed (m/min)	60 80 120 150
Feed rate (mm/rev)	0,03 0,04 0,08 0,1
Grade	BN250, BNC30G

Coolant:
Dry / Wet (for continuous cut)
Dry only (for interrupted cut)

Remarks:
To avoid thermal cracking of the cutting edge when interrupted cutting please ensure workpiece remains dry.

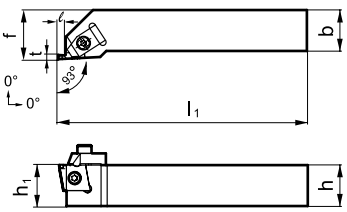
● = Eurostock
❑ = Delivery on request

GWB Type





Holders

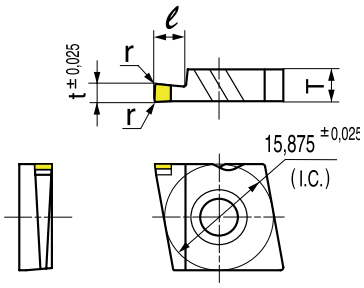


Cat. No.	Stock R	Stock L	h	h_1	b	f	l_1	t (*)	ℓ	Applicable Insert
GWB R/L **2020 - 45**	❑	❑	20	20	20	24	150	1,5 < t ≤ 2,0	3,5	CGA R/L 1504 ○○○
								2,0 < t ≤ 3,0	4,0	
							151	3,0 < t ≤ 4,5	5,0	
GWB R/L **2525 - 45**	●	●	25	25	25	30	150	1,5 < t ≤ 2,0	3,5	
								2,0 < t ≤ 3,0	4,0	
							151	3,0 < t ≤ 4,5	5,0	
GWB R/L **2525 - 60**	●	●	25	25	25	30	151	4,5 < t ≤ 6,0	5,0	CGA R/L 1506 ○○○

Right handed tool holders are applicable with right handed inserts.

Remark: Inserts are not included.

Inserts

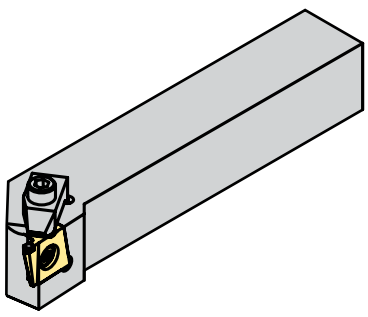


Cat. No.	Stock BN250 R	Stock BN250 L	Stock BNC30G R	Stock BNC30G L	t (*)	ℓ	r	I.C.	T	Applicable Holder
CGA R/L **1504 150**	●	●	●	●	1,5	3,5	0,2	15,875	4,76	GWB R/L 2020 - 45 GWB R/L 2525 - 45
CGA R/L **1504 200**	●	●	●	●	2,0					
CGA R/L **1504 250**	●	●	●	●	2,5	4,0				
CGA R/L **1504 300**	●	●	●	●	3,0					
CGA R/L **1504 350**	●	●	●	●	3,5	5,0				
CGA R/L **1504 400**	●	●	●	●	4,0					
CGA R/L **1504 450**	●	●	●	●	4,5					
CGA R/L **1506 500**	●	●	●	●	5,0				6,35	GWB R/L 2525 - 60
CGA R/L **1506 550**	●	●	●	●	5,5					
CGA R/L **1506 600**	●	●	●	●	6,0					

*) Special widths available on request

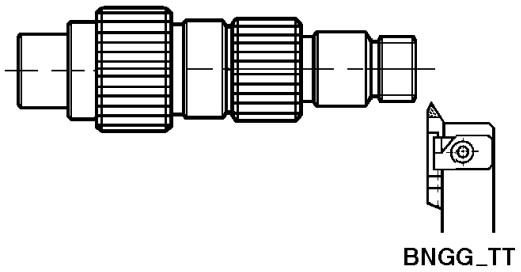
Spare Parts

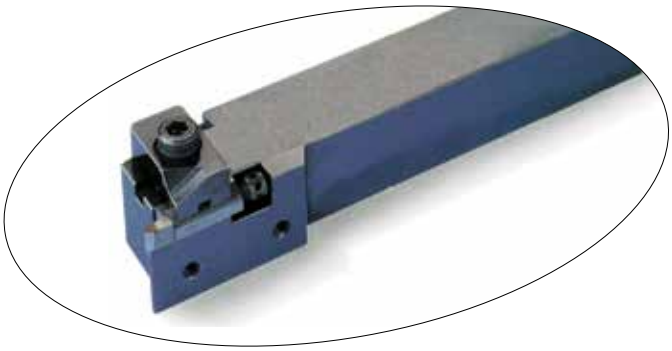
Holder	Clamp finger	Clamp screw	Insert screw	Spring	Wrench
					
GWB R/L **2020 - 45**	TF 72 (Right handed) TF 73 (Left handed)	BX 0520 T	BFTX 0511 N **5,0** (N·m)	GSP 6	TRX 20
GWB R/L **2525 - 45**					
GWB R/L **2525 - 60**					



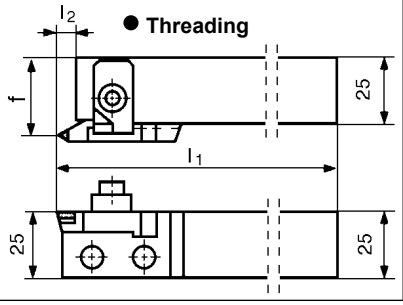
BNGG Type

For Hardened Steel



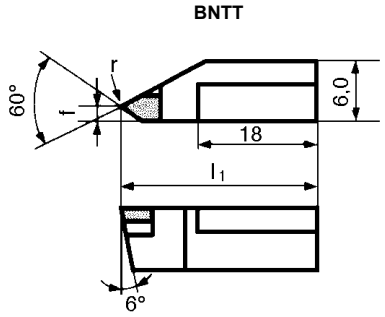


„Sumiboron“ Holders



Cat. No.	Stock		Dimensions (mm)			Applicable Insert
	R	L	f	l_2	l_1	
BNGG R/L **2525-TT**	●	❑	28,5	5	150	BNTT 1020 R/L BNTT 1530 R/L

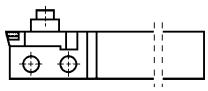
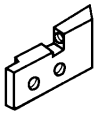
Inserts



Cat. No.	Stock						Dimensions (mm)				Applicable Holder
	BN250		BN300		BNX20						
	R	L	R	L	R	L	Pitch	r	l_1	s	
BNTT 1020 R/L	●	❑			●	❑	1,0 ~ 2,0	0,13	25	6,0	BNGG R/L 2525 -TT
BNTT 1530 R/L	●	❑			●	❑	1,5 ~ 3,0	0,13	25	6,0	

● Inserts also suitable for existing BNG2525R type holders

Spare Parts

Holder	Support	Clamp	Adjust screw	Spring	Screw	Wrench	
							
BNGG R/L 2525 - TT	BNGS R/L TT	BNGC R/L	FMJ	GSP 6	BX 0615 (for Clamp) BX 0414 (for support)	LH 050 LH 030	ø1,8x45

Recommended Cutting Conditions

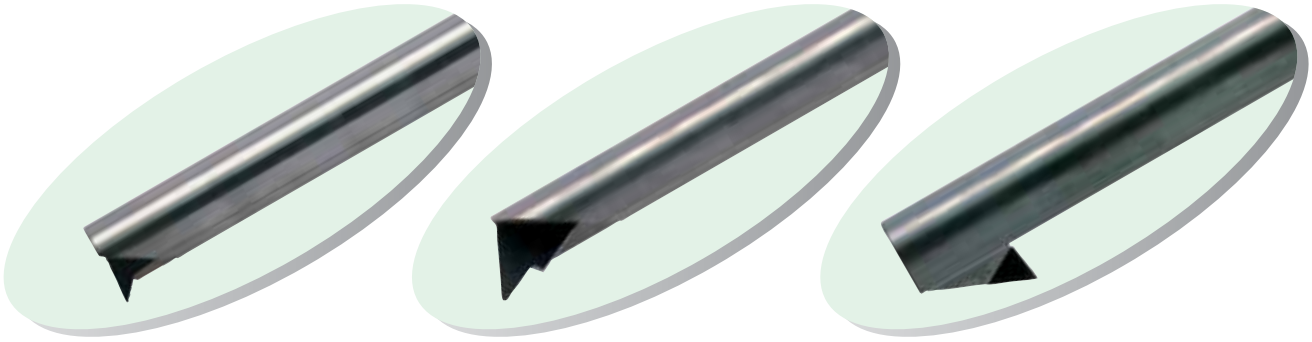
● **Threading**

Cutting speed (v_c)	80 ~ 120 m/min
Feed rate (f)	Max. pitch: 3,0 mm

● = Eurostock
❑ = Delivery on request

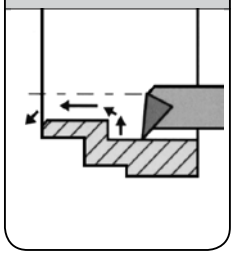
SUMIDIA Small Hole Boring Bars

DABB Type

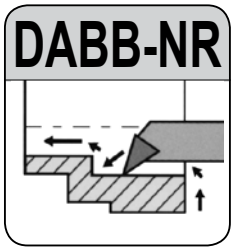


„Sumidia“ Brazed Boring Tools for Small Hole Boring

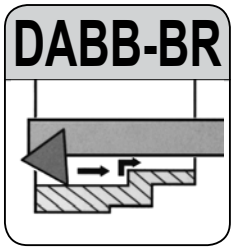
DABB-CR

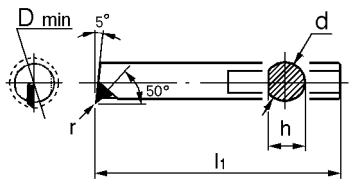
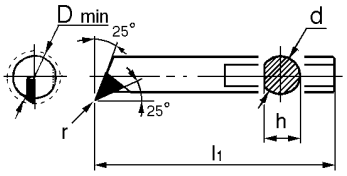
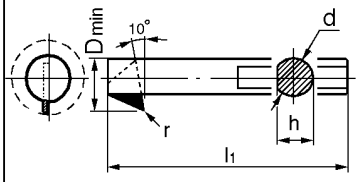


DABB-NR



DABB-BR

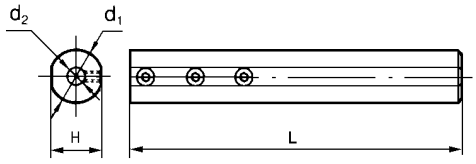


DABB (Solid carbide shank)	Cat. No.	Stock	Dimensions (mm)					Applicable Holder
		DA2200	D_{min}	d	l_1	h	r	
For small boring 	**DABB 025 CR**	●	3,0	2,5	60	2,2	0,1	HBB 2516
	DABB 035 CR	❑	4,0	3,5	60	3,2	0,1	HBB 3516
	DABB 045 CR	●	5,0	4,5	80	4,1	0,1	HBB 4516
	DABB 060 CR	❑	7,0	6,0	80	5,2	0,1	HBB 616
For profiling and corner grooving 	**DABB 025 NR**	❑	3,0	2,5	60	2,2	0,1	HBB 2516
	DABB 035 NR	●	4,0	3,5	60	3,2	0,1	HBB 3516
	DABB 045 NR	❑	5,0	4,5	80	4,1	0,1	HBB 4516
	DABB 060 NR	❑	7,0	6,0	80	5,2	0,1	HBB 616
For back boring 	**DABB 045 BR**	❑	7,0	4,5	80	4,0	0,1	HBB 4516
	DABB 060 BR		9,0	6,0	80	5,5	0,1	HBB 616

Recommended Cutting Conditions

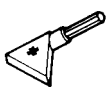
Spindle revolution	Feed rate	Depth of cut	Coolant
> 2000 rpm	0,03 ~ 0,1 mm/rev	0,03 ~ 0,2 mm	Wet

Holder



Cat. No.	Stock	Dimensions (mm)			
		d_1	L	d_2	H
HBB 2516	●	16	100	2,5	15
HBB 3516	●			3,5	
HBB 4516	●			4,5	
HBB 616	●			6,0	

Spare Parts

Screw	Wrench
	
BT 0404	TH 020

RF Type

High Speed Finishing of Aluminium Alloy

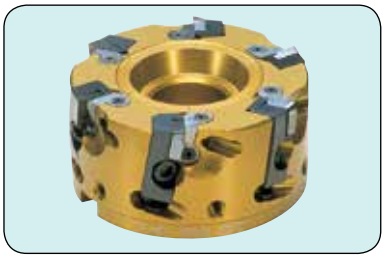


Fig. 1

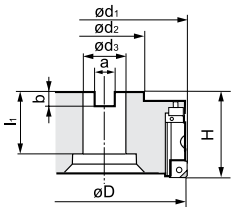


Fig. 2

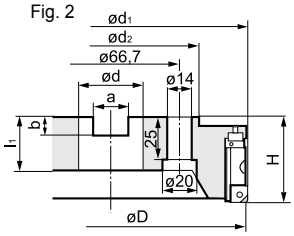
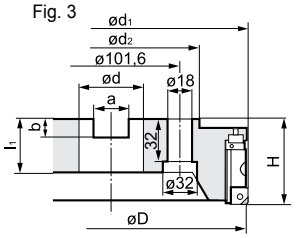


Fig. 3



Body

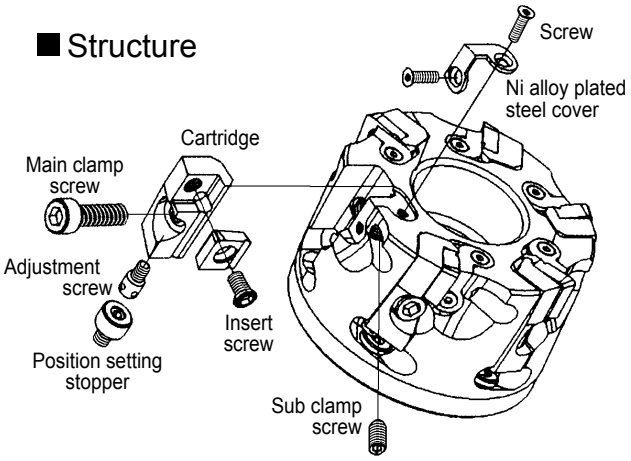
Type	Cat. No.	Stock	Dimensions (mm)				Mounting				Number of teeth	max. depth of cut	Weight (Kg)	Fig.
			ø D	ø d_1	ø d_2	H	ø d_3	a	b	l_1				
RF 4000	**RF 4080 R-S**	●	80	82	60	50	27	12,4	7,0	29	6	3,0	0,7	
	RF 4100 R-S	●	100	102	75	50	32	14,4	8,5	29	6		1,0	1.
	RF 4125 R-S	●	125	127	75	63	40	16,4	9,5	29	8		1,6	
	RF 4160 R-S	❑	160	162	100	63	40	16,4	9,5	29	10		2,6	2.
	RF 4200 R-S	❑	200	202	130	63	60	25,7	14,0	38	12		3,6	
	RF 4250 R-S	❑	250	252	130	63	60	25,7	14,0	38	16		6,0	3.
	RF 4315 R-S	❑	315	317	240	80	60	25,7	14,0	40	18		11,0	

Remark: PCD blades and inserts are not included.

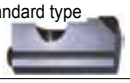
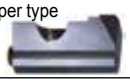
Insert for Roughing and Finishing

Shape	Cat. No.	Grade	Stock
	Carbide insert **SDET 1204 ZDFR**	**H1**	●
	PCD insert **SNEW 1204 ADFR-NF**	**DA1000** ● DA2200 ▲	
	PCD insert wiper type **SNEW 1204 ADFR-W-NF**	**DA1000** ● DA2200 ▲	

Structure



"Sumidia" Blade

PCD grade DA2200	Cat. No.	Stock
Standard type 	**RFB**	▲
Wiper type 	**RFBW**	▲

Cartridge

Shape	Cat. No.	Stock
For carbide insert 	**RFR**	●
For Sumidia insert 	**RFF**	●

Dummy Blade

	**RFD**	❑

Cutting Insert Selection

For easy assembling:
PCD blade **RFB**
PCD blade **RFB** (wiper type)

For finishing:
Cartridge **RFF**
PCD insert SNEW 1204 ADFR-NF (standard type)
SNEW 1204 ADFR-W-NF (wiper type)
PCD grade: DA2200

For roughing:
Cartridge **RFR**
Uncoated carbide insert
SDET 1204 ZDFR, grade: H1

Spare Parts

		 10,0	 3,0			 6,0		
Cover	Position setting stoper	Main clamp screw	Sub clamp screw	Cover clamp screw	Adjustment screw	Insert clamp screw	Hex wrench	Torque wrench
RFC	RFS	BX0620	BTD0510	FBUP2-A0-8	RFJ	BFTX0509N	TH015, TH025 TH050	TTX20

Setting Gauge



RF-SET

Dial-gauge is not included.

● = Eurostock
❑ = Delivery on request
▲ = To be replaced by new item

High Speed Finishing of Aluminium Alloy



Fig. 1

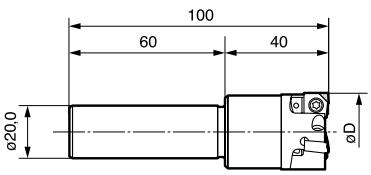
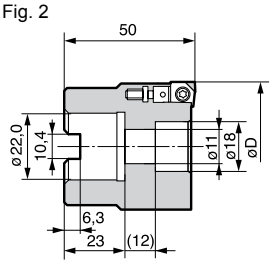


Fig. 2

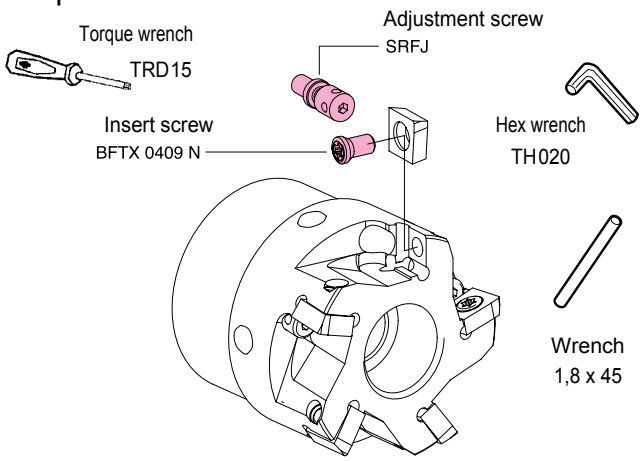


Body

Cat. No.	Stock	øD(mm)	No. of teeth	Fig.	Weight (Kg)
SRF 30 R-ST	❑	30	3	1	0,34
SRF 40 R-ST	❑	40	4	1	0,50
SRF 50 RS	❑	50	5	2	0,59
SRF 63 RS	❑	63	6	2	0,67

Inserts are sold seperately.

Spare Parts



Insert

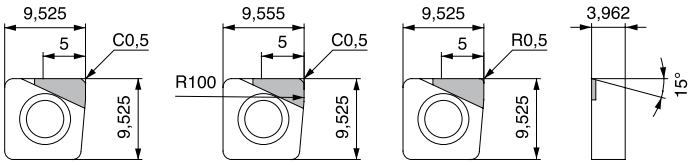


Fig. 1 Fig. 2 Fig. 3

Cat. No.	Cutting Edge	SUMIDIA DA2200	Fig
SNEW 09T3 ADTR-NF	Standard	▲	1
SNEW 09T3 ADTR-U-NF	Wiper	▲	2
SNEW 09T3 ADTR-R-NF	Nose Radius	▲	3

- Standard inserts and Wiper inserts can be used on the same cutter body.
- Standard inserts with nose radius should be used where vibration is present. As such, Wiper-inserts will not be appliccable.
- Inserts can be regrind 3 times (up to minimum IC diameter 9,225mm).
- When using reground inserts, it is advisable to reconfirm insert height and cutting diameter with a tool pre-setter.
- Do not mix new and reground inserts, or even inserts with different regrind amount on the same cutter.

Maximum D.O.C. Guide (SRF50RS, 5 teeth)

The contains guidelines on the maximum D.O.C., determined from internal tests. "O" mark indicates the possible application range. Actual cutting conditions should be set, based on actual machine and work characteristics.

D.O.C. (mm) \ Feed	Feed Speed, v_f (mm/min)		
	2.500	4.000	5.000
	Feed Rate, f_t (mm/tooth)		
	0,05	0,08	0,10
0,5	○	○	○
1,0	○	○	○
1,5	○	○	○
2,0	○	○	○
2,5	○	○	○
3,0	○	○	○
3,5	○	○	–
4,0	○	–	–
4,5	○	–	–
5,0	○	–	–

● Cutting Conditions

Cutter: SRF 50 RS
Insert: SNEW 09T3 ADFR-NF (DA2200)
n : 10.000 rpm
Width: 35mm at D.O.C. indicated above



Recommended Cutting Conditions for RF and SRF Type Cutters

Work Material		Process	Grade	Cutting Speed (m/min)		Feed Rate (mm/tooth)	Depth of Cut (mm)	
				RF Type	SRF Type		RF Type	SRF Type
Aluminium Alloy	Si < 13%	Finishing	**DA2200** (PCD)	2.000 ~ 5.000	~ 4.000	0,05 ~ 0,2	~ 3,0	~ 5,0
		Roughing	H1 (Carbide)	1.000 ~ 2.500	–			
	Si ≥ 13%	Finishing	**DA2200** (PCD)	400 ~ 800	~ 800			
		Roughing	H1 (Carbide)	200 ~ 400	–			

FMU Type

High Speed Finishing of Grey Cast Iron



Features

- High speed machining v_c = **1.500** m/min
- Excellent surface roughness Rz=3,2 (Ra=1,0)
- Safety structure for the centrifugal force under high speed cutting conditions
- Run-out is less than 10µm
- Easy assembling method using the setting gauge
- Running cost is reduced because of economical insert

Application

GG25~GG30 (HB200~250) grey cast iron with pearlite matrix, and ferrite matrix (HB130~160)
Application examples: engine block, cylinder block, etc



Specifications

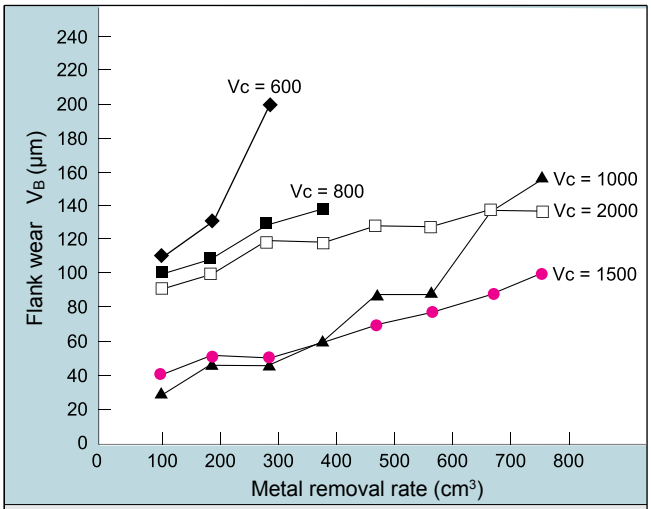
FMU Type: ø80 ~ ø315 mm
Insert: SNEW1203ADTR/L
Low cutting force type: SNEW1203ADTR/L-S

Recommended Cutting Conditions

Speed: v_c = 800 ~ 2000 m/min
Feed: f_t = 0,1 ~ 0,3 mm/tooth
Depth: d_{oc} = 0,5 mm or less
Dry cutting

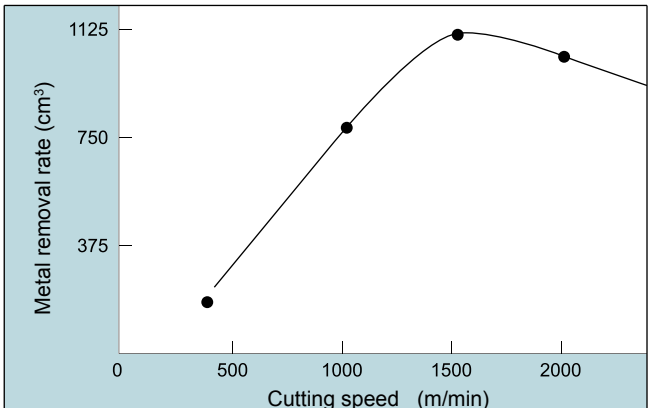
Performance

● Tool Life Diagram



Work material : GG25 H_B240 (Pearlite)
Cutting speed : v_c = 600 ~ 4000 m/min
Feed rate : f_t = 0,15 mm/tooth
Depth of cut : d_{oc} = 0,5 mm, Dry

● Estimated Tool Life



Work material : GG25 H_B240 (Pearlite)
Cutting speed : v_c = 400 ~ 4000 m/min
Feed rate : f_t = 0,15 mm/tooth
Depth of cut : d_{oc} = 0,5 mm, Dry

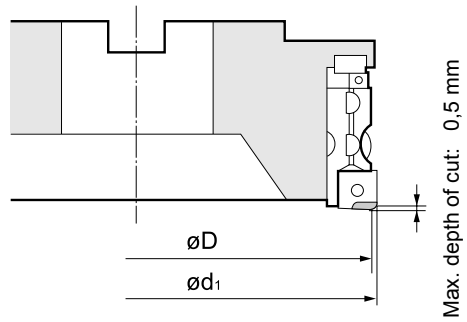
● Milling of ductile cast iron and alloy steel casting do not produce the best results.
● Dry cutting is recommended. Wet cutting will result in chipping of cutting edges in the early stages due to thermal cracking.

● = Eurostock
❑ = Delivery on request

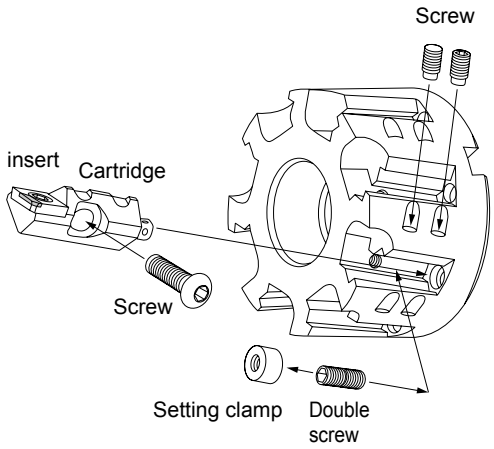
FMU Type

Specifications

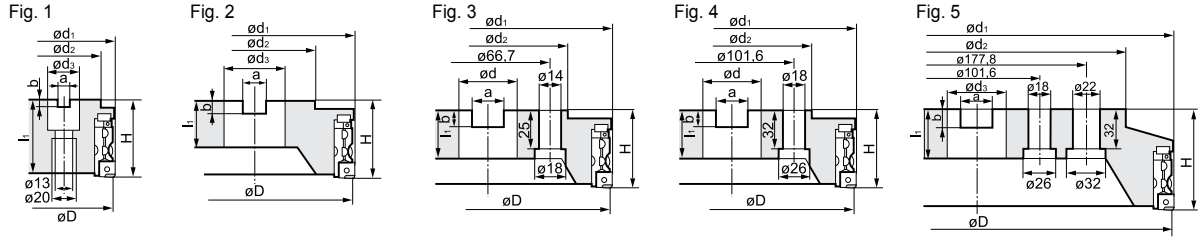
Approach angle: 90°
Axial rake angle: + 8°
Radial rake angle: + 2°



Structure

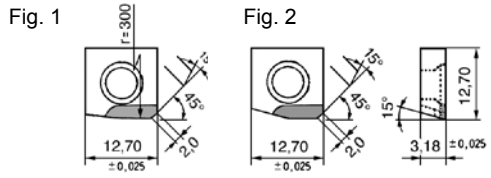


Body



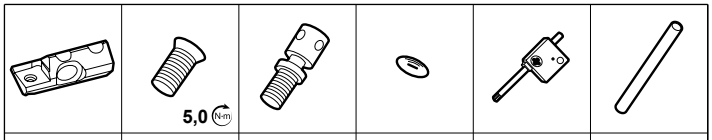
Type	Cat. No.	Stock R	Stock L	Dimensions (mm) ø D	ø d1	ø d2	H	Mounting ø d3	a	b	l1	Number of teeth	max. depth of cut	Weight (Kg)	Fig.
FMU 4000	**FMU 4080 R-S**	●		80	82,8	60	63	27	12,4	7,0	25	6	0,5	1,6	1.
	FMU 4100 R-S	●		100	102,8	76	63	32	14,4	8,5	29	8		2,4	2.
	FMU 4125 R-S	❑		125	127,8	75	63	40	16,4	9,5	29	10		3,4	
	FMU 4160 R-S	❑		160	162,8	100	63	40	16,4	9,5	29	12		5,6	3.
	FMU 4200 R-S	❑		200	202,8	130	63	60	25,7	14,0	38	16		9,2	4.
	FMU 4250 R-S	❑		250	252,8	130	63	60	25,7	14,0	38	20		14,3	
	FMU 4315 R-S			315	317,8	240	80	60	25,7	14,0	40	24		27,8	5.

Inserts



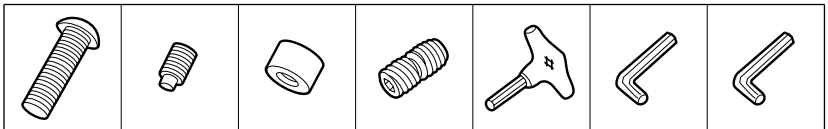
Cat. No.	Stock R	Stock L	CBN grade	Figure
SNEW 1203 ADT L/R	●		BN700	1
SNEW 1203 ADT L/R**-S**			BN700	2

Cartridge



Cartridge	Screw	Adjustment screw	O-ring	Wrench	Wrench
FMUU	BFTX0509N	FMUJ	P3	TRX20	1,8 x 45

Spare Parts



Screw	Screw	Setting clamp	Double screw	Wrench	Wrench	Wrench
BH0620	BTD0609	FMUE	WB5-10	TH040	LH030	LH025

Gauge



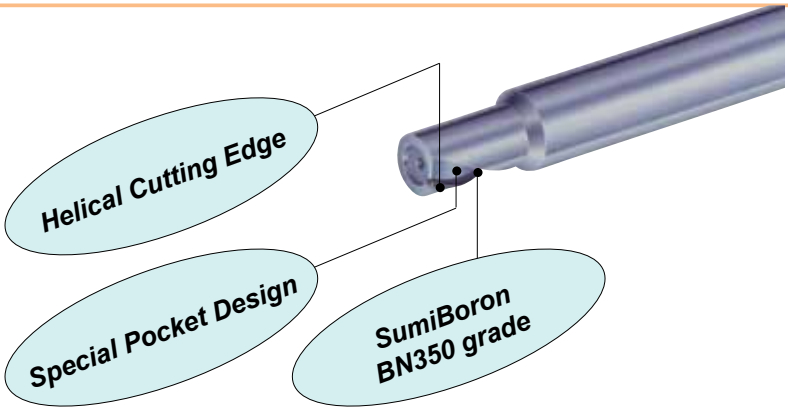
RF-SET

Dial-gauge is not included.

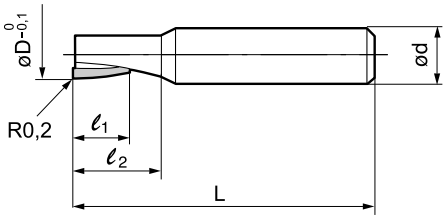
SUMIBORON
"Helical Master" BNES Type

Spiral CBN Endmill for Hardened Steel





■ Endmills BNES Type with 1 Spiral Flute

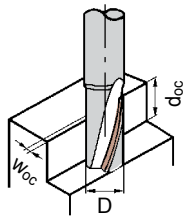


Helix angle : 15°
right-hand cut, right-hand helix

Cat. No.	Stock	Dimensions (mm)				
	BN350	øD	ød	ℓ_1	ℓ_2	L
BNES 1060	❑	6,0	10	7,0	11	60
BNES 1080	❑	8,0	10	10,0	14	70
BNES 1100	❑	10,0	12	12,0	17	75
BNES 1120	❑	12,0	12	14,0	20	80
BNES 1140	❑	14,0	16	16,0	21,5	80
BNES 1160	❑	16,0	16	18,0	24	80

■ Recommended Cutting Conditions

Cutting speed: v_c (m/min), Spindle revolutions: n (rpm), Feed per tooth: f_t (mm/tooth), Feed speed: v_f (mm/min)

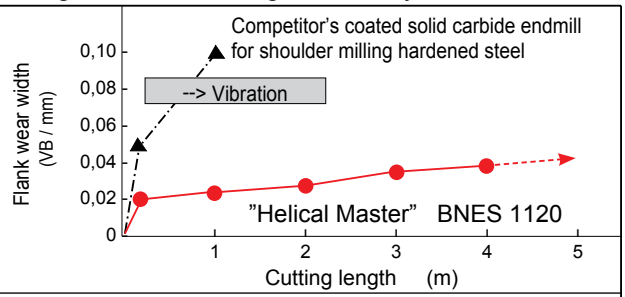
Tooling example	ø D	Hardened steel (H_RC 50 ~ 57) v_c = 100 ~ 170 m/min			Hardened steel (H_RC 58 ~ 65) v_c = 80 ~ 150 m/min		
	ø 6 ~ 8	w_{oc} ≤ 0,1 mm	n = 4000 ~ 9000	v_f (mm/min) = 240 ~ 540	w_{oc} ≤ 0,08 mm	n = 3200 ~ 8000	v_f (mm/min) = 150 ~ 370
	ø 10 ~ 12	w_{oc} ≤ 0,15 mm	n = 2700 ~ 5400	v_f (mm/min) = 180 ~ 360	w_{oc} ≤ 0,12 mm	n = 2100 ~ 4800	v_f (mm/min) 120 ~ 270
	ø 14 ~ 16	w_{oc} ≤ 0,2 mm	n = 2000 ~ 3800	v_f (mm/min) = 140 ~ 260	w_{oc} ≤ 0,15 mm	n = 1600 ~ 3400	v_f (mm/min) = 110 ~ 230

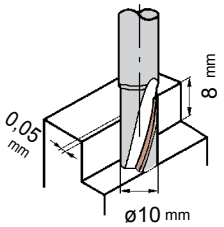
Depth of cut : d_{oc} ≤ D

Recommendation: Dry cutting (Air coolant)
Down-cut milling
Minimise the overhang
Use a rigid machine

■ Performance

● Long Tool Life and High Efficiency





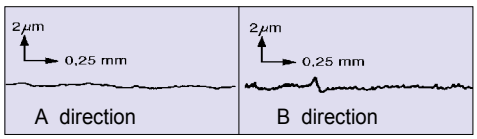
Work material: X155CrVMo12-1
Hardness: H_RC 60

Cutting data:
v_c = 100 m/min (**Helical Master**)
v_c = 40 m/min (Competitor's coated solid carbide endmill)
v_f = 186 mm/min

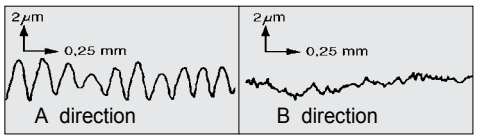
Down-cut milling
Dry cutting

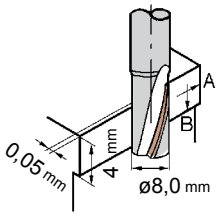
● Excellent Surface Roughness

"**Helical Master**" **BNES 1080** ø 8,0



Conventional straight flute CBN endmill, ø 8,0



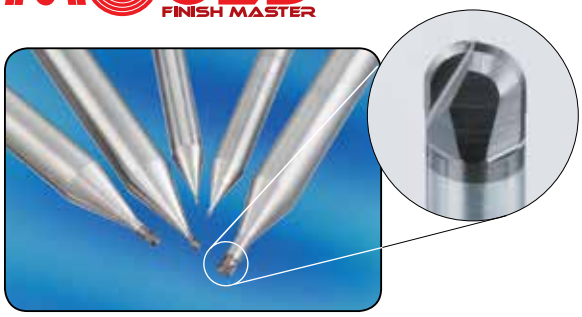


Work material: 15Cr3
Hardness: H_RC 55~58
Cutting data: v_c = 130 m/min
v_f = 310 mm/min

Down-cut milling
Dry cutting

● = Eurostock
❑ = Delivery on request

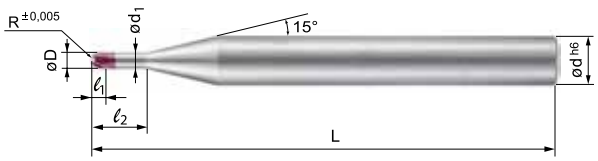
SUMIBORON "MOULD Finish Master" BNBP



Characteristics / Application

- High precision machining of hardened steels < HRC70 with long tool life
- Super tough grade SUMIBORON BN350 prevents chipping of the cutting edge
- R accuracy : ±0,005mm

Endmills



※ Endmill Identification

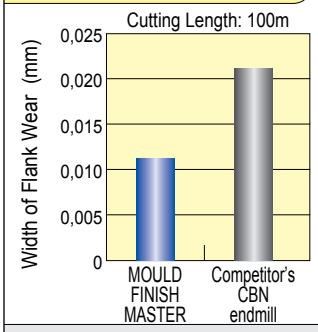
BNBP 2 R020 - 012 4

- BNBP 2 R020: MOULD FINISH MASTER
- 012: Number of teeth
- 4: Radius of ball nose
- Neck length (ℓ_2)
- Shank Diam.

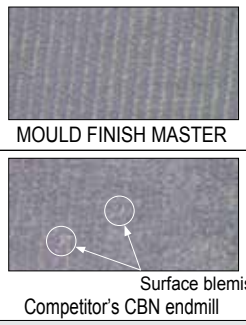
	Cat. No.	Stock	Dimensions (mm)						
		BN350	R	øD	L	ød1	ød	ℓ1	ℓ2
4,0 mm (Shank Diam.)	**BNBP 2 R020-012 4**	●	0,2	0,4	50	0,37	4	0,3	1,2
	BNBP 2 R030-015 4	●	0,3	0,6	50	0,57	4	0,4	1,5
	BNBP 2 R050-025 4	●	0,5	1,0	50	0,97	4	0,6	2,5
	BNBP 2 R075-040 4	●	0,75	1,5	50	1,47	4	0,9	4,0
	BNBP 2 R100-055 4	●	1,0	2,0	50	1,97	4	1,4	5,5
6,0 mm (Shank Diam.)	**BNBP 2 R020-012 6**	●	0,2	0,4	50	0,37	6	0,3	1,2
	BNBP 2 R030-015 6	●	0,3	0,6	50	0,57	6	0,4	1,5
	BNBP 2 R050-025 6	●	0,5	1,0	50	0,97	6	0,6	2,5
	BNBP 2 R075-040 6	●	0,75	1,5	50	1,47	6	0,9	4,0
	BNBP 2 R100-055 6	●	1,0	2,0	50	1,97	6	1,4	5,5

Performance

Wear Resistance

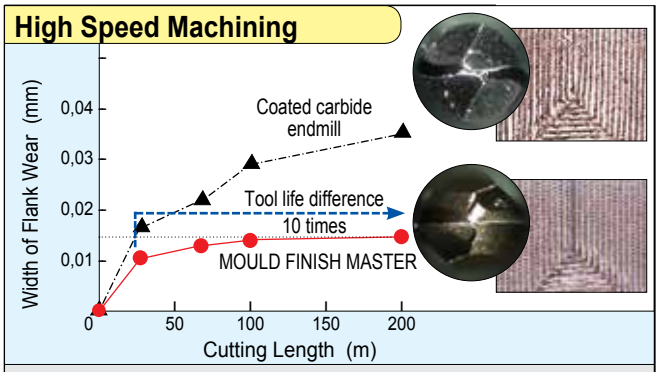


Machined Surface



R1,0 Ball endmill, Cutting data: Work material: X155CrVMo12-1 (H_RC60)
n = 20.000 rpm, f_t = 0,05 mm/tooth (v_f = 2.000mm/min)
d_{oc} = 0,05 mm, w_{oc} = 0,05 mm, Air blast

High Speed Machining



R1,0 Ball endmill, Cutting data: Work material: X155CrVMo12-1 (H_RC60)
n = 40.000 rpm, f_t = 0,05 mm/tooth (v_f = 4.000mm/min)
d_{oc} = 0,05 mm, w_{oc} = 0,05 mm, Oil mist

● Excellent surface finish compared with competitor's CBN and coated carbide endmills

Recommended Cutting Conditions

Spindle revolutions: N (rpm), Feed rate per tooth: f_t (mm/tooth), Depth of cut: d_{oc} (mm), Wide of cut: w_{oc} (mm)

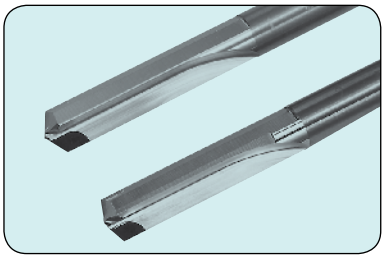
Material / Cutting data / Radius (mm)	Pre-hardened steel, Die steel (~ HRC52)				Die steel (~ HRC62)				High speed tool steel (~ HRC70)			
	n (rpm)	f_t (mm/tooth)	d_{oc} (mm)	W_{oc} (mm)	n (rpm)	f_t (mm/tooth)	d_{oc} (mm)	W_{oc} (mm)	n (rpm)	f_t (mm/tooth)	d_{oc} (mm)	W_{oc} (mm)
R 0,2	20.000~50.000	0,02	0,03	0,03	20.000~50.000	0,02	0,01	0,02	20.000~50.000	0,015	0,01	0,02
R 0,3	20.000~50.000	0,02	0,03	0,03	20.000~50.000	0,02	0,01	0,02	20.000~50.000	0,015	0,01	0,02
R 0,5	20.000~50.000	0,03	0,05	0,05	20.000~50.000	0,03	0,03	0,04	20.000~50.000	0,02	0,02	0,03
R 0,75	20.000~50.000	0,04	0,08	0,1	20.000~50.000	0,04	0,05	0,05	20.000~50.000	0,03	0,02	0,05
R 1,0	20.000~50.000	0,05	0,1	0,1	17.000~50.000	0,05	0,05	0,05	17.000~50.000	0,03	0,03	0,05



Important Notes

(1) For stable machining, a more rigid machine is recommended.
(2) Air blast or oil mist coolant is recommended.
(3) Shorten overhang as much as possible.

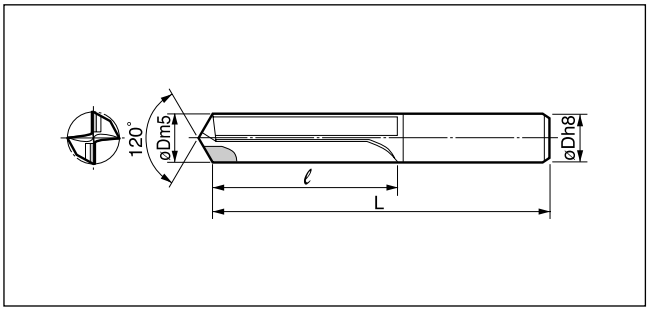
DAL/DDL/DML Type



From general to High Precision Drilling of Aluminum Alloys!

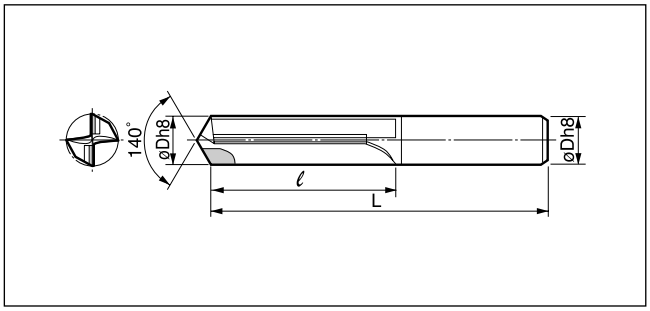
- High precision DAL type is able to produce holes of IT Class of 7~8.
- General DDL type is able to produce holes of IT class of 11~12, mainly for drilling of pre-tap holes.
- DML type is DDL type with a chamfer edge, incorporating 2 processes in one operation.

■ DAL Type



Cat. No.	Stock DA2200	øD	L	ℓ
DAL 0500H ~ 0600H		ø5 ≤ D ≤ ø6	80	30
DAL 0601H ~ 0700H		ø6 < D ≤ ø7	90	35
DAL 0701H ~ 0800H		ø7 < D ≤ ø8	90	35
DAL 0801H ~ 0900H		ø8 < D ≤ ø9	100	40
DAL 0901H ~ 1000H		ø9 < D ≤ ø10	100	40
DAL 1001H ~ 1100H		ø10 < D ≤ ø11	110	50
DAL 1101H ~ 1200H		ø11 < D ≤ ø12	110	50

■ DDL Type



Cat. No.	Stock DA2200	øD	L	ℓ
DDL 050V ~ 060V		ø5 ≤ D ≤ ø6	80	30
DDL 061V ~ 070V		ø6 < D ≤ ø7	90	35
DDL 071V ~ 080V		ø7 < D ≤ ø8	90	35
DDL 081V ~ 090V		ø8 < D ≤ ø9	100	40
DDL 091V ~ 100V		ø9 < D ≤ ø10	100	40
DDL 101V ~ 110V		ø10 < D ≤ ø11	110	50
DDL 111V ~ 120V		ø11 < D ≤ ø12	110	50

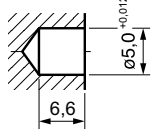
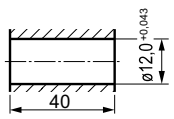
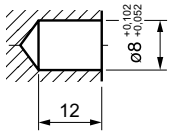
■ Recommended Conditions

	Cutting Speed (m/min)	Feed Rate (mm/rev)	Drilling Length L/D	Oil
øD < 8	80 ~ 250	0,05 ~ 0,2	Below 3 x D	Water soluble
8 ≤ øD		0,1 ~ 0,3		

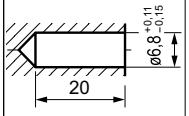
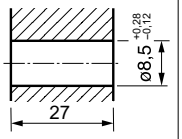
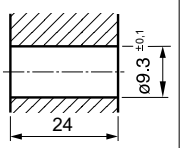
■ Important Notes

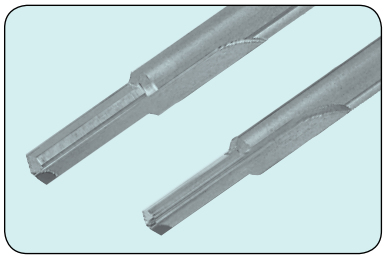
- Select a high rigidity machine and high precison tool holder.
- Enough coolant to drilled hole.

■ Application Examples (DAL Type)

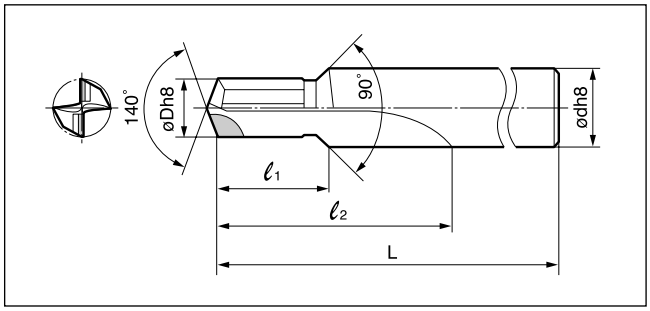
Work Shape	Work	Conditions	Results
	A390 High silicon Aluminum	Vc=100m/min f=0,1mm/rev	• Holes by carbide drill was out of specifications after 2.000 holes/reg. • SumiDia drill could drill up to 30.000 holes/reg. • 15 times tool life that of carbide drills.
	A390 High silicon Aluminum (pre-cast hole of ø10)	Vc=120m/min f=0,12mm/rev	• Average 40,000 holes/reg • Surface roughness Ry = 1µm
	ADC10 Aluminum Die Cast	Vc=90m/min f=0,08mm/rev	• More than 50.000 holes and still running

■ Application Examples (DDL Type)

Work Shape	Work	Conditions	Results
	ADC12 Aluminum Die Cast M8 Pre-tap holes	Vc=214m/min f=0,14mm/rev	• Regrind after 100.000 holes
	ADC12 Aluminum Die Cast	Vc=200m/min f=0,17mm/rev	• Regrind after 74.000 holes (2.000m) (Preset tool change)
	AC2A Aluminum Casting	Vc=234m/min f=0,28mm/rev	• Regrind after 80.000 holes (Preset tool change)

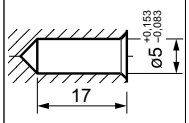
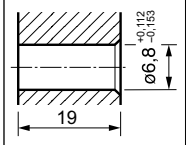
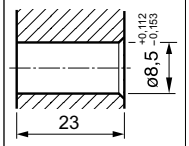


■ DML Type

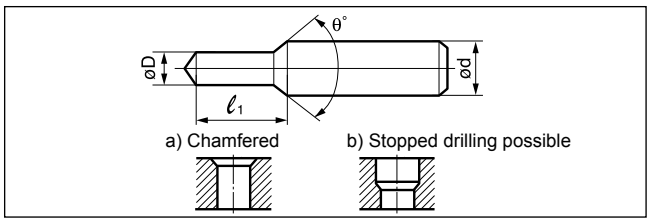


Applicable Tap Size	Cat. No.	Stock DA2200	øD	ød	L	ℓ1	ℓ2
M6	**DML 050V**		5	8	90	18	36
M8	**DML 068V**		6,8	10	104	24	48
M10	**DML 085V**		8,5	12	122	30	60
M12	**DML 103V**		10,3	14	136	36	72

■ Application Examples (DML Type)

Work Shape	Work	Conditions	Results
	AC4C-T6 Aluminum Casting M6 Pre-tap holes	Vc=100m/min f=0,1mm/rev m/c=6 spindles	• Regrind after 150.000 holes • Tool life for carbide drill is 500 holes. • 30 times tool life that of carbide drills
	AC2C-T2 Aluminum Casting M8 Pre-tap holes	Vc=210m/min f=0,15mm/rev	• 100.000 holes/reg (2.000m) and still running. • Dilling and chamfering in the same process
	AC4C-T6 Aluminum Casting M10 Pre-tap holes	Vc=250m/min f=0,2mm/rev	• 80.000 holes/reg (1,840m) and still running. • Drilling and chamfering in the same process

■ DML Type Possible Profiles



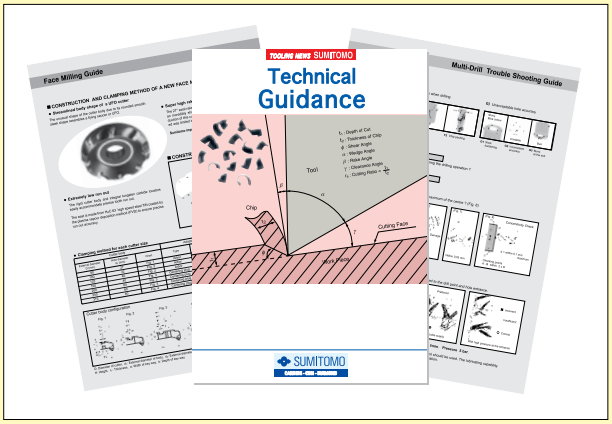
(1) Tolerance for dimension L is more than 0,2mm.
(2) θ° is less than 180°.

N



Technical Guidance References

N1 ~ N24



Basics of Turning ..... N 2
Tool Failures and Remedies ..... N 3 - 4
Chip Control ..... N 5

Basics of Milling ..... N 6 - 8
Tool Failures and Remedies ..... N 9

Basics of Endmilling N10-11
Tool Failures and Remedies N12

Basics of Drilling N13-15
Tool Failures and Remedies N16

SUMIBORON for
Hardened Steel Machining N17
Cast Iron Machining N18

Hard-to cut Materials Machining N19
Tool Failure and Remedies N20

References
Steel and Non-Ferrous Metal Symbols Chart N21
Hardness Scale Comparison Chart N22
Finished Surface Roughness N23

Basics of Turning

■ Calculating Power Requirement

$$P_c = \frac{d_{oc} \cdot f \cdot v_c \cdot K_c}{60 \times 10^3 \times \eta}$$

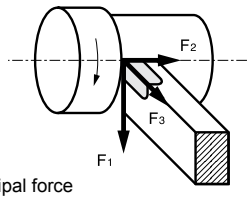
$$H = \frac{P_c}{0{,}75}$$

P_c : Net power requirement (KW)
v_c : Cutting speed (m/min)
f : Feed rate (mm/rev)
a_p : Depth of cut (mm)
η : Machine efficiency (0,70 ~ 0,85)
K_c : Specific cutting force (N/mm²)
H : Required horsepower (HP)

● Rough value of specific cutting force (K_c)

General steel :	2.500 ~ 3.000 N/mm²
Cast iron :	1.500 N/mm²
Aluminum :	800 N/mm²

■ Cutting Force



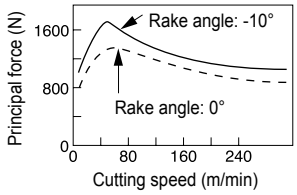
F_1 : Principal force
F_2 : Feed force
F_3 : Back force

● Calculating cutting force

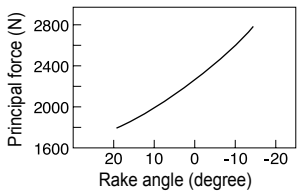
$$P = K_c \cdot q = \frac{k_c \times d_{oc} \times f}{1000}$$

P : Cutting force (N)
K_c : Specific cutting force (N/mm²)
q : Chip area (mm²)
d_{oc} : Depth of cut (mm)
f : Feed rate (mm/rev)

■ Cutting Speed and Cutting Force



■ Rake Angle and Cutting Force



■ Calculating Cutting Speed

① Calculating rotational speed from cutting speed

$$n = \frac{1000 \cdot v_c}{\pi \cdot D}$$

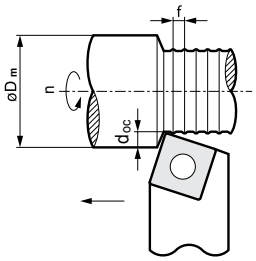
n : Spindle speed (min⁻¹)
v_c : Cutting speed (m/min)
D : Diameter of workpiece (mm)
$\pi \approx 3{,}14$

(Eg.) v_c =150m/min, D=100mm

$$n = \frac{1000 \times 150}{3{,}14 \times 100} = 478\ (\text{min}^{-1})$$

② Calculating cutting speed from rotational speed

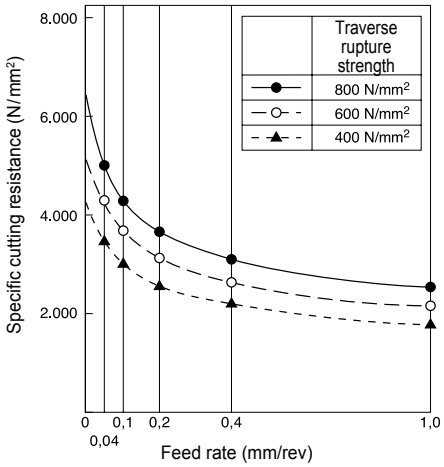
$v_c = \frac{\pi \cdot D \cdot n}{1.000}$	Refer to the above table



n : Spindle speed (min⁻¹)
v_c : Cutting speed (m/min)
f : Feed rate (mm/rev)
d_{oc} : Depth of cut (mm)
D_m : Diameter of workpiece (mm)

■ Feed Rate and Specific Cutting Force

(For carbon steel)



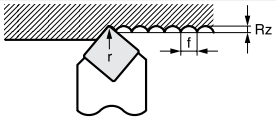
When feed rate decreases, specific cutting force increases.

■ Roughness

● Theoretical Surface Finish

$$Rz = \frac{f^2}{8 \times r}$$

Rz : Surface finish (mm)
f : Feed rate (mm/rev)
r : Nose radius (mm)



● Actual surface roughness

Steel :
Theoretical surface finish x 1,5 ~ 3
Cast iron :
Theoretical surface finish x 3 ~ 5

● Ways to Improve Surface Finish

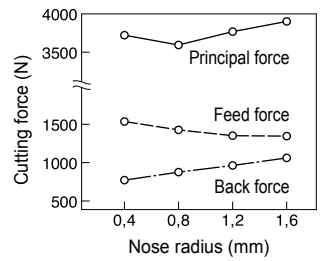
① Use an insert with a larger nose radius.

② Optimize the cutting speed and feed rate so that built-up edge does not occur.

③ Select an appropriate insert grade.

④ Use wiper insert.

■ Nose Radius and Cutting Force

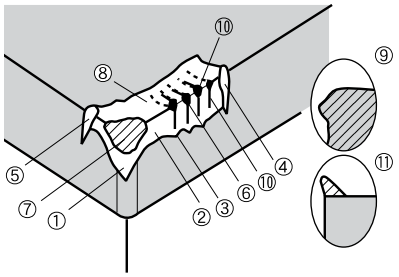


Large nose radius increases back force.

Work : 42CrMo4 (Hs38)
Inserts : TNGA2204○○
Holder : PTGNR2525-43
Condition : v_c =100m/min
d_{oc} =4mm
f =0,45mm/rev

Tool Failures and Tool Life

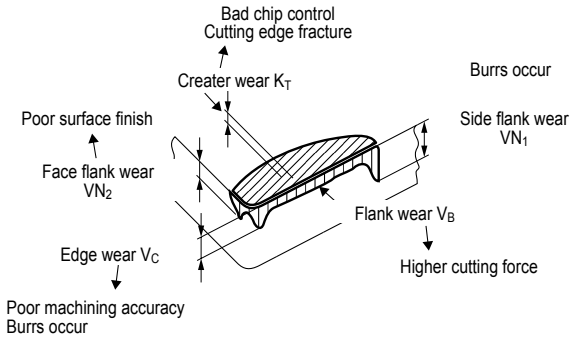
■ Forms of Tool Failures

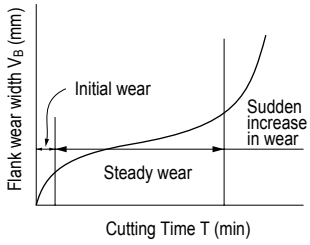
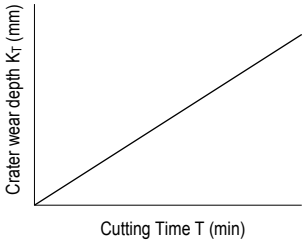


Cat.	No.	Name of Failure	Cause of Failure
Resulting from Mechanical causes	1~5	Flank Wear	Due to the scratching effect of hard grains contained in the work material.
	6	Chipping	Fine breakages caused by high cutting loads or chattering.
	7	Fracture	Due to the impact of an excessive mechanical force acting on the cutting edge.
Resulting from Chemical reactions	8	Crater Wear	Swaft chips removing tool material as it flow over the top face at high temperatures.
	9	Plastic Deformation	Cutting edge is depressed due to softening at high temperatures.
	10	Thermal Crack	Fatigue from rapid, repeated heating and cooling cycles during machining.
	11	Built-up Edge	Work material is pressure welded on the top face of the cutting edge.

■ Tool Wear

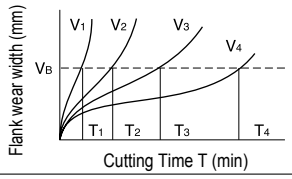
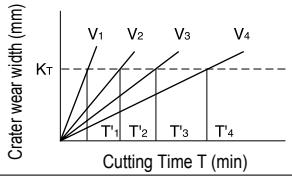
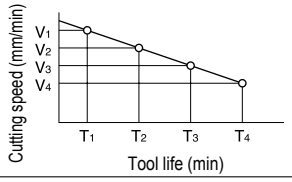
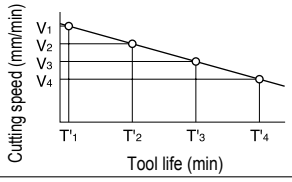
Forms of Tool Wear



Flank wear	Crater wear
	
Wear is rapid initially, then it proceeds more gradually in proportion with cutting time until a certain limit, beyond which it increases rapidly again.	Crater wear is more progressive with no sudden breakdown pattern.

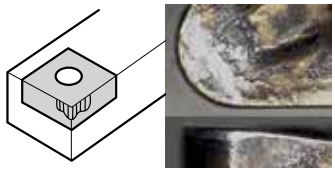
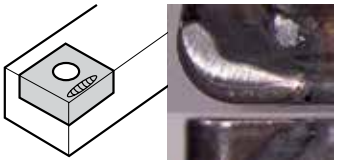
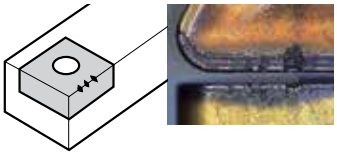
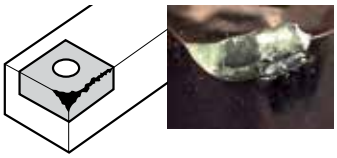
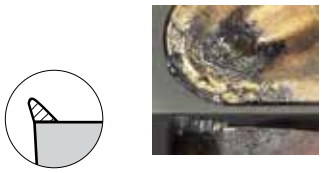
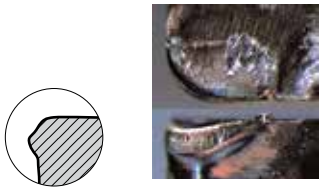
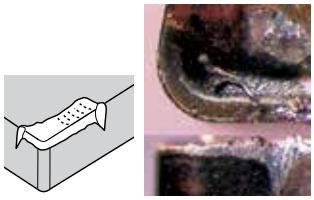
■ Tool Life (V-T)

Measure the relative tool lives of the specified wear, over a range of cutting speeds, then plot the tool life along the X-axis and the cutting speed along the Y-axis on a double logarithm graph.

	Flank wear	Crater wear
Tool wear		
Tool life		

Tool Failure and Remedies

■ Trouble Shooting Guide for Turning

	Damage	Cause	Countermeasures
Tool Edge Failure	Excessive flank wear 	- Grade lacks wear resistance. - Cutting speed ist too fast. - Feed rate ist far too slow.	- Select a wear resistant grade. P30 ⇨ P20 ⇨ P10 K20 ⇨ K10 ⇨ K01 - Use an insert with a larger rake angle. - Decrease the cutting speed. - Increase feed rates.
	Excessive crater wear 	- Grade lacks crater wear resistance. - Rake angle is too small. - Cutting speed is too fast. - Feed rate and depth of cut are too large.	- Select a more crater-resistant grade. - Use an insert with a larger rake angle. - Select an appropriate chipbreaker. - Decrease the cutting speed. - Decrease the D.O.C. and feed rate.
	Cutting edge chipping 	- Grade lacks toughness. - Insert falls off due to chip build-up. - Cutting edge lacks toughness. - Feed rate and depth of cut are too large.	- Change to tougher grades. P10 ⇨ P20 ⇨ P30 K01 ⇨ K10 ⇨ K20 - Increase amount of honing on cutting edge. - Reduce rake angle. - Reduce feed rates and depth of cut.
	Cutting edge fracture 	- Grades lacks toughness. - Cutting edge lacks toughness. - Holder lacks toughness. - Feed rarte is too fast. - Depth of cut is too large.	- Change to tougher grades. P10 ⇨ P20 ⇨ P30 K01 ⇨ K10 ⇨ K20 - Select a chipbreaker with a strong cutting edge. - Select a holder with a larger approach angle. - Select a holder with a larger shank size. - Decrease the D.O.C. and feed rate.
	Build-up edge 	- Inappropriate grade selection. - Dull cutting edge. - Cutting speed is too slow. - Feed rate ist too slow.	- Select a grade with less affinity to the work material. Coated carbide or cermet grades. - Select a grade with a smooth coating. - Use an insert with a larger rake angle. - Reduce amount of honing. - Increase cutting speeds. - Increase feed rates.
	Plastic deformation 	- Grade lacks thermal resistance. - Cutting speed is too fast. - Feed rate is too fast. - Depth of cut is too large. - Not enough cutting fluid.	- Select a more crater-wear-resistant grade. - Use an insert with a larger rake angle. - Decrease the cutting speed. - Reduce feed rates and depth of cut. - Supply a sufficient amount of coolant.
	Notch wear 	- Grade lacks wear resistance. - Rake angle is too small. - Cutting speed is too fast.	- Select a wear resistant grade. P30 ⇨ P20 ⇨ P10 K20 ⇨ K10 ⇨ K01 - Use an insert with a larger rake angle. - Alter depth of cutto shift the notch location.

Chip Control

■ Type of Chip Generation

	a	b	c	d
Shape				
Condition	Continuous chips with good surface finish.	Chip is sheared and separated by the shear angle.	Chips appear to be torn from the surface.	Chips crack before reaching the cutting point.
Application	Steel, Stainless steel	Steel, Stainless steel (Low speed)	Steel, Cast iron (Very low speed, very small feedrate)	Cast iron, Carbon
Influence factor	Easy ← Work deformation → Difficult			
	Large ← Rake angle → Small			
	Small ← D.O.C. → Large			
	Fast ← Cutting speed → Slow			

■ Type of Chip Control

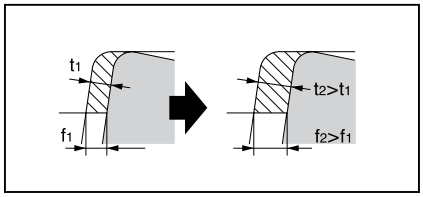
Feed rate	A	B	C	D	E
Large feed rate					
Small feed rate					
NC lathe (For automation)	×	×	○	○	△
General lathe (For safety)	×	○	○	○ ~ △	×

Good : C type, D type

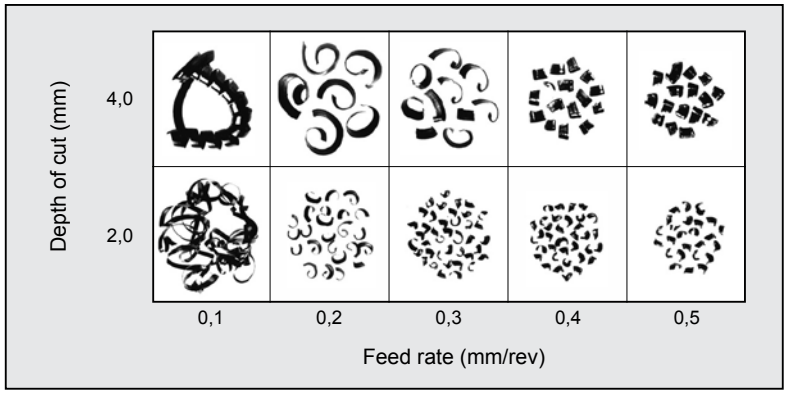
Poor
- A type : Twines around the tool or workpiece, damages the machined surface and affects safety.
- B type : Bulky, causes problems in the automatic chip conveyor and chipping occurs easily.
- E type : Causes spraying of chips, poor machined surface due to chattering, chipping, large cutting force and high temperatures.

■ Factor of Improvement Chip Control

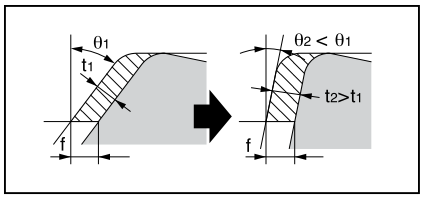
① Increase feed rate



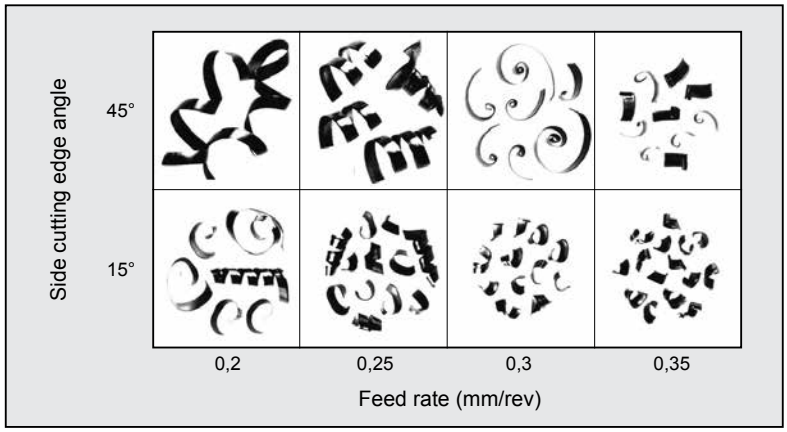
When feedrate increase, chips become thick and chip control improves.



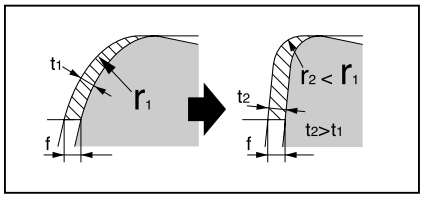
② Decrease side cutting edge



Even if feed rate is the same, smaller side cutting edge angle makes chips thick and chip control improves.

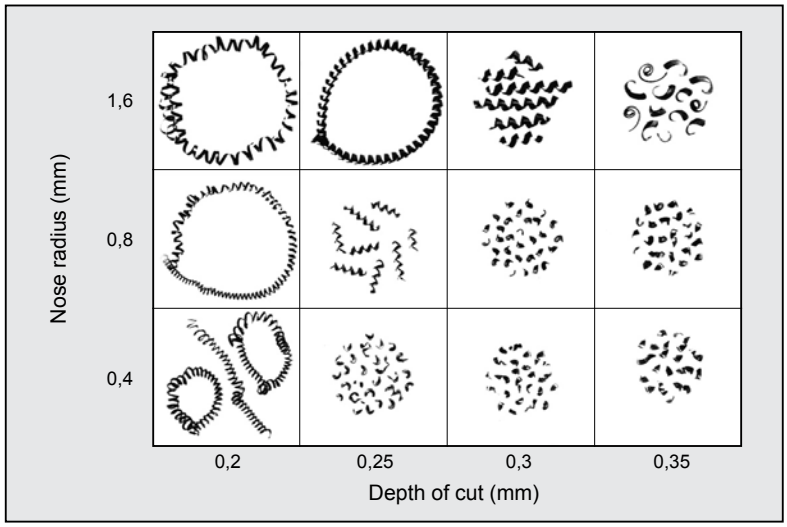


③ Decrease nose radius



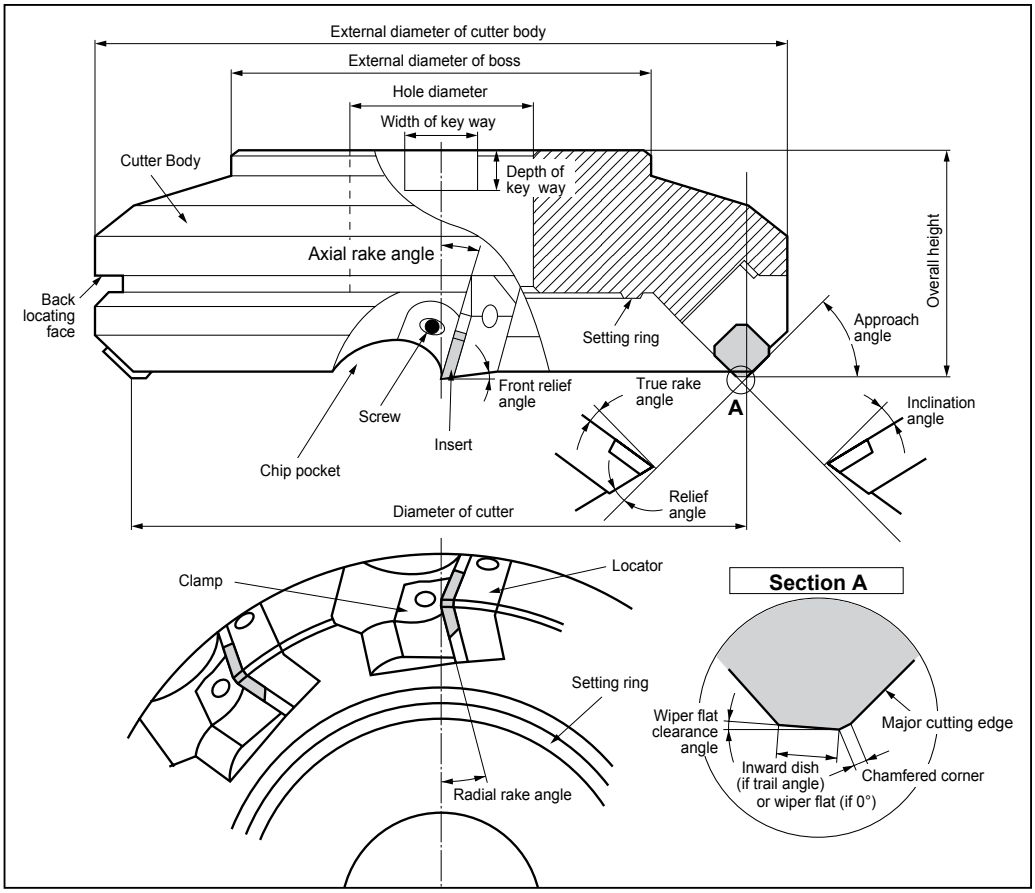
Even if depth of cut is the same, smaller nose radius makes chip thick and chip control improves.

* Cutting resistance increases in proportion with the width of the contact surface. Therefore, with a larger nose radius, cutting resistance and back force increases, chattering may also occur. However, with the same feedrate, a smaller nose radius would produce a poorer surface finish.



Basics of Milling

■ Parts of a Milling Cutter



■ Power Requirement

● Calculating cutting force

$$P_c = \frac{d_{oc} \cdot w_{oc} \cdot v_f \cdot K_c}{60 \times 10^6 \times \eta} \text{ (kW)}$$

● Horsepower

$$H = \frac{Pc}{0{,}75}$$

● Chip removal amount

$$Q = \frac{d_{oc} \times w_{oc} \times v_f}{1.000} \text{ (cm}^3\text{/min)}$$

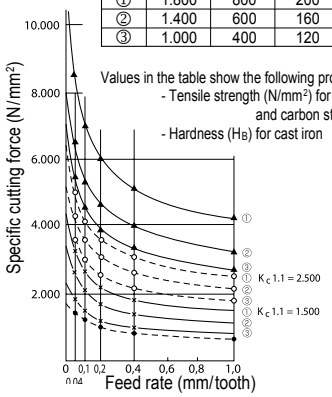
P_c : Net power requirement (kW)
H : Horsepower requirement (HP)
Q : Chip removal amount (cm^3/min)
w_{oc} : Cutting width (mm)
v_f : Feed speed (mm/min)
d_{oc} : Depth of cut (mm)
η : Machine efficiency (0,70 ~ 0,85)
K_c : Specific cutting forrce (N/mm^2)

Eg. rough value
(Steel : 2.500 ~ 3.000
Cast iron : 1.500)

● Relation between feed rate, work material, specific cutting force

Work-piece No.	Alloy steel	Carbon steel	Cast iron	Aluminum alloy
①	1.800	800	200	–
②	1.400	600	160	–
③	1.000	400	120	–

Values in the table show the following properties:
- Tensile strength (N/mm^2) for alloy steel and carbon steel
- Hardness (H_B) for cast iron



● Calculating cutting speed

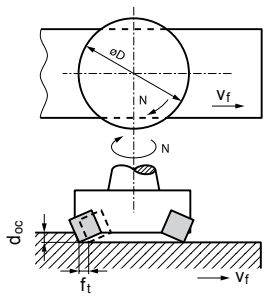
$$v_c = \frac{\pi \times D \times n}{1.000}$$

● Calculating feed rate

$$v_f = f_t \times z \times n$$

$$f_t = \frac{v_f}{z \times n}$$

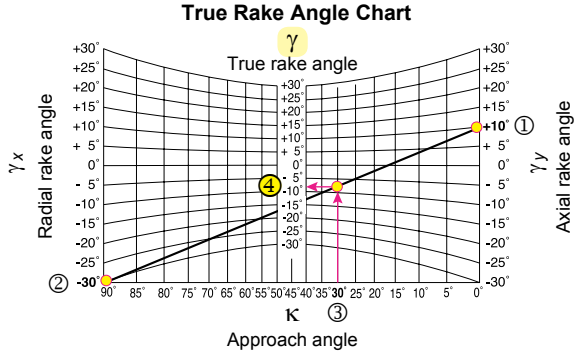
v_c : Cutting speed (m/min)
$\pi \approx 3{,}14$
D : Cutter diameter (mm)
n : Rotation speed (rpm)
v_f : Feed speed (mm/min)
f_t : Feed rate (mm/tooth)
z : Number of teeth



Functions of the Various Cutting Angles

	Description	Code	Functions	Influences
① ②	Axial rake angle Radial rake angle	γ_y γ_x	Controls chip removal direction, effects adhesion of the chips and thrust force etc.	Rake angles can vary from positive to negative (large to small) with typical combinations of positive and negative, positive and positive or negative and negative configurations.
③	Approach angle	κ	Controls chip thickness and chip removal direction	The effect of the small approach angle is to reduce the chip thickness and cutting force.
④	True rake angle (Effective rake angle)	γ	Controls cutting performance and ability to retain a cutting edge	- With a positive (large) angle, cutting ability and adhesion resistance are improved but the strength of the cutting edge is weakened. - With negative (small) angle, the strength of the cutting edge is improved but chips will tend to adhere more easily.
⑤	Inclination angle	λ	Controls chip removal direction	- With a positive (large) angle, the chip removal is satisfactory with less cutting resistance but the strengh of the corner is weaker.
⑥	Wiper flat clearance angle	α_f	Controls surface finish	A smaller clearance angle will produce a better surface finish.
⑦	Clearance angle	α	Controls edge strength, tool life and chattering, etc	

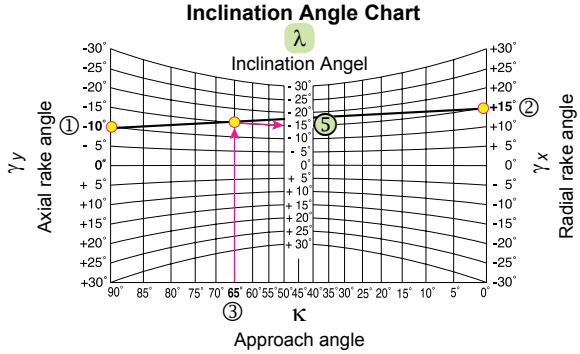
True Rake Angle Chart



Example in using the above chart:		Solution:
① γ_y :	Axial rake angle = +10°	True rake angle
② γ_x :	Radial rake angle = -30°	④ γ = - 8°
③ κ :	Approach angle = 30°	

Formula : $\tan\gamma = \tan\gamma_x \cdot \sin\kappa + \tan\gamma_y \cdot \cos\kappa$

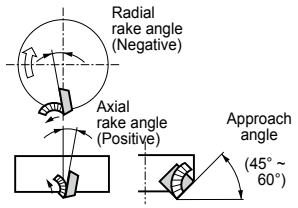
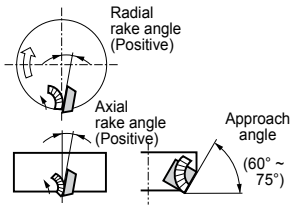
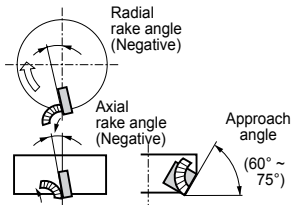
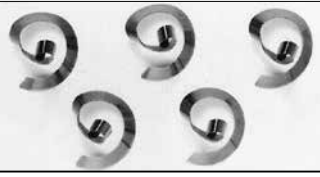
Inclination Angle Chart



Example in using the above chart :		Solution:
① γ_y :	Axial rake angle = -10°	Inclination angle
② γ_x :	Radial rake angle = +10°	⑤ λ = - 15°
③ κ :	Approach angle = 65°	

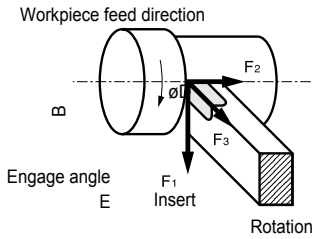
Formula : $\tan\lambda = \tan\gamma_y \cdot \sin\kappa - \tan\gamma_x \cdot \cos\kappa$

Rake Angle Combination

	Negative - Positive Type	Double Positive Type	Double Negative Type
The effects of the various angle configurations with relation to chip formation and chip removal. Chip removal direction Rotation			
Advantage	Excellent chip removal and good cutting action	Good cutting action	Double-sided inserts can be use and higher cutting edge strength
Disadvantage	Only single-sided inserts can be use	Lower cutting edge strength and only single-sided inserts can be use	Dull cutting action
Application	For Steel, Cast iron, Stainless steel, Alloy steel	For general milling of steel For low rigidly work piece	For light milling of cast iron and steel
Typical cutter	WGX, WGC, UFO	DPG	DNX, DGC, DNF
Chips (Eg.) Workpiece: 37Cr4 v_c = 130 m/min f_t = 0.23 mm/tooth d_{oc} = 3 mm			

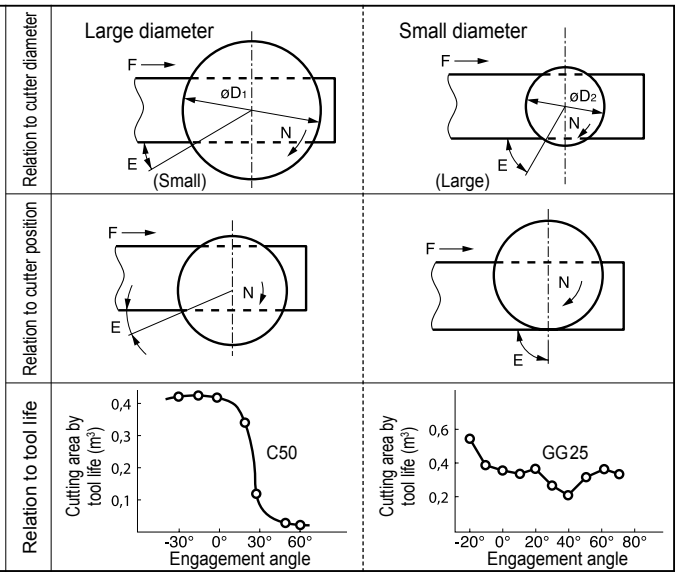
Basics of Milling

■ Relation Between Engage Angle and Tool Life

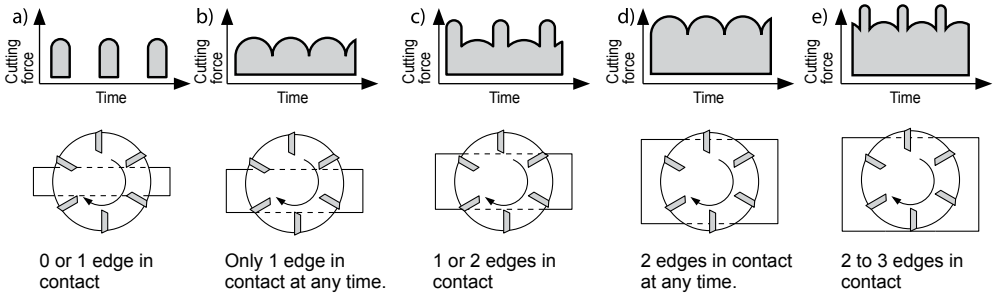


Engage angle denotes the angle by which the full length of the cutting edge comes in contact with the workpiece, with reference to the feed direction. The larger E is, the shorter the tool life.

To change the value of E:
1) Increase the cutter size
2) Shift the position of the cutter



● Relation between the number of simultaneously engaged cutting edges and cutting force:



■ To Improve Surface Roughness

① Milling inserts with wiper flat

When all the cutting edges have wiper flats, a few teeth are intentionally elevated to play the role of a wiper insert.

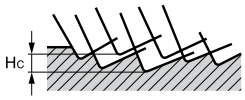
- Insert equipped with straight wiper flat (Face angle: Approx 15' - 1°)
- Insert equipped with curved wiper flat (Eg. curvature R500)

② Integral wiper insert system

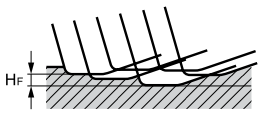
A system to protrude one or two inserts (wiper insert) with a smooth curved edge just a little beyond the other teeth to wipe the milled surface.

- (Applies to WGC, RF types etc.)

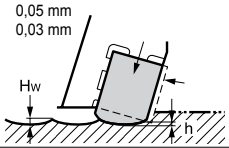
● Surface roughness without wiper flat



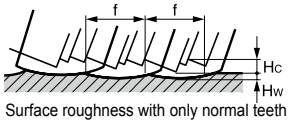
● Surface roughness with straight wiper flat



h : Projected value of wiper insert
Steels : 0,05 mm
Al : 0,03 mm

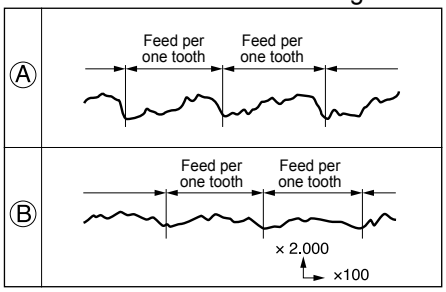


f : Feed rate per revolution



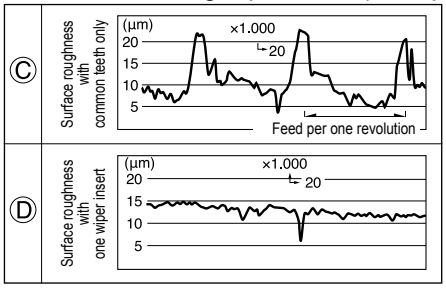
Hc : Surface roughness with only normal teeth
Hw : Surface roughness with wiper insert

● Influence of different face angles on surface finish



- Workpiece: 34CrMo4
- Cutter: DPG 5160 R (Single tooth)
- v_c = 154 m/min
  f_t = 0,234 mm/tooth
  d_{oc} = 2 mm
- Face angle
  Ⓐ : 28'
  Ⓑ : 6'

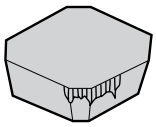
● Effects of having wiper insert (example)

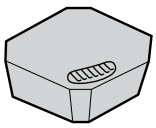


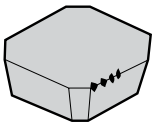
- Workpiece: GG25
- Cutter: DPG 4100 R
- Insert: SPKN 1203
- Axial run-out: 0,015 mm
- Radial run-out: 0,04 mm
- v_c = 105 m/min
- f_t = 0,29 mm/tooth (1,45 mm/rev)

Ⓒ : Only normal teeth
Ⓓ : with 1 wiper insert

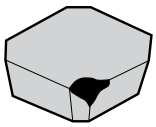
■ Trouble Shooting Guide for Milling

<table>
<tr><th colspan="2">Trouble</th><th colspan="2">Basic Remedies</th><th>Remedy Examples</th></tr>
<tr><td rowspan="5">Cutting Edge Failure</td><td>Excessive Flank Wear
</td><td>Tool Material

Cutting Conditions</td><td>- Select a more wear resistant grade.
Carbide
P30 ⇨ P20
K20 ⇨ K10 ⇨ { Coated / Cermet
- Reduce cutting speeds.
- Increase feedrate.</td><td>- Recommended insert grades
<table><tr><th></th><th>Steel</th><th>Cast Iron</th><th>Non-Ferrous Alloy</th></tr><tr><td>Finishing</td><td>T250A (Cermet)</td><td>ACK200 (Coated Carbide)
BN700 (SUMIBORON)</td><td>DA1000 (SUMIDIA)</td></tr><tr><td>Roughing</td><td>ACP100 (Coated Carbide)</td><td>ACK200 (Coated Carbide)</td><td>DL1000 (Coated Carbide)</td></tr></table></td></tr>
<tr><td>Excessive Crater Wear
</td><td>Tool Material

Cutting Conditions</td><td>- Select a crater resistant grade.
- Reduce cutting speeds.
- Reduce depth-of-cut and feed rate.</td><td>- Recommended insert grades
<table><tr><th></th><th>Steel</th><th>Cast Iron</th><th>Non-Ferrous Alloy</th></tr><tr><td>Finishing</td><td>T250A (Cermet)</td><td>ACK200 (Coated Carbide)</td><td>DA1000 (SUMIDIA)</td></tr><tr><td>Roughing</td><td>ACP100 (Coated Carbide)</td><td>ACK200 (Coated Carbide)</td><td>DL1000 (Coated Carbide)</td></tr></table></td></tr>
<tr><td>Cutting Edge Chipping
</td><td>Tool Material

Cutting Conditions

Tool Design</td><td>- Select tougher grade.
P10 ⇨ P20 ⇨ P30
K01 ⇨ K10 ⇨ K20
- Reduce feed rates.
- Select a negative-positive cutter configuration with a large approach angle.
- Reinforce the cutting edge (Honing).
- Select a strong edge insert (G → H).</td><td>- Recommended insert grades
<table><tr><th></th><th>Steel</th><th>Cast Iron</th></tr><tr><td>Finishing</td><td>ACP200 (Coated Carbide)</td><td>ACK200 (Coated Carbide)</td></tr><tr><td>Roughing</td><td>ACP300 (Coated Carbide)</td><td>ACK300 (Coated Carbide)</td></tr></table>- Recommended cutter: WaveMill WGX type
- Cutting conditions:
Refer to recommended conditions listed in the general catalogue</td></tr>
<tr><td>Partial Fracture of Cutting Edges
</td><td>Tool Material

Cutting Conditions

Tool Design</td><td>- If it is due to excessive low speeds or very low feed rates, select an adhesion resistant grade.
- If it is due to thermal cracking, select a thermal impact resistant grade.
- Select appropriate conditions with regards to the particular application.
- Select a negative-positive (or negative) cutter configuration with a large approach angle.
- Reinforce the cutting edge (Honing).
- Select a strong edge insert (G → H).
- Increase insert size -
(Thickness in particular).</td><td>- Recommended insert grades
<table><tr><th></th><th>Steel</th><th>Cast Iron</th></tr><tr><td>Roughing</td><td>ACP300
(Coated Carbide)</td><td>ACK300
(Coated Carbide)</td></tr></table>- Recommended cutter: WaveMill WGX type
- Insert thickness: 3,18 → 4,76mm
- Insert type: Standard → Strong edge type
- Cutting conditions:
Refer to recommended conditions listed in the general catalogue</td></tr>
<tr><td rowspan="4">Others</td><td>Unsatisfactory Machined Surface Finish</td><td>Tool Material

Cutting Conditions

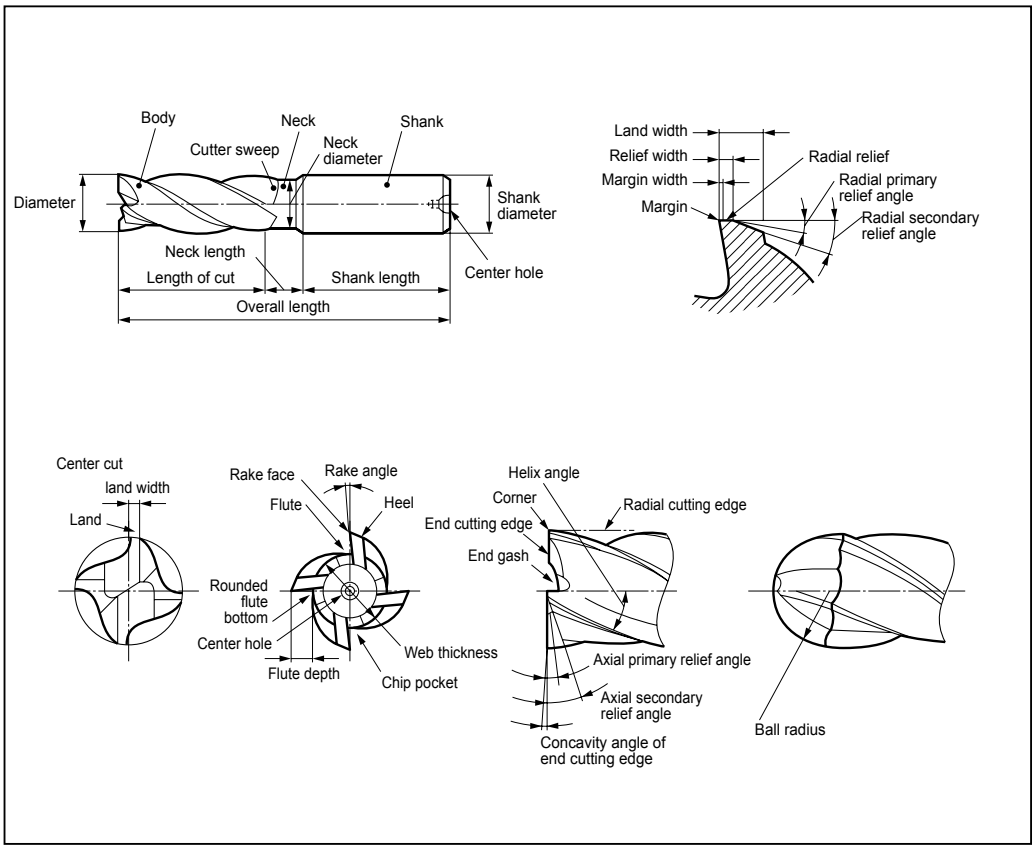
Tool Design</td><td>- Select an adhesion resistant grade.
Carbide → Cermet
- Increase cutting speeds.
- Improve axial run-out of cutting edges.
(Use a cutter with less run-out)
(Attach correct inserts)
- Use wiper inserts.
- Use special purpose cutters designed for finishing.</td><td>- Recommended insert grades
<table><tr><th></th><th></th><th>Steel</th><th>Cast Iron</th><th>Non-Ferrous Alloy</th></tr><tr><td>Roughing</td><td>Cutter Insert</td><td>WGX type*
ACP200
(Coated Carbide)</td><td>DGC type*
ACK200
(Coated Carbide)</td><td>FF type*
H1 (Carbide)
DL1000 (Coated Carbide)</td></tr><tr><td>Finishing</td><td>Cutter Insert</td><td>WGC type
T250A
(Cermet)</td><td>FMU type
BN700
(SUMIBORON)</td><td>RF type
DA1000
(SUMIDIA)</td></tr></table>* marked cutters can be fitted with wiper inserts.</td></tr>
<tr><td>Chattering</td><td>Cutting Conditions
Tool Design

Others</td><td>- Reduce feed rates.
- Select a high rake cutter with sharp cutting edges
- Use an irregular pitched cutter.
- Improve workpiece and cutter clamp rigidity.</td><td>- Recommended cutters:
For steel: WaveMill WGX type
For cast iron: DNX type
For Non-ferrous alloy: High speed cutter for aluminium
RF type</td></tr>
<tr><td>Unsatisfactory Chip Control</td><td>Tool Design</td><td>- Select cutter with good chip removal features.
- Reduce number of teeth.
- Enlarge chip pocket.</td><td>- Recommended cutter: WaveMill WGX type</td></tr>
<tr><td>Edge Chipping on Workpiece</td><td>Tool Design

Cutting Conditions</td><td>- Select a large approach angle.
- Select a sharp cutting edge insert (G → L).
- Reduce feed rates.</td><td>- Recommended cutter: WaveMill WGX type</td></tr>
<tr><td>Burr on Workpiece</td><td>Tool Design
Cutting Conditions</td><td>- Select a cutter with sharp cutting edges.
- Increase feed rates.</td><td>- Recommended cutter: WaveMill WGX type + FG breaker
DGC type + FG breaker</td></tr>
</table>

Basics of Endmilling

■ Parts of an Endmill



■ Calculating Cutting Conditions

● Cutting speed

$$v_c = \frac{\pi \cdot D \cdot n}{1.000} \qquad n = \frac{1.000 \cdot v_c}{\pi \cdot D}$$

● Feed rate

$$v_f = f \times n$$

$$v_f = f_t \times z \times n \qquad f_t = \frac{v_f}{z \times n}$$

● Depth of cut (D.O.C)

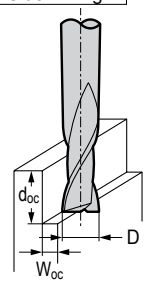
d_{oc} : Axial D.O.C. (depth)
w_{oc} : Radial D.O.C. (width)

● Notch width (D_1)

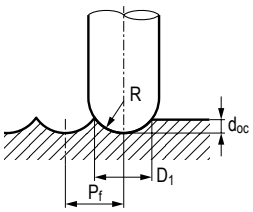
$$D1 = 2 \times \sqrt{2 \times R \times d_{oc} - d_{oc}^2}$$

● Cutting speed and feedrate are calculated using the same formula as square endmill.

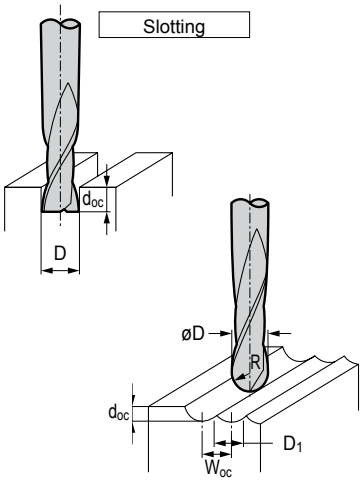
Side milling



v_c : Cutting speed (m/min)
$\pi \approx 3{,}14$
D : Endmill diameter (mm)
n : Rotational speed (min^{-1})
v_f : Feed speed (mm/min)
f_r : Feed rate per revolution (mm/rev)
f_t : Feed rate per tooth (mm/tooth)
z : Number of teeth

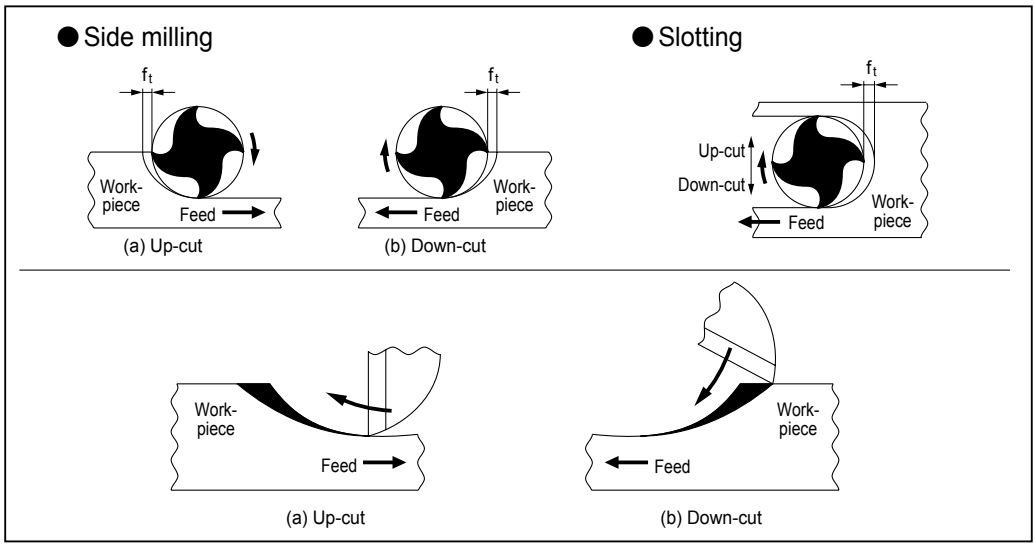


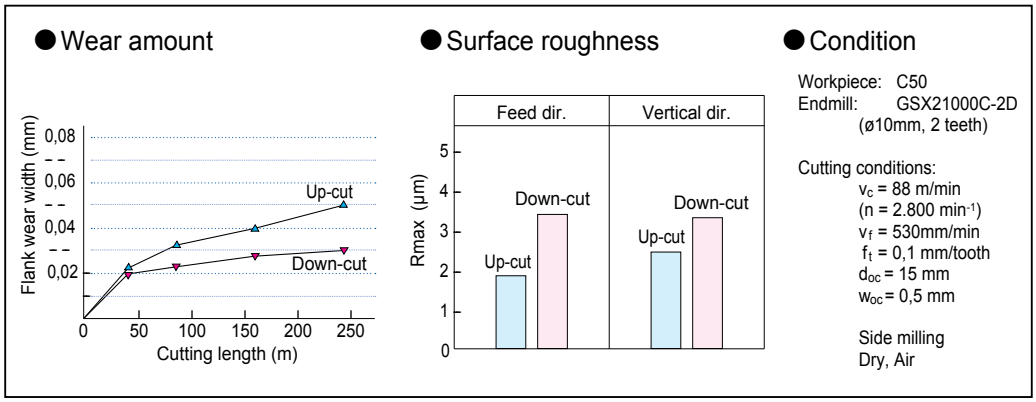
Slotting



(Ball Endmill)

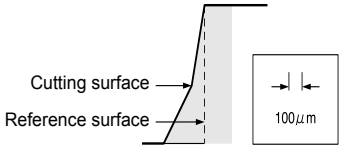
■ Up-cut and Dowm-cut





■ Relation Between Cutting Condition and Deflection

Endmill			Side milling: Work material: Pre-hardened steel (40HRC); Cutting data: v_c = 25m/min, d_{oc} = 12 mm, W_{oc} = 0,8 mm		Slotting: Work material: Pre-hardened steel (40HRC); Cutting data: v_c = 25m/min, d_{oc} = 8 mm, W_{oc} = 8 mm (Up-cut side / Down-cut side)	
Cat. No.	Number of teeth	Helix angle	Feed rate 0,16 mm/rev	Feed rate 0,11 mm/rev	Feed rate 0,05 mm/rev	Feed rate 0,03 mm/rev
			Style	Style	Style	Style
			Up-cut / Down-cut	Up-cut / Down-cut	Up-cut / Down-cut	Up-cut / Down-cut
SSM 2080	2	30°				
SSM 4080	4	30°				



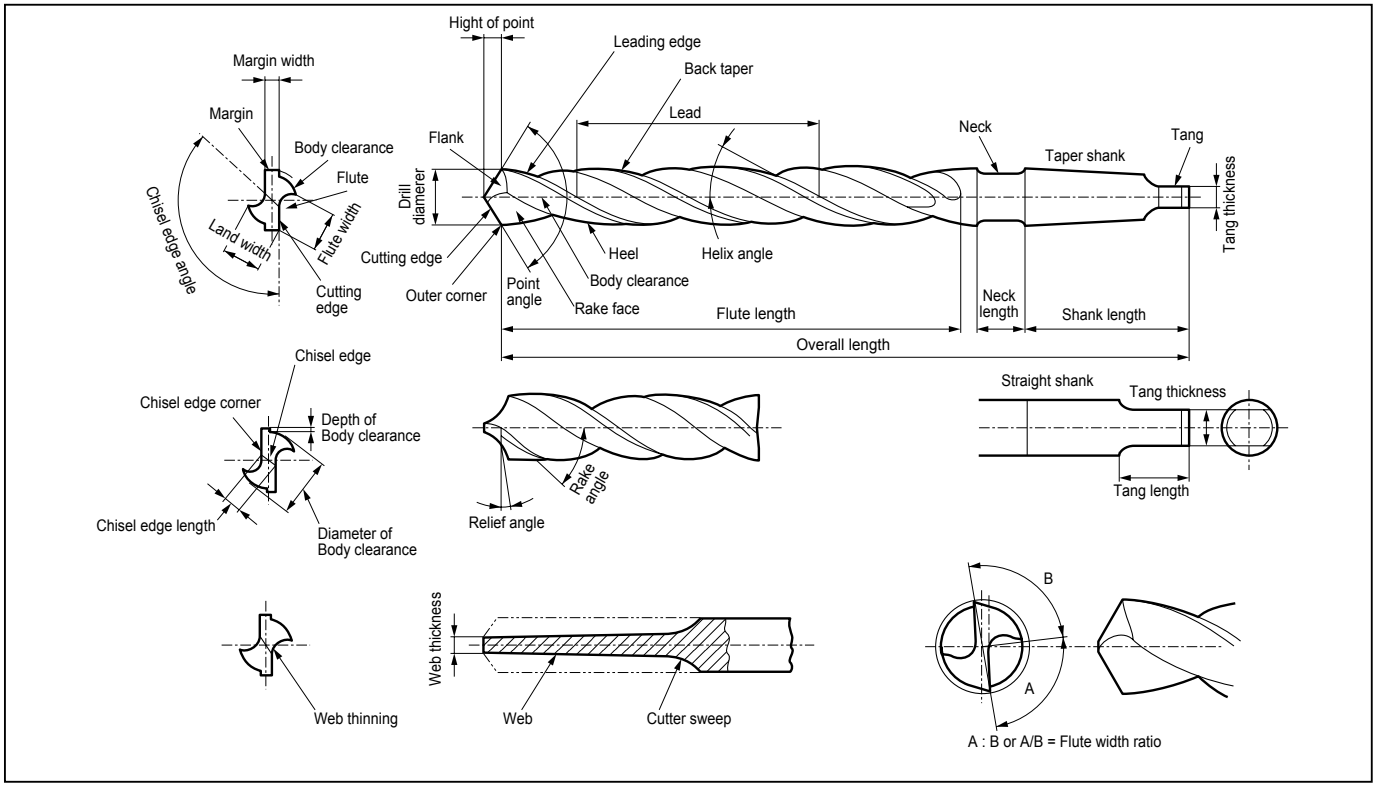
Tool Failure and Remedies

■ Trouble Shooting Guide for Endmilling

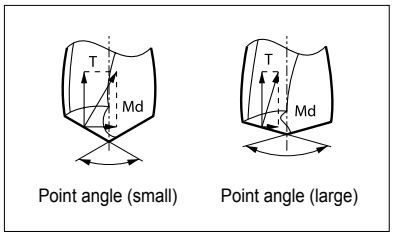
Failure		Cause		Remedies
Cutting Edge Failure	Excessive Wear	Cutting Conditions	- Cutting speed is too fast - Feed rate is too fast	- Decrease cutting speed and feed rate.
		Tool Shape	- The flank relief angle ist too small	- Change to an appropriate flank relief angle.
		Tool Material	- Insufficient wear resistance	- Select a substrate with more wear resistance - Use a coated tool
	Chipping	Cutting Conditions	- Feed rate ist too fast - Cutting depth is too deep - Tool overhang ist too long	- Decrease cutting speed. - Reduce depth of cut - Adjust tool overhang for correct length
		Machine Area	- Work clamps are weak - Tool is not firmly attached	- Clamp the work piece firmly - Make sure the tool is seated in the chuck properly
	Tool Fracture	Cutting Conditions	- Feed rate ist too fast - Cutting depth is too deep - Tool overhang ist too long - Cutting edge is too long	- Decrease cutting speed. - Reduce depth of cut - Reduce tool overhang as much as possible - Select a tool with a shorter cutting edge
Others	Shoulder Deflection	Cutting Conditions	- Feed rate is too fast - Cutting depth is too deep - Tool overhang is too long - Cutting on the down-cut	- Decrease cutting speed. - Reduce depth of cut - Adjust tool overhang for correct length - Change directions to up-cut
		Tool Shape	- Helix angle is large	- Use a tool with a smaller helix angle
	Unsatisfactory Machined Surface Finish	Cutting Conditions	- Feed rate is too fast	- Decrease cutting speed.
			- Packing of chips	- Use air blow - Use an insert with a larger relief pocket.
	Chattering	Cutting Conditions	- Cutting speed is too fast - Cutting on the up-cut - Tool overhang is too long	- Decrease cutting speed. - Change directions to down-cut - Adjust tool overhang for correct length
		Tool Shape	- Rake angle is large	- Use a tool with an appropriate rake angle
		Machine Area	- Work clamps are weak - Tool is not firmly attached	- Clamp the work piece firmly - Make sure the tool is seated in the chuck properly
	Packing of Chip	Cutting Conditions	- Feed rate is too fast - Cutting depth is too deep	- Decrease cutting speed. - Reduce depth of cut
		Tool Shape	- Too many teeth - Packing of chips	- Reduce number of teeth - Use air blow

Basics of Drilling

■ Parts of a Drill

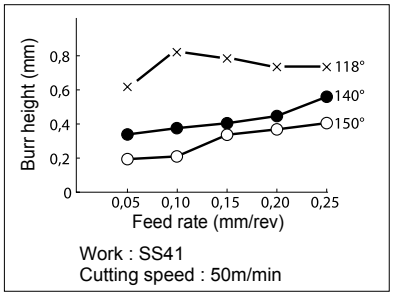


● Point Angle and Force



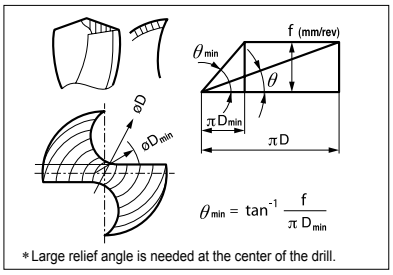
When point angle is large, thrust becomes large but torque becomes small.

● Point Angle and Burr



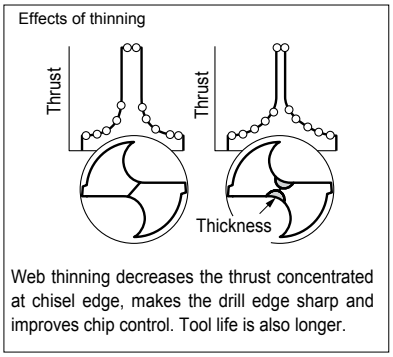
When point angle is large, burr height becomes low.

● Min. Requirement Relief Angle



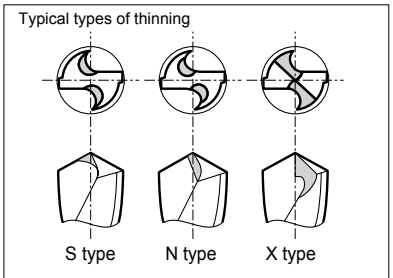
＊Large relief angle is needed at the center of the drill.

● Web Thickness and Thrust



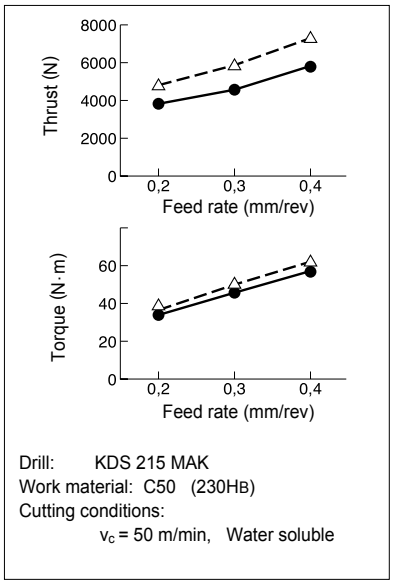
Web thinning decreases the thrust concentrated at chisel edge, makes the drill edge sharp and improves chip control. Tool life is also longer.

● Decrease Chisel Width by Thinning



S type : Standard type used generaly.
N type : Suitable for thin web drills.
X type : For hard-to-cut material or deep hole drilling.

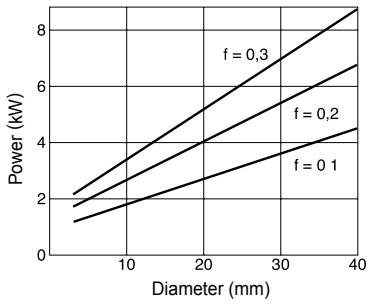
● Width of Edge Threatment and Cutting Force

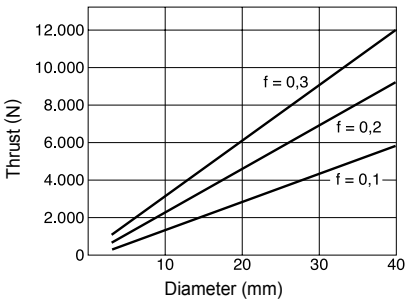


Drill: KDS 215 MAK
Work material: C50 (230HB)
Cutting conditions:
v_c = 50 m/min, Water soluble

Basics of Drilling

■ Reference of Power Requirement and Thrust





Work material:
C48 (220HB)

■ Cutting Condition Selection

● Control cutting force for low rigid machine

The following table shows the relation between edge treatment width and cutting force. If a problem caused by cutting force occurs, reduce either the feedrate or the edge treatment width.

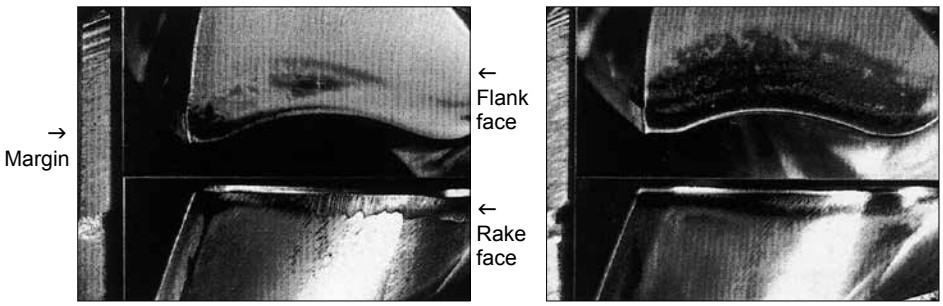
Condition		Edge treatment width			
		0,15mm		0,05mm	
v_c (m/min)	f (mm/rev)	Torque (N• m)	Thrust (N)	Torque (N• m)	Thrust (N)
40	0,38	12,8	2.820	12,0	2.520
50	0,30	10,8	2.520	9,4	1.920
60	0,25	9,2	2.320	7,6	1.640
60	0,15	6,4	1.640	5,2	1.100

Drill : ø10
Work material:
C50 (230HB)

● High speed machining recommendation

When there is surplus capacity with enough machine power and rigidity drilling at normal recommended cutting conditions, we recommend higher drilling speeds.

Wear example

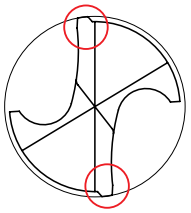


Vc=60m/min　　Vc=120m/min

Work material: C50 (230HB)
Cutting data: f = 0,3 mm/rev
d_{oc} = 50mm
Tool life: 600 holes (Cutting length : 30m)

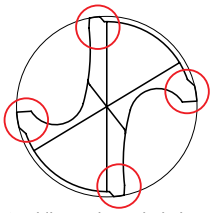
■ Explanation of Margins (Difference between single and double margins)

● Single Margin (2 guides: circled parts)



● Shape used on most drills

● D Double Margin (4 guides: circled parts)

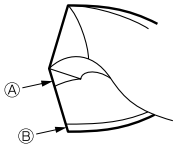


● 4-point guiding reduces hole bending and undulation for improved stability and accuracy during deep hole drilling.

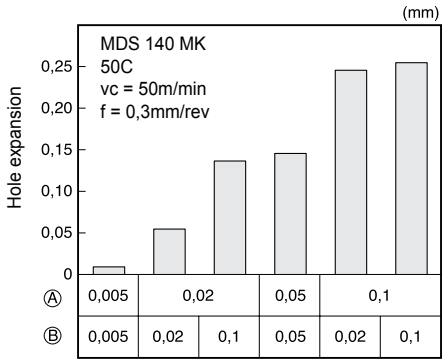
Basics of Drilling

■ Run-out Accuracy

Run-out of the lip height B and thinning point A are important.

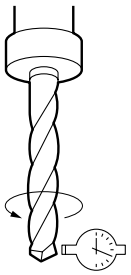


Ⓐ : The run-out accuracy of thinning point
Ⓑ : The difference of lip height

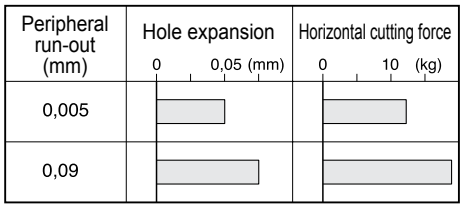


■ Peripheral Run-out Accuracy when Tool Rotates

Drill run-out when mounted on the machine spindle must be within 0,03mm. If the run-out is large, the drilled hole will also be large causing an increase in the horizontal cutting force, which may result in drill breakage if the machine or work clamping is not rigid.



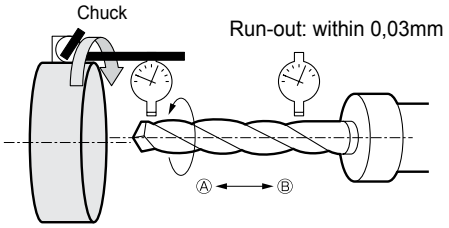
Run-out: within 0,03mm



Drill: MDS120MK
Work material: C50 (230HB)
Cutting data: v_c=50 m/min, f=0,3 mm/rev, d_{oc} =38mm
Water soluble

■ Peripheral Run-out Accuracy when Workpiece Rotates

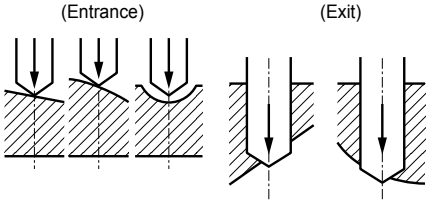
When use on a lathe, run-out at point A must be within 0,03mm, this value must be similar when taken at position B.



■ Influence of Workpiece Surface

● Workpiece with slanted or uneven surface

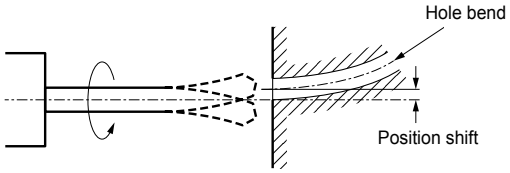
If the surface of the hole entrance or exit is slanted or uneven, decrease the feedrate to 0,1~0,15mm/rev at these points.



■ How to Use Long Drill

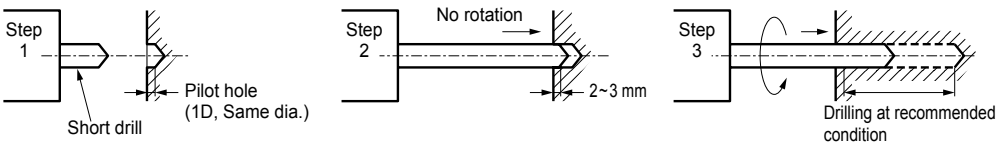
● Problem

When using a long drill (e.g. XHGS type and XHT type), DAK type or SMDH-D type drills at high rotational speeds, the run-out of the drill tip may cause a position shift at the entry point making the drill hole bent and resulting in drill breakage.

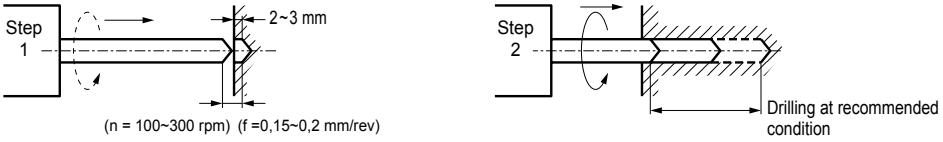


● Remedies

Method 1.



Method 2. Low rotational speed minimizes centrifugal forces and prevents drill bending.

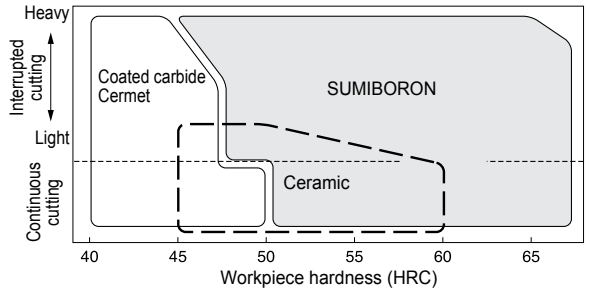


Tool Failure and Remedies

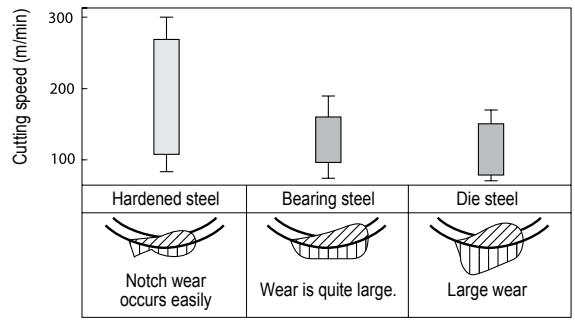
■ Trouble Shooting Guide for Drilling

Failure		Basic Remedies		Remedies Examples
Drill Failure	Excessive Wear on Cutting Edge	Cutting Conditions	- Use higher cutting speeds. - Increase feed rates.	- Vc=80~100m/min - Refer to recommended cutting conditions listed in the general catalogue.
		Cutting Fluid	- Reduce pressure if useing internal coolant. - Use cutting fluid with more lubricity.	- Below 1,5MPa.
	Chisel Point Chipping	Tool Design	- Increase size of chisel width. - Increase amount of honing on cutting edge.	
		Cutting Conditions	- Reduce depth-of cut. - Reduce feed rate at entry point.	- f = 0,05~0,1 mm/rev .
		Others	- Improve workpiece clamping rigidity.	
	Chipping on Peripheral Cutting Edge	Tool Design	- Increase amount of honing on cutting edge. - Reduce the amount of front flank angle.	
		Cutting Conditions	- Reduce cutting speeds. - Increase feed rates.	- Refer to recommended cutting conditions listed in the general catalogue.
		Cutting Fluid Others	- Use cutting fluid with more lubricity. - Improve workpiece clamp rigidity.	
	Margin Wear	Tool Design	- Increase amount of back taper. - Reduce margin width.	
		Cutting Conditions	- Reduce cutting speeds. - Increase feed rates.	- Refer to recommended cutting conditions listed in the general catalogue.
		Cutting Fluid Others	- Use cutting fluid with more lubricity. - Schedule for earlier regrind.	
	Drill Breakage	Tool Design	- Increase amount of back taper. - Reduce margin width.	
		Cutting Conditions	- Reduce cutting speeds.	- Refer to recommended cutting conditions listed in the general catalogue.
		Cutting Fluid Others	- Use cutting fluid with more lubricity. - Improve workpiece clamp rigidity.	
Unsatisfactory Hole Accuracy	Oversized Holes	Tool Design	- Improve overall dril rigidity. (large web, small flute). - Reduce drill point angle.	- 130°~120°
		Cutting Conditions	- Reduce feed rate at entry phase. - Reduce cutting speeds.	- f = 0,05~0,1 mm/rev - Refer to recommended cutting conditions listed in the general catalogue.
		Cutting Fluid Others	- Improve workpiece clamp rigidity. - Improve drill clamp precision. - Improve drill clamp rigidity.	- Drill run-out below 0,02mm
	Poor Surface Finish	Tool Design	- Increase amount of back taper.	
		Cutting Conditions	- Increase cutting speeds.	- Refer to recommended cutting conditions listed in the general catalogue.
		Cutting Fluid	- Use cutting fluid with more lubricity.	
	Holes are Not Straight	Tool Design Cutting Conditions	- Reduce amount of edge honing. - Reduce feedrates.	- Refer to recommended cutting conditions listed in the general catalogue.
		Others	- Improve workpiece clamp rigidity. - Improve drill clamp precision. - Improve drill clamp ridigity.	- Drill run-out below 0,02mm
Unsatisfactory Chip Control	Packing of Chips	Cutting Conditions	- Increase cutting speeds. - Increase feed rates.	- Refer to recommended cutting conditions listed in the general catalogue.
		Cutting Fluid	- Reduce pressure if using internal coolant.	- Below 1,5MPa.
	Long Stringy Chips	Tool Design Cutting Conditions	- Reduce amount of edge honing. - Increase feed rates.	- Refer to recommended cutting conditions listed in the general catalogue.
		Cutting Fluid	- Reduce pressure if using internal coolant.	- Below 1,5MPa.

Application Map of the Various Tool Materials

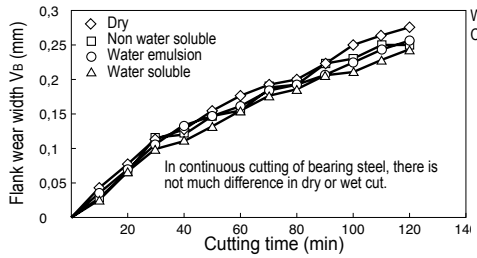


Work Materials and Cutting Speed Recommendations



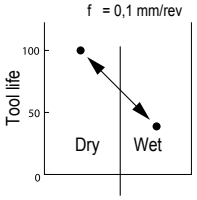
Influence of Coolant on Tool Life

● Continuous cutting



● Interrupted cutting

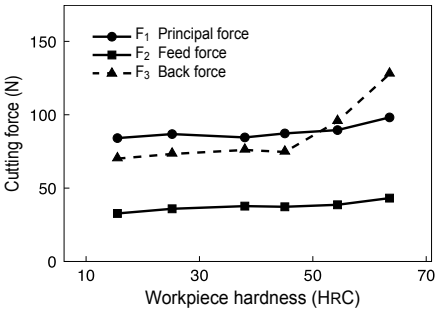
Work material: X155CrVMo12-1
Cutting data: v_c = 100 m/min
d_{oc} = 0,2 mm
f = 0,1 mm/rev

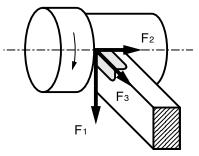


Work material: 100Cr6 (HRC58~62)
Insert: TPGN160304
Cutting data: v_c = 100 m/min
d_{oc} = 0,15 mm
f = 0,1 mm/rev

For continuous cutting, the influence of coolant on tool life is minimal. However for interrupted cutting, coolant will shorten the tool life because of thermal cracking.

Relation Workpiece Hardness and Cutting Forces

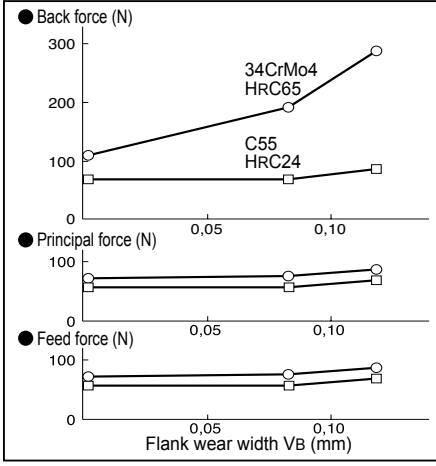




Work material: C105W1
Cutting data: v_c = 120 m/min
d_{oc} = 0,2 mm
f = 0,1 mm/rev

Back force increases substantially for harder work materials.

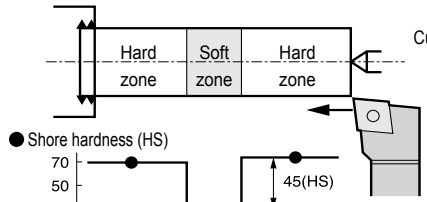
Relation between Flank Wear and Cutting Force



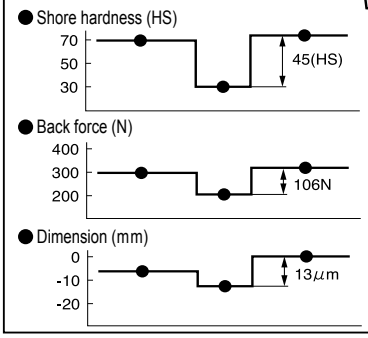
Cutting data: v_c = 80 m/min
d_{oc} = 0,15 mm
f = 0,1 mm/rev

For hardened steel machining, back force increases substantially due to the expansion of flank wear.

Workpiece Hardness on Cutting Force and Accuracy

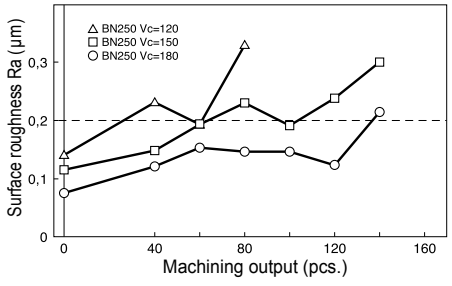


Cutting data: v_c = 120 m/min
d_{oc} = 0,5 mm
f = 0,3 mm/rev
dry



External dimension at the soft zone is smaller due to lower cutting forces.

Relation Cutting Speed and Surface Roughness



Work material: 25CrMo4 (HRC58~62)
Holder: MTXNR2525
Insert: TNMA160408NU

Cutting data:
v_c= 120, 150, 180 m/min
d_{oc} = 0,15 mm
f = 0,045 mm/rev
Wet

At high cutting speeds, surface roughness is more stable.

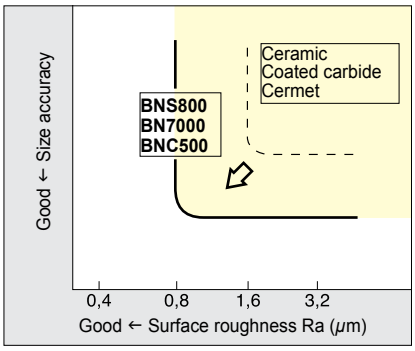
Improvement of Surface Roughness by Altering the Feedrate

Constant Feedrate	Variable Feedrate
Previous edge position f Stationary notch location	f Shifting notch location
	

Varying the feedrate spreads the notch location over a larger area, surface finish improves and notch wear decreases.

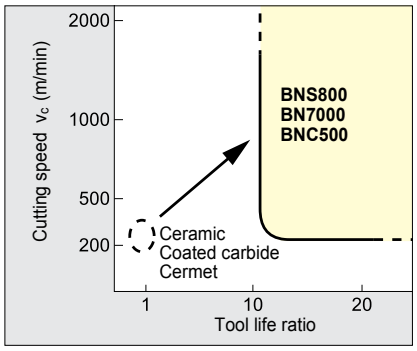
■ Advantages of Using SUMIBORON for Cast Iron Machining

● Higher accuracy

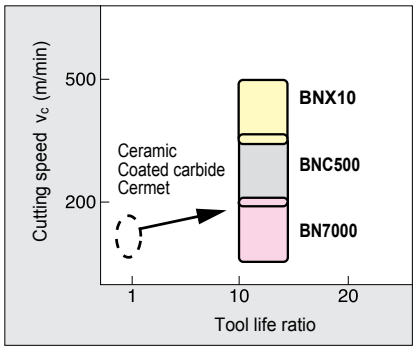


● Longer tool life at higher cutting speeds

GG: Grey cast iron

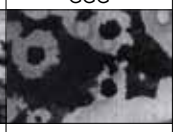
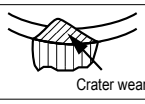
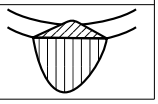


GGG: Ductile cast iron

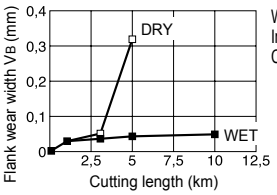


■ Turning

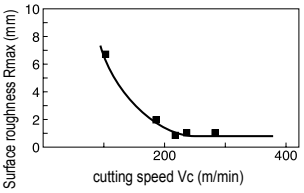
● Cast iron structure and wear shape examples

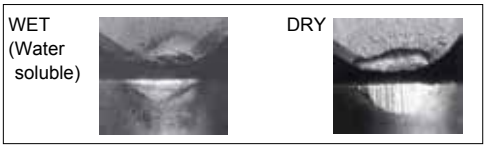
		GG	GGG
Structure			
	Matrix	Pearlite	Pearlite + Ferrite
Tool wear shape	Wet		
	Dry	 Crater wear	

($v_c \geq 200$ m/min)



Work material: GG25
Insert: SNGN120408(BN500)
Cutting data: v_c = 450 m/min
d_{oc} = 0,25 mm
f = 0,15 mm/rev
Continuous cutting





For machining cast iron with SUMIBORON, cutting speeds (Vc) should be 200m/min and above. WET cutting is recommended.

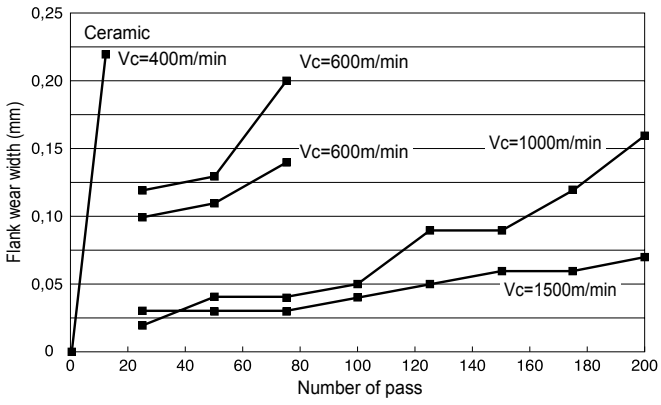
Machine: N/C lathe
Work material: GG25 (HB200)
Holder: MTJNP2525
Insert: TNMA160408(BN500)
Cutting data: v_c = 110~280 m/min
d_{oc} = 0,1 mm
f = 0,1 mm/rev
WET

■ Milling

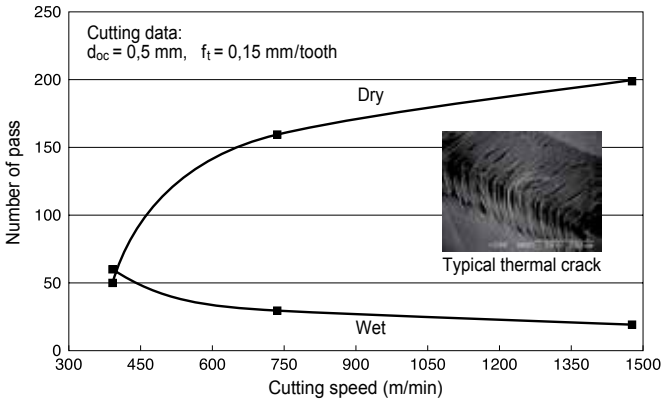
SUMIBORON BN Finish Mill EASY



- High speed machining Vc = 2000m/min
- Surface Roughness Rz=3,2 (Ra=1,0)
- Running cost is reduced because of economical insert
- Easy insert setting with the aid of a setting gauge
- Safe, anti-centrifugal force construction for high speed conditions

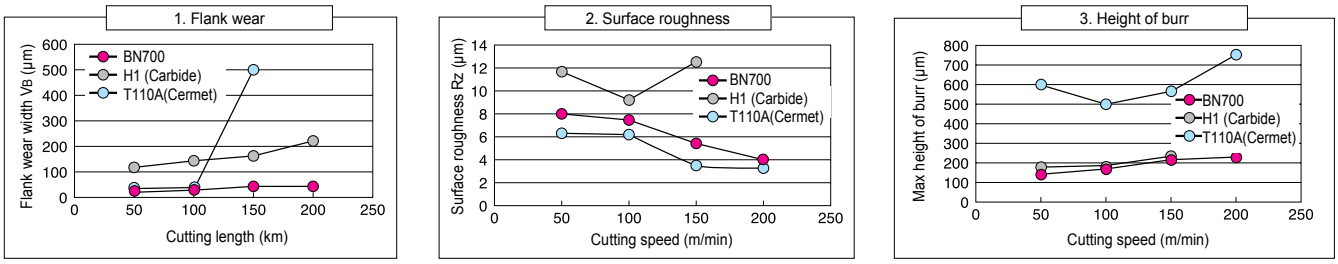


Work material: GG25
Tool material: BN700
Cutting data: d_{oc} = 0,5 mm, f_t = 0,1 mm/tooth, DRY



Dry cutting is recommended for high speed milling of cast iron with SUMIBORON.

■ Powder Metal



Work material: SMF4040 equivalent
Process details: ø100~300mm heavy interrupted facing with grooves and drilled holes. (after 40 passes)
Insert: TNGA160404 Cutting data: f=0.1mm/rev, d=0.1mm, Wet

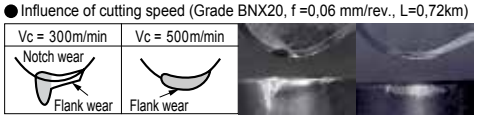
For general power metal components, carbide and cermet grades can perform up to Vc=100m/min. However, around Vc=120m/min, wear becomes rapid and surface roughness deteriorates with increased burrs.
SUMIBORON on the other hand, exhibits stability and superior wear resistance, burr prevention and surface roughness especially at high speeds.

■ Heat Resistive Alloy

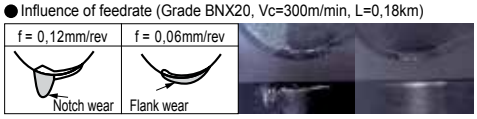
● Ni based alloy

Typical tool damage of CBN tool when cutting Inconel 718

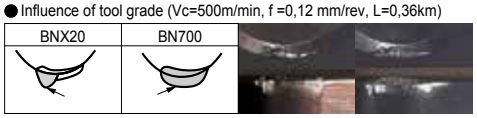
● Influence of cutting speed (Grade BNX20, f =0,06 mm/rev., L=0,72km)



● Influence of feedrate (Grade BNX20, Vc=300m/min, L=0,18km)



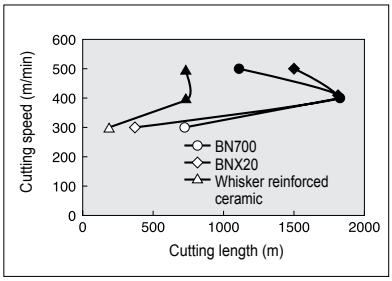
● Influence of tool grade (Vc=500m/min, f =0,12 mm/rev, L=0,36km)



Cutting data: d_{oc} = 0,3mm, WET

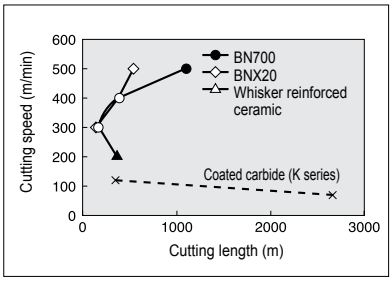
0,5mm

Cutting data: f = 0,06mm/rev, d_{oc} = 0,3mm, WET



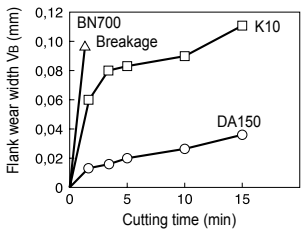
Tool life criteria
Notch wear = 0,25mm
Or flank wear = 0,25mm
BNX20 is recommended for high speed and low feedrate condition.
BN700 is recommended for cutting speeds below 240m/min

Cutting data: f = 0,12mm/rev, d_{oc} = 0,3mm, WET

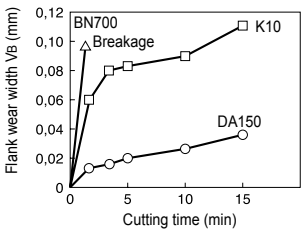


Tool life criteria
Notch wear = 0,25mm
Or flank wear = 0,25mm
BN700 is recommended for cutting at high feedrates.
(Over f=0,1mm/rev)

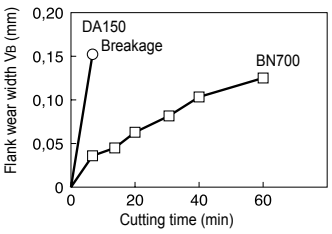
● Ti based alloy



Work Material: Ti-6Al-4V
Insert: DNM120404NF
Cutting data: v_c = 100m/min, d_{oc} = 0,1mm, f = 0,05mm/rev, WET
SUMIDIA positive type inserts are extremely good for Ti alloy, due to high cutting edge strength and high wear resistance.



Work Material: Ti-6Al-4V
Insert: DNM120404NF
Cutting data: v_c = 100m/min, d_{oc} = 0,1mm, f = 0,05mm/rev, WET
SUMIDIA positive type inserts are extremely good for Ti alloy, due to high cutting edge strength and high wear resistance.

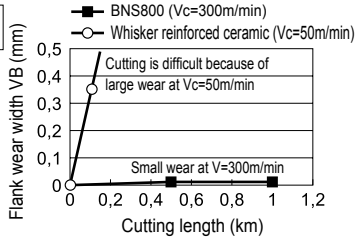


Work Material: Ti-6Al-4V
Insert: DNMA150412
Cutting data: Vc = 120m/min, d_{oc} = 0,3mm, f =0,25mm/rev, WET
Negative type insert BN700 is excellent for high efficiency cutting. (For large depth of cut and high feedrates)

● Hard facing alloys

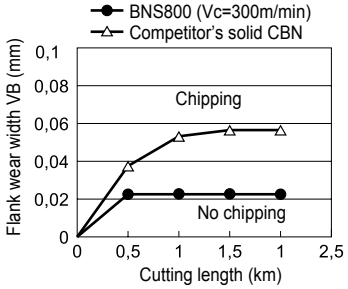
Work material: Colmonoy No.6 (Ni-based self fluxing alloy)

Insert: SNGN090308
Cutting data:
v_c = 50, 300 m/min
f = 0,1 mm/rev
d_{oc} = 0,2 mm
Wet



Work material: Stellite SF-20 (Co-based Self-fluxing alloy)

Insert: SNGN090308
Cutting data:
v_c = 50 m/min
f = 0,1 mm/rev
d_{oc} = 0,2 mm
Dry





BNS800
(Vc=300m/min, After 2km Cutting)



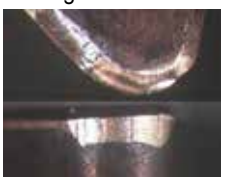
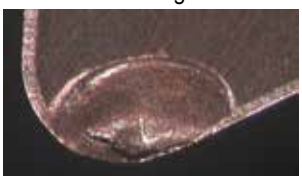
Whisker reinforced ceramic
(Vc=50m/min, After 10m Cutting)



BNS800
(After 2km of cutting)



Competitor's solid CBN
(After 2km of cutting)

	Damage		Remedies
Cutting Edge Failure	Large flank wear 	Tool material Tool design Cutting condition	☞ Select a more wear resistant grade. ☞ Reduce the cutting force. ☞ Reduce the NL width and angle. ☞ Positive inserts preferred ☞ Check the cutting speed. ☞ Reduce the cutting speed to less than 200m/min. ☞ Higher feed rate reduces the overall tool-to-work contact time.
	Large crater wear 	Tool material Tool design Cutting condition	☞ Crater wear resistant grades are recommended. Continuous ~ Light interrupted cutting = BNC2010 Light ~ Medium interrupted cutting = BNX20 Medium ~ Heavy interrupted cutting = BNX25 ☞ Determine the cutting edge geometry after inspecting the used inserts closely. ☞ Sharpen the cutting edge to prevent crater wear. ☞ Strengthen the cutting edge to prevent crater breakage. ☞ Check the cutting speed. ☞ Reduce the cutting speed to less than 200m/min. ☞ Higher feed rates are recommended.
	Breakage at bottom of crater 		
	Flaking 	Tool material Tool design Cutting condition	☞ Flaking is caused by high back forces and back force is related to flank wear. ☞ Select a more wear resistant grade. ☞ A sharper cutting edge helps prevent flaking. ☞ Reduce the NL angle and width ☞ Positive inserts preferred ☞ Reduce flank wear with lower speed and higher feed rates. ☞ Reducing tool-to-work contact time effectively reduces flank wear.
	Chipping at notch position 	Cutting condition	☞ If surface finish is affected, consider using the “Variable Feed rate” method to improve finishing. ☞ For other cases, use remedies similar to that for normal wear.
	Chipping at notch position 	Tool material Tool design Cutting condition	☞ Caused by impact shocks to the cutting edge. Chattering may also be a contributing factor. ☞ Select a tougher grade. ☞ Strengthen the cutting edge. ☞ Large NL angle, Honing. ☞ Higher feed rates are recommended to lessen the number of impacts.
	Chipping at nose position 	Tool material Tool design Cutting condition	☞ Caused by impact shocks to the cutting edge. Chattering may also be a contributing factor. ☞ Select a tougher grade. ☞ Strengthen the cutting edge. ☞ Large NL angle, Honing. ☞ Higher feedrates are recommended to lessen the number of impacts.
	Thermal crack 	Cutting condition Tool design Tool material	☞ Thermal shocks generate vertical crack lines across the cutting edge. Completely dry condition is recommended. ☞ If dry condition machining is already observed, then reduction of cutting temperatures and cutting force is necessary. ☞ Decrease cutting speed, feedrate, depth of cut. ☞ Sharpen cutting edge. ☞ Select more thermal conductivity grade.

■ Steel and Non-Ferrous Metal Symbols Chart

● Carbon Steels

JIS	AISI	DIN
S10C	1010	C10
S15C	1015	C15
S20C	1020	C22
S25C	1025	C25
S30C	1030	C30
S35C	1035	C35
S40C	1040	C40
S45C	1045	C45
S50C	1049	C50
S55C	1055	C55

● Ni-Cr-Mo Steels

SNCM220	8620	21NiCrMo2
SNCM240	8640	—
SNCM415	—	—
SNCM420	4320	—
SNCM439	4340	40NiCrMo6
SNCM447	—	34NiCrMo6

● Cr Steels

SCr415	—	15CrMo5
SCr420	5120	20Cr4
SCr430	5130	34Cr4
SCr435	5132	37Cr4
SCr440	5140	41Cr4
SCr445	5147	—

● Cr-Mo Steels

SCM415	—	15CrMo5
SCM420	—	20CrMo5
SCM430	4131	25CrMo4
SCM435	4137	34CrMo4
SCM440	4140	42CrMo4
SCM445	4145	—

● Mn Steels and Mn-Cr Steels for Structural Use

SMn420	1522	—
SMn433	1534	—
SMn438	1541	—
SMn443	1541	—
SMnC420	—	—
SMnC443	—	—

● Cr-Mo Steels

SK1	—	—
SK2	W1-11 1/2	—
SK3	W1-10	C105W1
SK4	W1-9	—
SK5	W1-8	C80W1
SK6	—	C80W1
SK7	—	C70W2

● High Speed Steels

JIS	AISI	DIN
SKH2	T1	—
SKH3	T4	S18-1-2-5
SKH10	T15	S12-1-4-5
SKH51	M2	S6-5-2
SKH52	M3–1	—
SKH53	M3–2	S6-5-3
SKH54	M4	—
SKH56	M36	—

● Alloy Tool Steels

SKS11	F2	—
SKS51	L6	—
SKS43	W2-9 1/2	—
SKD1	D3	X210Cr12
SKD11	D2	X155CrVMo12-1
SKD61	—	X40CrVMo5-1

● Grey Cast Iron

FC100	No 20B	GG-10
FC150	No 25B	GG-15
FC200	No 30B	GG-20
FC250	No 35B	GG-25
FC300	No 45B	GG-30
FC350	No 50B	GG-35

● Nodular Cast Iron

FCD400	60-40-18	GGG-40
FCD450	—	GGG-40.3
FCD500	80-55-06	GGG-50
FCD600	—	GGG-60
FCD700	100-70-03	GGG-70

● Ferritic Stainless Steels

SUS405	405	X10CrAl13
SUS429	429	—
SUS430	430	X6Cr17
SUS430F	430F	X7CrMo18
SUS434	434	X6CrMo17 1

● Martensitic Stainless Steels

SUS403	403	—
SUS410	410	X10Cr13
SUS416	416	—
SUS420JI	420	X20Cr13
SUS420F	420F	—
SUS431	431	X20CrNi17 2
SUS440A	440A	—
SUS440B	440B	—
SUS440C	440C	—

● Austenitic Stainless Steels

JIS	AISI	DIN
SUS201	201	—
SUS202	202	—
SUS301	301	X12CrNi17 7
SUS302	302	—
SUS302B	302B	—
SUS303	303	X10CrNiS18 9
SUS303Se	303Se	—
SUS304	304	X5CrNiS18 10
SUS304L	304L	X2CrNi19 11
SUS304NI	304N	—
SUS305	305	X5CrNi18 12
SUS308	308	—
SUS309S	309S	—
SUS310S	310S	—
SUS316	316	X5CrMo17 12 2
SUS316L	316L	X2CrNiMo17 13 2
SUS316N	316N	—
SUS317	317	—
SUS317L	317L	X2CrNiMo18 16 4
SUS321	321	X6CrNiTi18 10
SUS347	347	X6CrNiNb18 10
SUS384	384	—

● Heat Resisting Steels

SUH31	—	—
SUH35	—	—
SUH36	—	X53CrMnNi21 9
SUH37	—	—
SUH38	—	—
SUH309	309	—
SUH310	310	CrNi2520
SUH330	N08330	—

● Ferritic Heat Resisting Steels

SUH21	—	CrAl1205
SUH409	409	X6CrTi12
SUH446	446	—

● Martensitic Heat Resisting Steels

SUH1	—	X45CrSi9 3
SUH3	—	—
SUH4	—	—
SUH11	—	—
SUH600	—	—

References

■ Hardness Scale Comparision Chart

● Approx. metric value and Brinell hardness of steel

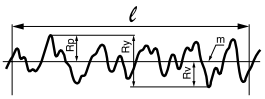
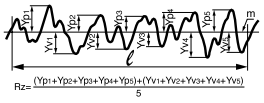
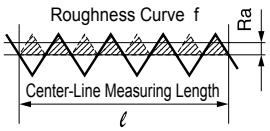
Brinell Hardness 10mm Ball 3.000kgf (HB)	Rockwell Hardness				Vickers Hardness 50kgf	Shore Hardness	Traverse Rupture Strength (N/mm^2)
	„A“ Scale Diamond, brale 60kgf (HRA)	„B“ Scale 100kgf 1/10“ Ball (HRB)	„C“ Scale Diamond, brale 150kgf (HRC)	„D“ Scale Diamond, brale 100kgf (HRD)	(HV)	(HS)	
—	85,6	—	68,0	76,9	940	97	—
—	85,3	—	67,5	76,5	920	96	—
—	85,0	—	67,0	76,1	900	95	—
767	84,7	—	66,4	75,7	880	93	—
757	84,4	—	65,9	75,3	860	92	—
745	84,1	—	65,3	74,8	840	91	—
733	83,8	—	64,7	74,3	820	90	—
722	83,4	—	64,0	73,8	800	88	—
712	—	—	—	—	—	—	—
710	83,0	—	63,3	73,3	780	87	—
698	82,6	—	62,5	72,6	760	86	—
684	82,2	—	61,8	72,1	740	—	—
682	82,2	—	61,7	72,0	737	84	—
670	81,8	—	61,0	71,5	720	83	—
656	81,3	—	60,1	70,8	700	—	—
653	81,2	—	60,0	70,7	697	81	—
647	81,1	—	59,7	70,5	690	—	—
638	80,8	—	59,2	70,1	680	80	—
630	80,6	—	58,8	69,8	670	—	—
627	80,5	—	58,7	69,8	667	79	—
601	79,8	—	57,3	68,7	640	77	—
578	79,1	—	56,0	67,7	615	75	—
555	78,4	—	54,7	66,7	591	73	2055
534	77,8	—	53,5	65,8	569	71	1985
514	76,9	—	52,1	64,7	547	70	1890
495	76,3	—	51,0	63,8	528	68	1820
477	75,6	—	49,6	62,7	508	66	1730
461	74,9	—	48,5	61,7	491	65	1670
444	74,2	—	47,1	60,8	472	63	1585
429	73,4	—	45,7	59,7	455	61	1510
415	72,8	—	44,5	58,8	440	59	1460
401	72,0	—	43,1	57,8	425	58	1390
388	71,4	—	41,8	56,8	410	56	1330
375	70,6	—	40,4	55,7	396	54	1270
363	70,0	—	39,1	54,6	383	52	1220
352	69,3	(110,0)	37,9	53,8	372	51	1180
341	68,7	(109,0)	36,6	52,8	360	50	1130
331	68,1	(108,5)	35,5	51,9	350	48	1095

Brinell Hardness 10mm Ball 3.000kgf (HB)	Rockwell Hardness				Vickers Hardness 50kgf	Shore Hardness	Traverse Rupture Strength (N/mm^2)
	„A“ Scale Diamond, brale 60kgf (HRA)	„B“ Scale 100kgf 1/10“ Ball (HRB)	„C“ Scale Diamond, brale 150kgf (HRC)	„D“ Scale Diamond, brale 100kgf (HRD)	(HV)	(HS)	
321	67,5	(108,0)	34,3	50,1	339	47	1060
311	66,9	(107,5)	33,1	50,0	328	46	1025
302	66,3	(107,0)	32,1	49,3	319	45	1005
293	65,7	(106,0)	30,9	48,3	309	43	970
285	65,3	(105,5)	29,9	47,6	301	—	950
277	64,6	(104,5)	28,8	46,7	292	41	925
269	64,1	(104,0)	27,6	45,9	284	40	895
262	63,6	(103,0)	26,6	45,0	276	39	875
255	63,0	(102,0)	25,4	44,2	269	38	850
248	62,6	(101,0)	24,2	43,2	261	37	825
241	61,8	100,0	22,8	42,0	253	36	800
235	61,4	99,0	21,7	41,4	247	35	785
229	60,8	98,2	20,5	40,5	241	34	765
223	—	97,3	(18,8)	—	234	—	—
217	—	96,4	(17,5)	—	228	33	725
212	—	95,5	(16,0)	—	222	—	705
207	—	94,6	(15,2)	—	218	32	690
201	—	93,8	(13,8)	—	212	31	675
197	—	92,8	(12,7)	—	207	30	655
192	—	91,9	(11,5)	—	202	29	640
187	—	90,7	(10,0)	—	196	—	620
183	—	90,0	(9,0)	—	192	28	615
179	—	89,0	(8,0)	—	188	27	600
174	—	87,8	(6,4)	—	182	—	585
170	—	86,8	(5,4)	—	178	26	570
167	—	86,0	(4,4)	—	175	—	560
163	—	85,0	(3,3)	—	171	25	545
156	—	82,9	(0,9)	—	163	—	525
149	—	80,8	—	—	156	23	505
143	—	78,7	—	—	150	22	490
137	—	76,4	—	—	143	21	460
131	—	74,0	—	—	137	—	450
126	—	72,0	—	—	132	20	435
121	—	69,8	—	—	127	19	415
116	—	67,6	—	—	122	18	400
111	—	65,7	—	—	117	15	385

1) Figures within the ( ) are not commonly used
2) Rockwell A, C and D scales utilises a diamond brale
3) 1 N/mm^2 = 1 MPa

■ Finished Surface Roughness

● Types of Surface Roughness Measurements

Types	Symbol	Method of Determination	Descriptive Figure
Maximum Height	※1) Ry	This is the value (expressed in µm) measured from the deepest valley to the highest peak of the reference line, ℓ, extracted from the profile. (Disregard unusually high peaks and deep valleys as they are considered as flaws.)	
Ten-point Mean Roughness	※2) Rz	From the profile, extract a portion to be the reference line, ℓ. Select the 5 highest peak and 5 deepest valleys. Measure the distance between the two lines and express it in µm. (1 µm = 0,001mm)	
Calculated Roughness	Ra	This method is to obtain a center line between the peaks and valleys within the reference line, ℓ. Fold along the center line to superimpose the valleys against the peaks. (Shaded portions with dashed outline on the right figure). Take the total shaded area and divided it by ℓ in µm.	

Designated values of the above types of surface roughness, standard reference length values and the triangular symbol classifications are shown on the table on the right.

※1) Ry : According to new **JIS B 0601**:2001 (Old symbol: Rz)
※2) Rz : According to new **JIS B 0601**:2001 (Old symbol: Rz_{JIS})

Designated values for ※1) Ry	Designated values for ※2) Rz	Designated values for Ra	Standard reference length values, ℓ (mm)	Triangular Symbols
(0,05S) 0,1S 0,2S 0,4S	(0,05Z) 0,1Z 0,2Z 0,4Z	(0,013a) 0,025a 0,05a 0,10a	—	▽▽▽▽
0,8S	0,8Z	0,20a	0,25	
1,6S 3,2S 6,3S	1,6Z 3,2Z 6,3Z	0,4a 0,8a 1,6a	0,8	▽▽▽
12,5S (18S) 25S	12,5Z (18Z) 25Z	3,2a 6,3a	2,5	▽▽
(35S) 50S (70S) 100S	(35Z) 50Z (70Z) 100Z	12,5a 25a	—	▽
(140S) 200S (280S) 400S (560S)	(140Z) 200Z (280Z) 400Z (560Z)	(50a) (100a)	—	—

Remarks: The designated values in the brackets do not apply unless otherwise stated.

Spare Parts

P

P1 ~ P8

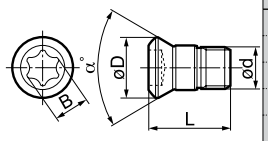


Screw P2
Lever Pin, Shim P4
Shim Pin, Nut, Eccentric Pin P6
Wrench P7

Screw

■ Screw

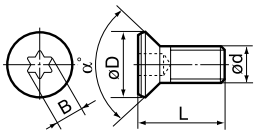
High Precision Screw



Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	D	B	α°
BFTG0408F	●	M4	0,5	7,5	5,7	T15	60
BFTG0409F	●	M4	0,5	8,4	6,2	T15	60
BFTG0513F	●	M5	0,5	13	6,8	T20	60
BFTG0617F	●	M6	0,75	16,5	8	T25	60
BFTG0621F	●	M6	0,75	21	9,5	T25	60
BFTG0825F	●	M8	0,75	24,5	12	T25	60

Torx Flat Head Screw

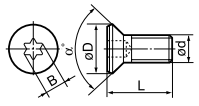
Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	D	B	α°
BFTX02508	●	M2,5	0,45	7,5	3,45	T8	60
BFTX0309		M3	0,5	8,8	4,2	T10	60
BFTX03508	●	M3,5	0,6	8	5,1	T10	52
BFTX03584	●	M3,5	0,6	7,4	5,2	T15	60
BFTX03588	●	M3,5	0,6	8,8	5,2	T15	60
BFTX0414	●	M4	0,7	14,5	5,5	T15	60
BFTX0515	●	M5	0,8	15	7	T20	60
BFTX0613		M6	1,0	13	9	T25	60
BFTX0615		M6	1,0	15	9	T25	60
BFTX0617		M6	1,0	17	9	T25	60



Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	D	B	α°
BFTX0203A	●	M2	0,4	3	2,7	T6	90
BFTX0204A	●	M2	0,4	4,3	2,7	T6	90
BFTX0305A	●	M3	0,5	5,3	4,3	T10	90
BFTX0306A	●	M3	0,5	5,8	4,3	T10	90
BFTX0307A	●	M3	0,5	6,8	4,3	T10	90
BFTX0407A	●	M4	0,5	7,3	5,6	T15	90
BFTX0410A	●	M4	0,7	10,3	5,6	T15	90
BFTX0509A	●	M5	0,8	9,3	6,9	T20	90

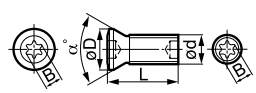
Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	D	B	α°
BFTX0203N	●	M2	0,4	3	2,7	T6	60
BFTX0204N	●	M2	0,4	4,3	2,7	T6	60
BFTX02205N	●	M2,2	0,45	4,5	3	T6	60
BFTX02505N	●	M2,5	0,45	4,5	3,45	T8	60
BFTX02506N	●	M2,5	0,45	5,5	3,45	T8	60
BFTX0306N	●	M3	0,5	5,5	4,2	T10	60
BFTX0307N	●	M3	0,5	7	4,2	T10	60
BFTX0309N	●	M3	0,5	8,8	4,2	T10	60
BFTX03509N	●	M3,5	0,6	9	5,1	T10	52
BFTX0406N	●	M4	0,7	5,5	5,6	T15	60
BFTX0407N	●	M4	0,7	7	5,6	T15	60
BFTX0409N	●	M4	0,7	9	5,6	T15	60
BFTX0412N	●	M4	0,7	11,5	5,6	T15	60
BFTX0509N	●	M5	0,8	9	7	T20	60
BFTX0511N	●	M5	0,8	11,5	7	T20	60
BFTX0515N	●	M5	0,8	15	7	T20	60

Torx Flat Head Screw



Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	D	B	α°
BFTX0307 IP	●	M3	0,5	7	4,3	10IP	55
BFTX03512 IP	●	M3,5	0,6	11,5	5,3	15IP	60

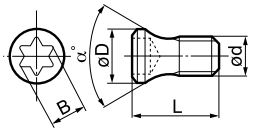
Torx Flat Head Screw



Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	D	B	α°
BFTX0410T8L	●	M4(L)	0,7	10,3	5,6	T10	90
BFTX0410T8R	●	M4	0,7	10,3	5,6	T10	90

■ Screw

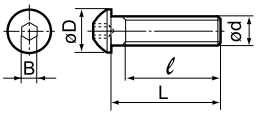
Torx Flat Head Screw



Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	D	B	α°
BFTY02205	●	M2,2	0,45	5,0	3,05	T7	60
BFTY02206	●	M2,2	0,45	5,6	3,05	T7	60

Button Head Cap Screw

Hexagonal Hole Type



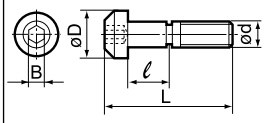
T Type with Torx Hole



(BH410T)

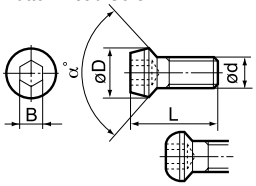
Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	ℓ	D	B
BH0304		M3	0,5	4	Full	5,5	2
BH0306	●	M3	0,5	6	Full	5,5	2
FBUP3-A0-9 (=BH0308)	●	M3	0,5	8	Full	5,5	2
BH0310	●	M3	0,5	10	Full	5,5	2
BH03504		M3,5	0,6	4	Full	7	2
BH0408		M4	0,7	8	Full	6	2,5
BH0410T	❑	M4	0,7	10	Full	7,5	T15
BH0415	❑	M4	0,7	15	Full	6	2,5
BH0510		M5	0,8	10	Full	9,5	3
BH0620	●	M6	1,0	20	Full	10,5	4
BH0824R		M8	1,25	24	20	12	4
BH0824L		M8	1,25	24	20	12	4
BH0825	❑	M8	1,25	25	20	12	4
BH0830R		M8	1,25	30	26	12	4
BH0830L		M8	1,25	30	26	12	4
BH0832		M8	1,25	32	29,5	12	4
BH1030R		M10	1,5	30	26	14	5
BH1030L		M10	1,5	30	26	14	5
BH1036R		M10	1,5	36	32	14	5
BH1036L		M10	1,5	36	32	14	5

Phillip Head Cap Screw



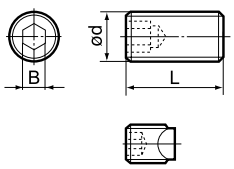
Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	ℓ	D	B
BHA0525	●	M5	0,8	25,5	9,5	8,5	3
BHA0625	●	M6	1,0	30	11,3	10,5	4
BHE0407	❑	M4	0,7	9,5	2	5,7	2,5
BHE0510	❑	M5	0,8	13	3	7,7	3

Button Head Screw



Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	D	B	α°
BHF0203L		M2	0,4	4	3	1,5	90
BHF0203T		M2	0,4	4	3	1,5	90
BHF0203S		M2	0,4	5,5	3	1,5	90
BHF0203B		M2	0,4	5,5	3,5	1,5	90
BHF0306R		M3	0,5	6,5	4,4	2	90
BHF0308R		M3	0,5	8	4,4	2	90
BHF0623	❑	M6	1,0	23	12	4	90

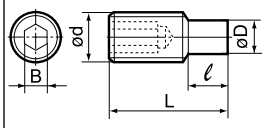
Set Screw



Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	–	B	–
BT0305	❑	M3	0,5	5	–	1,5	–
BT0310	❑	M3	0,5	10	–	1,5	–
BT0404	●	M4	0,7	4	–	2	–
BT0506	●	M5	0,8	6	–	2,5	–
BT0507K		M5	0,8	7	–	2,5	–
BT0510	❑	M5	0,8	10	–	2,5	–
BT0610		M6	1,0	10	–	3	–
BT0612		M6	1,0	12	–	3	–
BT0620		M6	1,0	20	–	3	–

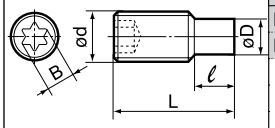
■ Screw

Set Screw



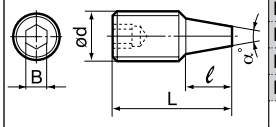
Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	ℓ	D	B
BTD0408		M4	0,7	8	2	2,8	2
BTD0410		M4	0,7	10	2	2,8	2
BTD0412		M4	0,7	12	2	2,8	2
BTD0508		M5	0,8	8	3	3,5	2,5
BTD0510	●	M5	0,8	10	3	3,5	2,5
BTD0518		M5	0,8	18	4	3,5	2,5
BTD0609	●	M6	1,0	9	2	4	3
BTD0615		M6	1,0	15	5	4	3
BTD0618		M6	1,0	18	5	4	3
BTD0620		M6	1,0	20	5	4	3
BTD0812		M8	1,25	12	2	5	4
BTD0818		M8	1,25	18	6	5	4
BTD0820		M8	1,25	20	6	5	4
BTD0825		M8	1,25	25	8,5	5	4

Set Screw with Torx Hole



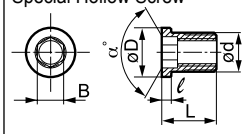
Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	ℓ	D	B
BTD0615T		M6	1,0	15	5	4	T20
BTD0620T		M6	1,0	20	5	4,3	T20

Set Screw



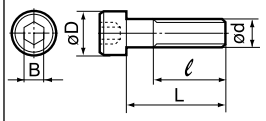
Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	ℓ	B	α°
BTT0407	●	M4	0,5	7	2,6	2	60
BTT0411	●	M4	0,5	11	2,6	2	60
BTT0511		M5	0,8	11	5	2	60
BTT0615		M6	1,0	15	6	2,6	60

Special Hollow Screw



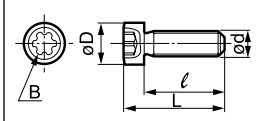
Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	ℓ	D	B
BW0507F	●	M5	0,5	7	1,2	6,3	3,5
BW0609F	●	M6	0,8	9	1,5	7,7	4

Cap Screw



Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	ℓ	D	B
BX0308		M3	0,5	8	Full	5	2,5
BX0408		M4	0,7	8	6	7	3
BX0410		M4	0,7	10	8	7	3
BX0412		M4	0,7	12	Full	7	3
BX0414	●	M4	0,7	14	Full	7	3
BX0425		M4	0,7	25	23	7	3
BX0430		M4	0,7	30	28	7	3
BX0508	●	M5	0,8	8	Full	8,5	4
BX0510	●	M5	0,8	10	Full	8,5	4
BX0512	●	M5	0,8	12	Full	8,5	4
BX0515		M5	0,8	15	Full	8,5	4
BX0520	●	M5	0,8	20	16	8,5	4
BX0615	❑	M6	1,0	15	Full	10	5
BX0620		M6	1,0	20	18	10	5
BX0622	●	M6	1,0	22	18	10	5
BX0625		M6	1,0	25	18	10	5
BX0820		M8	1,25	20	Full	13	6
BX0835		M8	1,25	35	22	13	6

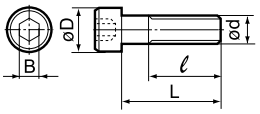
Torx Screw



Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	ℓ	D	B
BXD02208 IP	●	M2,2	0,45	7,5	5,7	3,5	8 IP
BXD02509 IP	●	M2,5	0,45	9	7	4,1	10IP
BXD03011 IP	●	M3	0,5	10,5	8	4,9	15IP
BXD03512 IP	●	M3,5	0,6	11,5	8,8	5,5	15IP
BXD04014 IP	●	M4	0,7	12,5	9,5	6	20IP
BXD04519 IP		M4,5	0,75	14,3	10,8	6,8	25IP

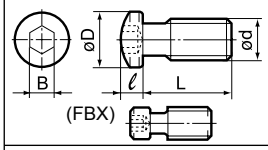
■ Screw

Cap Screw



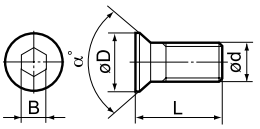
Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	ℓ	D	B
EHBX0512	●	M5	0,8	12	10,5	8	4

Fastener Bolt



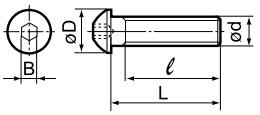
Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	ℓ	D	B
FBH0512	●	M5	0,8	12	3,1	7,3	3
FBX0811	●	M8	1,25	11	4,9	8,5	4
FBX0817	●	M8	1,25	17	5	8,5	4

Flat Head Screw



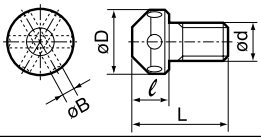
Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	ℓ	B	α°
FBUP1-A0-8		M3	0,5	6	4,4	2	82
FBUP1-V0-8		M3	0,5	6	5,6	2	82
FBUP2-A0-8	❑	M3	0,5	10	5,5	2	82
FBUP3-A0-8		M3,5	0,6	12	7	2	82
FBUP4-A0-8		M5	0,8	15	9,3	3	82
BFX0307R		M3	0,5	7	4	2	60
BFX0407R		M4	0,7	6,5	5,8	2,5	90
BFX0410R		M4	0,7	9,5	5,8	2,5	90
BFX0410L		M4(L)	0,7	9,5	5,8	2,5	90
BFX0508		M5	0,8	8	7,5	3	90
BFX0511R		M5	0,8	10,5	7,5	3	90
BFX0511L		M5(L)	0,8	10,5	7,5	3	90
BFX0611R		M6	1,0	11	9,5	3	90

Button Head Cap Screw



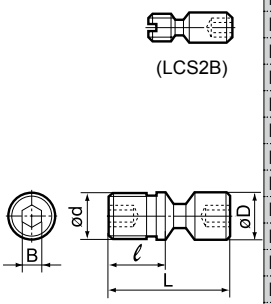
Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	ℓ	D	B
FBUP3-A0-9	●	M3	0,5	8	Full	5,5	2

Axial adjustment Screw



Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	ℓ	D	B
FMUJ	●	M4	0,7	17	6,5	6	2
RFJ	❑	M4	0,7	12	6	6	2
SRFJ	❑	M4	0,7	17	6,5	6	1,8

Screw for Lever Lock

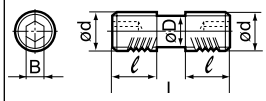


Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	ℓ	D	B
LCS2B		M3	0,5	10	3	3,6	2
LCS3	●	M6	1,0	17	10	6	2,5
LCS3B-SD	●	M5	0,8	9,5	4,2	5	2
LCS3DB-SD	●	M5	0,8	12	6	5	2
LCS3S		M6	1,0	15	10	6	2,5
LCS3TB-SD	●	M6	1,0	16,7	9,6	6	2,5
LCS3TE	●	M6	1,0	15,5	8,5	6	2,5
LCS4	●	M8	1,0	21	10	8	3
LCS4B-SD	●	M6	1,0	13,4	9	6	2,5
LCS41BS-SD	●	M8	1,0	17	9,3	8	3
LCS42BS-SD	●	M8	1,0	20,7	9,8	8	3
LCS4CA	●	M8	1,0	17,5	10	8	3
LCS5	●	M8	1,0	25	12	8	3
LCS5B-SD	❑	M8	1,0	20,5	12,3	8	3
LCS5CA		M8	1,0	20,5	12	8	3
LCS5DB-SD	❑	M8	1,0	21,1	11,4	8	3
LCS6	❑	M10	1,0	27,2	14,4	9,8	4
LCS6B-SD	●	M10	1,0	27,2	14,4	10	4
LCS10	●	M5	0,8	14,5	8,5	5	2
LCS12	●	M6	1,0	17	9,6	6	2,5
LCS16	●	M6	1,0	21	13,6	6	2,5
LCS20	●	M8	1,0	23,5	13,2	8	4
LCS25		M10	1,0	30	17,4	10	6,5
LCS32		M12	1,0	36	19,3	12	7

Screw, Lever Pin, Shim

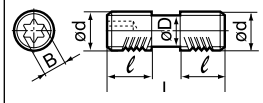
■ Screw

Double Screw



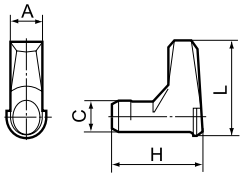
Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	ℓ	D	B
WB4-8		M4	0,7	7,5	3	3,0	2
WB5-10	●	M5	0,8	10	4	3,8	2,5
WB5-12	●	M5	0,8	12	5	3,8	2,5
WB5-18	❑	M5	0,8	18	6	3,8	2,5
WB6-13	❑	M6	1,0	13	5	4,5	3
WB6-16	●	M6	1,0	16	6	4,5	3
WB6-20	❑	M6	1,0	20	8,5	4,5	3
WB6-30		M6	1,0	30	12	4,5	3
WB8-20	●	M8	1,25	20	8,5	6,2	4
WB8-24		M8	1,25	24	8,5	6,2	4
WB8-30	●	M8	1,25	30	11,5	6,2	4
WB8F-30	●	M8	1,0	30	11,5	6,2	4

Torx Double Screw

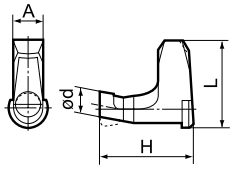


Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	ℓ	D	B
WB6-16T	❑	M6	1,0	14	6	4,5	T20
WB6-24T		M6	1,0	24	8,5	4,5	T20
WB7-15T	●	M7	1,0	15	5,5	5	T25
WB7F-15T	●	M7	0,75	15	8,5	5,5	T25
WB7F-20TL	●	M7(L)	0,75	20	8,5	5,5	T25
WB8-22T	●	M8	1,25	22	5,5	6,2	T27
WB8-22TL	●	M8(L)	1,25	22	8,5	6,2	T27
WB8-30T	●	M8	1,25	30	11,5	6,2	T27
WB8-30TL		M8(L)	1,25	30	11,5	6,2	T27
WB8R-16T	❑	M8	1,25	14	6	6,2	T27

■ Lever Pin

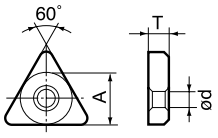


Cat. No.	Stock	Dimensions (mm)					
		A	H	L	C	–	–
LCL3		3,7	12	10	3,6	–	–
LCL3-SD	●	3,7	12	10	3,55	–	–
LCL3C-SD	❑	3,1	7,8	9,9	3,1	–	–
LCL3D-SD	●	3,7	11,5	12	3,55	–	–
LCL3DB-SD	●	3,1	9,4	11,5	3,1	–	–
LCL3S	●	3,7	10,6	10	3,6	–	–
LCL3T-SD	●	2,6	6,3	7,2	2,15	–	–
LCL4		4,7	14	14,55	4,7	–	–
LCL4-SD	●	4,65	13,2	13,35	4,7	–	–
LCL4C-SD	●	4,65	10	13,35	4,7	–	–
LCL4D-SD	●	4,65	14,8	16	4,7	–	–
LCL4T-SD	●	4,65	13,2	13,35	4,7	–	–
LCL5		6	17	17,1	6	–	–
LCL5-SD	●	6	17,3	16,65	6	–	–
LCL5C-SD	❑	7,5	18,1	20,5	7,5	–	–
LCL6-SD	●	7,5	21	20,5	7,5	–	–
LCL8	●	8,6	25,4	25,4	8,6	–	–

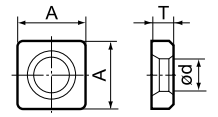


Cat. No.	Stock	Dimensions (mm)					
		A	H	L	C	–	–
LCL06	●	2,5	6,2	7,0	2,1	–	–
LCL09	●	3,5	9,3	10,8	3,2	–	–
LCL10	●	3,4	11,8	10,8	3	–	–
LCL12	●	3,7	13,4	12,9	3,5	–	–
LCL16	●	4,6	17,6	18,4	4,4	–	–
LCL20	❑	6	18,9	20,4	5,6	–	–
LCL25		7,5	23,5	23,9	6,2	–	–
LCL32		8,5	26,8	29,8	8	–	–

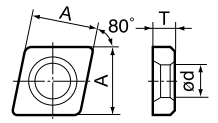
■ Shim



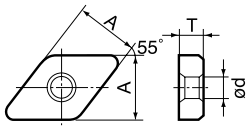
Cat. No.	Stock	Dimensions (mm)					
		A	T	d	–	–	–
LST317SD	●	9,5	2,7	5,2	–	–	–
LST42SD	●	12,65	3,18	6,9	–	–	–
LST53SD		15,85	4,76	7,9	–	–	–



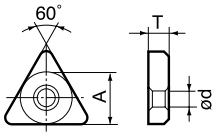
Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	D	B	α°
LSS32SD	●	9,48	3,18	5	–	–	–
LSS42SD	●	12,65	3,18	6,9	–	–	–
LSS53SD	❑	15,85	4,76	7,9	–	–	–
LSS63SD	●	19	4,76	10	–	–	–
LSS84		25,35	6,35	13,2	–	–	–



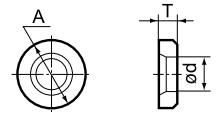
Cat. No.	Stock	Dimensions (mm)					
		A	T	d	–	–	–
LSC32SD	●	9,48	3,18	5	–	–	–
LSC42SD	●	12,65	3,18	6,9	–	–	–
LSC53SD	●	15,85	4,76	7,9	–	–	–
LSC63SD	❑	19	4,76	10	–	–	–
LSC317		9,5	2,7	5,2	–	–	–



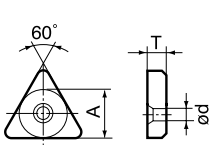
Cat. No.	Stock	Dimensions (mm)					
		A	T	d	–	–	–
LSD32SD	●	8,5	3,18	5	–	–	–
LSD42SD	●	12,65	3,18	6,9	–	–	–



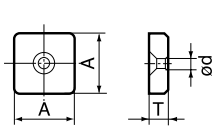
Cat. No.	Stock	Dimensions (mm)					
		A	T	d	–	–	–
LST317CA		9,33	2,7	5	–	–	–
LST42CA		12,5	3,2	6,7	–	–	–



Cat. No.	Stock	Dimensions (mm)					
		A	T	d	–	–	–
LSR817	❑	8,4	2,7	4,8	–	–	–
LSR917	❑	9	2,7	4,8	–	–	–
LSR10	●	8,4	3,18	4,7	–	–	–
LSR12	●	10	3,18	4,7	–	–	–
LSR16	●	13,5	4,76	6,3	–	–	–
LSR20	●	17,2	4,76	7,9	–	–	–
LSR25	●	22	6,35	9,5	–	–	–



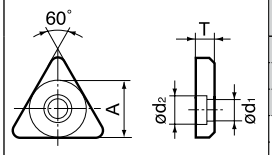
Cat. No.	Stock	Dimensions (mm)					
		A	T	d	–	–	–
STND323		9,3	3,18	3,4	–	–	–
STND433		12,5	4,76	3,4	–	–	–



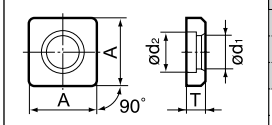
Cat. No.	Stock	Dimensions (mm)					
		A	T	d	–	–	–
SSND423	●	12,5	3,18	3,4	–	–	–
SSND533		15,65	4,76	3,4	–	–	–

Shim

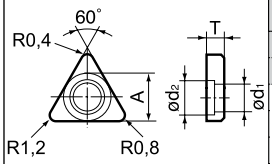
■ Shim



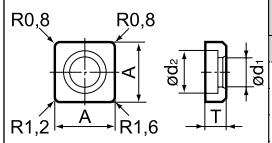
Cat. No.	Stock	Dimensions (mm)					
		A	T	d_1	d_2	–	–
STW323	●	9,5	3,18	4,7	6,5	–	–
STW333	●	9,5	4,76	4,7	6,5	–	–
STW434	●	12,65	4,76	6,2	8	–	–



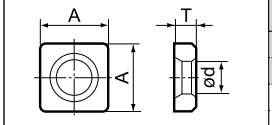
Cat. No.	Stock	Dimensions (mm)					
		A	T	d_1	d_2	–	–
SSW423	●	12,65	3,18	6,2	8	–	–
SSW433	●	12,65	4,76	6,2	8	–	–
SSW635	●	19	4,76	9	11,5	–	–



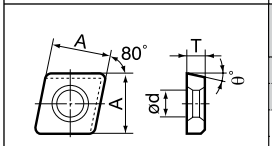
Cat. No.	Stock	Dimensions (mm)					
		A	T	d_1	d_2	–	–
EST32		9,53	3,18	5,5	5,9	–	–
EST43		12,7	4,76	7,5	7,9	–	–



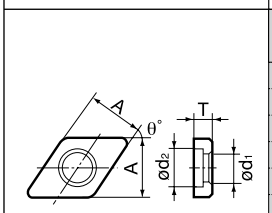
Cat. No.	Stock	Dimensions (mm)					
		A	T	d_1	d_2	–	–
ESS42		12,7	3,18	7,5	7,9	–	–



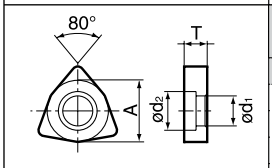
Cat. No.	Stock	Dimensions (mm)					
		A	T	d	–	–	θ°
LSS42CA		12,5	3,2	6,7	–	–	8
LSS53CA		15,68	4,8	7,7	–	–	10



Cat. No.	Stock	Dimensions (mm)					
		A	T	d	–	–	θ°
LSC42CA		12,5	3,2	6,7	–	–	8
LSC53CA		15,68	4,8	7,7	–	–	10

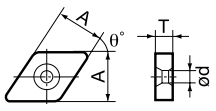


Cat. No.	Stock	Dimensions (mm)					
		A	T	d	–	–	θ°
SVW322		9,5	3,18	4,7	6,5	–	35
SFW423		12,65	3,18	6,2	8,0	–	50
SFW433		12,65	4,76	6,2	8,0	–	50
SDW323	●	9,5	3,18	4,7	6,5	–	55
SDW423	●	12,65	3,18	6,2	8,0	–	55
SCW323		9,5	3,18	4,8	6,5	–	80
SCW423	●	12,65	3,18	6,2	8,0	–	80
SCW635	●	19	4,76	9	11,5	–	80

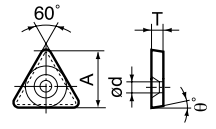


Cat. No.	Stock	Dimensions (mm)					
		A	T	d_1	d_2	–	–
SWW433	●	12,65	4,76	6,2	8	–	

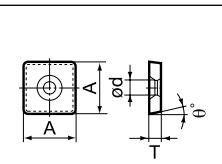
■ Shim



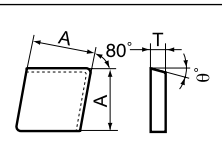
Cat. No.	Stock	Dimensions (mm)					
		A	T	d	–	–	θ°
SDND433		12,65	4,76	3,4	–	–	55
SEND423		12,5	3,18	3,4	–	–	75
SCND433	❑	12,65	4,76	3,4	–	–	80



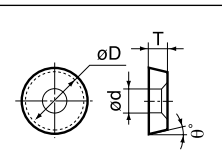
Cat. No.	Stock	Dimensions (mm)					
		A	T	d	–	–	θ°
STPD322	●	8,4	3,18	3,4	–	–	6
STPD422	●	11,0	11,0	3,4	–	–	6
STPL42		11,0	3,18	3,4	–	–	6



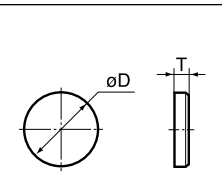
Cat. No.	Stock	Dimensions (mm)					
		A	T	d	–	–	θ°
SSPD422		11,6	3,18	3,4	—	—	6
SSPD522		14,1	3,18	3,4	—	—	6



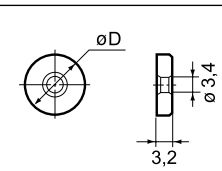
Cat. No.	Stock	Dimensions (mm)					
		A	T	d	–	–	θ°
SCN204		8,7	2,04	–	–	–	7



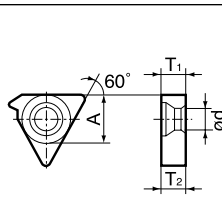
Cat. No.	Stock	Dimensions (mm)					
		D	T	d	–	–	θ°
SRPH163		14	3,2	5,3	–	–	11
SRPH203		18	3,2	6,3	–	–	11



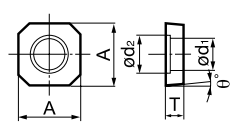
Cat. No.	Stock	Dimensions (mm)					
		D	T	–	–	–	–
BNRS120		11,2	4	–	–	–	–
BNRS160		15,2	4	–	–	–	–
BNRS200		19,2	4	–	–	–	–
BNRS290		28,2	4	–	–	–	–



Cat. No.	Stock	Dimensions (mm)					
		D	–	–	–	–	–
SRND32	●	9,5	–	–	–	–	–
SRND42	●	12,7	–	–	–	–	–



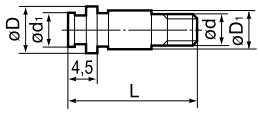
Cat. No.	Stock	Dimensions (mm)					
		A	T_1	T_2	d	–	–
LSTE31-0	●	9,5	2,7	2,7	5,2	–	–
LSTE31-1	●	9,5	2,67	2,91	5,2	–	–
LSTE31-2	●	9,5	2,64	3,11	5,2	–	–
LSTE42-0		12,7	3,18	3,18	7,0	–	–
LSTE42-1		12,7	3,14	3,45	7,0	–	–
LSTE42-2		12,7	3,09	3,71	7,0	–	–



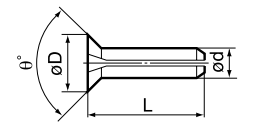
Cat. No.	Stock	Dimensions (mm)					
		A	T	d_1	d_2	–	θ°
WGCS13R		10,7	3,0	5,5	7,5	–	5

Shim Pin, Nut, Eccentric Pin

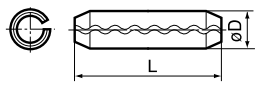
■ Shim Pin



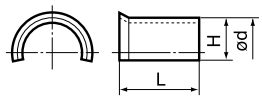
Cat. No.	Stock	Dimensions (mm)					
		d	Pitch	L	D	D_1	d_1
MP317	●	M4	0,7	15,5	6	4	3,7
MP320	●	M4	0,7	19,5	6	4	3,7
MP416	●	M5	0,8	14	7,5	6	5
MP420	●	M5	0,8	20	7,5	6	5
MP432	●	M5	0,8	32	7,5	6	5
MP445	❑	M5	0,8	45	7,5	6	5



Cat. No.	Stock	Dimensions (mm)					
		d	-	L	D	θ°	–
SPP308	●	3,2	–	8	4,8	120	–

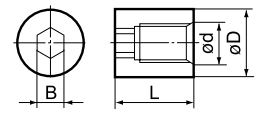


Cat. No.	Stock	Dimensions (mm)					
		–	–	L	D	–	–
SPP3	●	–	–	16	3	–	–

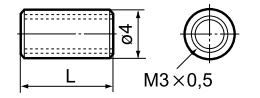


Cat. No.	Stock	Dimensions (mm)					
		d	H	L	–	–	–
LSP3SD	●	5	3,5	5,5	–	–	–
LSP4SD	●	6,7	4	7	–	–	–
LSP5SD	●	7,7	4,5	8,5	–	–	–
LSP6SD	●	9,85	5,9	11,1	–	–	–
LSP8		13,05	10	12	–	–	–
LSP10	●	5	3,3	6,5	–	–	–
LSP16	●	6,6	4,5	9	–	–	–
LSP20	●	8,2	5,5	9	–	–	–
LSP25		9,8	6,5	11	–	–	–
LSP32		13	10	12	–	–	–

■ Nut

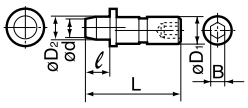


Cat. No.	Stock	Dimensions (mm)					
		d	L	D	B	–	–
CPM32N	●	M4	7,5	7	3	–	–
CPM43N	●	M5	8,5	7	3	–	–
CPM43S	●	M5	6	7	3	–	–

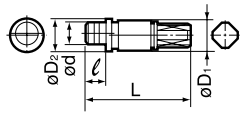


Cat. No.	Stock	Dimensions (mm)					
		L	–	–	–	–	–
BNBW-2	●	3	–	–	–	–	–
BNBW-4	❑	5	–	–	–	–	–
BNBW-7	❑	8	–	–	–	–	–

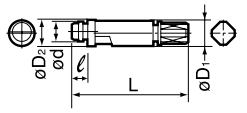
■ Eccentric Pin



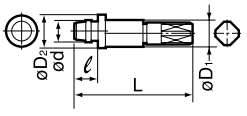
Cat. No.	Stock	Dimensions (mm)					
		d	D_1	D_2	L	ℓ	B
CPB32C		3,3	4,1	5,5	14	3,4	2,5
CPB34	●	3,4	4,1	5,5	14	5	2,5
CPB35	❑	3,4	4,1	5,5	17	5	2,5
CPB42	●	4,5	5,5	7	14	5	3
CPB43	●	4,5	5,5	7	16	5	3
CPB43S	●	4,5	5,5	7	19	5	3
CPB44T	❑	4,5	5,5	7	22	5	3
CPB45T	●	4,5	5,5	7	27	5	3
CPB64		6,8	8,2	10,5	24	6,6	4



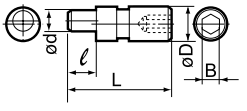
Cat. No.	Stock	Dimensions (mm)					
		d	D_1	D_2	L	ℓ	-
P221US		2,11	3,5	4	18	3,3	–
P322US		3,635	5	5,5	21	3,3	–
P323US		3,635	5	5,5	24	3,3	–
P332US		3,635	5	5,5	21	4,9	–
P333US		3,635	5	5,5	24	4,9	–
P334US		3,635	5	5,5	30	4,9	–
P433U		5,025	7	7,5	24	4,9	–
P434U		5,025	7	7,5	30	4,9	–



Cat. No.	Stock	Dimensions (mm)					
		d	D_1	D_2	L	ℓ	-
P323WS		3,635	5	5,8	24	3,3	–
P333WS		3,635	5	5,8	24	4,9	–
P334WS		3,635	5	5,8	30	4,9	–
P433W		5,025	7	7,8	24	4,9	–
P434W		5,025	7	7,8	30	4,9	–



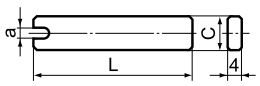
Cat. No.	Stock	Dimensions (mm)					
		d	D_1	D_2	L	ℓ	-
CPZ333V		3,4	4,1	5,5	29	5	–
CPZ334		3,4	4,1	5,5	32	5,5	–
CPZ433		4,5	5,5	7	26	5	–
CPZ434		4,5	5,5	7	32	5	–
CPZ435		4,5	5,5	7	39	5	–
CPZ438		4,5	5,5	7	44	5	–



Cat. No.	Stock	Dimensions (mm)					
		d	D_1	D_2	L	ℓ	B
CPU304C	❑	3,3	5,5	–	10	3,5	3

■Wrench

Key Wrench



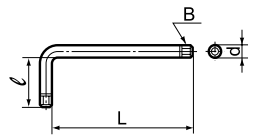
Cat. No.	Stock	Dimensions (mm)					
		L	a	–	C	–	–
KY25		45	2,5	–	10	–	–
KY40		60	4	–	13	–	–

Hex Wrench (Hexagonal)



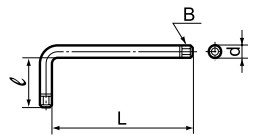
Cat. No.	Stock	Dimensions (mm)					
		B	L	ℓ	–	–	–
LH015	❑	1,5	52	8	–	–	–
LH020	●	2	58	12	–	–	–
LH025	●	2,5	60	15	–	–	–
LH030	●	3	65	20	–	–	–
LH035	●	3,5	70	25	–	–	–
LH040	●	4	72	25	–	–	–
LH050	❑	5	80	28	–	–	–
LH060		6	90	32	–	–	–

Torx Wrench



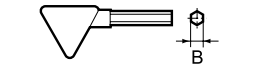
Cat. No.	Stock	Dimensions (mm)					
		B	d	L	ℓ	–	–
LT08-06		T8	2,3	45,0	6,0	–	–
LT20	❑	T20	3,9	57,2	19,1	–	–
LT25	❑	T25	4,4	60,3	20,2	–	–
LT27	●	T27	5,0	63,5	21,5	–	–

"Torx Plus" Wrench



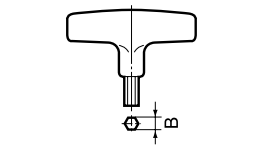
Cat. No.	Stock	Dimensions (mm)					
		B	d	L	ℓ	–	–
LT 20 IP	●	T20	4,0	57	18,5	–	–
LT 25 IP	●	T25	4,5	60	19,5	–	–

Hex Wrench (Hexagonal)



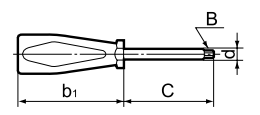
Cat. No.	Stock	Dimensions (mm)					
		B	–	–	–	–	–
TH015	●	1,5	–	–	–	–	–
TH020	●	2	–	–	–	–	–
TH025	●	2,5	–	–	–	–	–

Hex Wrench (Hexagonal)



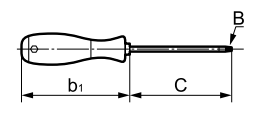
Cat. No.	Stock	Dimensions (mm)					
		B	–	–	–	–	–
TH030	●	3	–	–	–	–	–
TH040	●	4	–	–	–	–	–
TH050	●	5	–	–	–	–	–

Torx Wrench



Cat. No.	Stock	Dimensions (mm)					
		B	d	C	B_1	–	–
TRD07	●	T7	2,0	45	70	–	–
TRD08	●	T8	2,3	55	70	–	–
TRD15	❑	T15	3,9	70	100	–	–
TRD20	●	T20	4,6	100	90	–	–
TRD25	●	T25	5,3	80	110	–	–

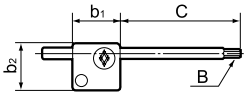
Torx Wrench



Cat. No.	Stock	Dimensions (mm)					
		B	C	b_1	–	–	–
TRDR08 IP	●	8IP	60	104	–	–	–
TRDR10 IP	●	10IP	80	111	–	–	–
TRDR15 IP	●	15IP	80	111	–	–	–
TRDR20 IP	●	20IP	100	118	–	–	–
TRDR25 IP	●	25IP	100	118	–	–	–

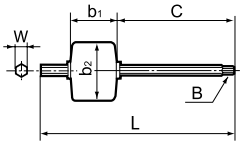
■Wrench

Torx Wrench



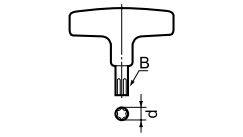
Cat. No.	Stock	Dimensions (mm)					
		B	C	b_1	b_2	–	–
TRX06	●	T6	34,5	15	15	–	–
TRX08	●	T8	34,5	19	19	–	–
TRX10	●	T10	42,5	22	22	–	–
TRX15	●	T15	45	22	27	–	–
TRX20	●	T20	49,0	22	30	–	–

Torx Plus Wrench



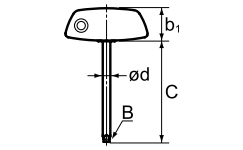
Cat. No.	Stock	Dimensions (mm)					
		B	W	L	C	b_1	b_2
TRX15 IP	●	T15	3,5	85,5	47	23	29

Torx Wrench



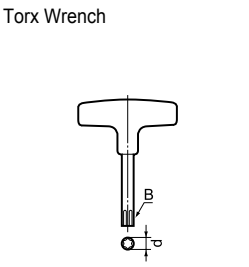
Cat. No.	Stock	Dimensions (mm)					
		B	d	–	–	–	–
TT25	●	T25	4,4	–	–	–	–
TT27	●	T27	5,0	–	–	–	–

Torx Plus Wrench



Cat. No.	Stock	Dimensions (mm)					
		B	d	C	b_1	–	–
TTR15 IP	●	15IP	4,0	80	25,5	–	–

Torx Wrench



Cat. No.	Stock	Dimensions (mm)					
		B	d	–	–	–	–
TTX15W	●	T15	4,0	–	–	–	–
TTX20	●	T20	3,9	–	–	–	–

Index

P

P9 ~ P22



Index

1,8x45 ... G43, G45, M28, M31, M33, ... Spare parts
... M36, M39, M41 ...
AECT******PEFRA ... H22, H23, G40, G41 ... Indexable insert
AFBSM** ... M30, M31 ... Spare parts
APET******PDER-F ... H25 ... Indexable insert
APET******PDFR-S ... H25 ... Indexable insert
APMT******PDER ... H25 ... Indexable insert
APMT******PDER-H ... H25 ... Indexable insert
ASM**** ... J47 ... Solid endmill
ASM****DL ... J31 ... Solid endmill
ASM****DL-R** ... J31 ... Solid endmill
AXET******PEFR-S ... H18, H19, H27, H28 ... Indexable insert
... G34, G35 ...
AXMT******PEER-E ... H18, H19, H27, H28 ... Indexable insert
... G34, G35 ...
AXMT******PEER-EH ... H18, H19, H27, H28 ... Indexable insert
... G34, G35 ...
AXMT******PEER-G ... H18, H19, H27, H28 ... Indexable insert
... G34, G35 ...
AXMT******PEER-H ... H18, H19, H27, H28 ... Indexable insert
... G34, G35 ...
AXMT******PEER-L ... H19, H28, G34, G35 ... Indexable insert
B***-SCLC R/L ****-** ... E14 ... Boring bar
B***-SDQC R/L ****-** ... E17 ... Boring bar
B***-SDUC R/L ****-** ... E16 ... Boring bar
B***-STUP R/L ****-** ... E20 ... Boring bar
BCS** ... F25, F27 ... Spare parts
BFTG****F ... H33, P2 ... Spare parts
BFTX**** ... F12, G40, H22, P2 ... Spare parts
BFTX***** ... D38, E21, E22, F32, F33 ... Spare parts
... H25, K49, K50, K51, K52 ...
... K57, P2 ...
BFTX****A ... E15, E18, E20, E23, P2 ... Spare parts
BFTX****IP ... G9, G12, G16, G19, G23, G30 ... Spare parts
... G35, G39, H6, H9, H10, H14, ...
... H18, H19, H27, H28, H35, H36, ...
... H37, P2 ...
BFTX*****IP ... G11, G12, G23, G26, G31, G33 ... Spare parts
... G34, H7, H9, H10, H13, H15, H34, ...
... H35, H36, H37, P2 ...
BFTX*****IP** ... G39, H9, H10, ... Spare parts
BFTX****N ... D11, D12, D13, D14, D15, D16 ... Spare parts
... D17, D30, D31, D32, D33, D36, ...
... D37, D38, D41, D42, E8, E9 ...
... E11, E12, E13, E14, E16 ...
... E17, E19, E23, E24, F12, F21, ...
... G36, G38, G41, G42, G43, G45, H23 ...
... H31, H38, K51, K52, K53, K54 ...
... K61, M33, M35, M38 ...
... M39, M41, P2 ...
BFTX*****N ... D31, D32, D33, D37, D38, D39 ... Spare parts
... D37, E14, E16, E17, E19 ...
... E22, H25, K51, K52, K53, K54 ...
... K61, P2 ...
BFTX****SD ... D35 ... Spare parts
BFTX*****SD ... D35 ... Spare parts
BFTX****T8 R/L ... F22, P2 ... Spare parts
BFTY***** ... K51, K52, K53, K54, K61, P2 ... Spare parts
BFX**** ... P3 ... Spare parts
BFX****L ... P3 ... Spare parts
BFX****R ... P3 ... Spare parts
BH**** ... D27, F16, G45, M33, M41 ... Spare parts
... P2 ...
BH**** R/L ... D25, P2 ... Spare parts
BH***** ... E21, E22, P2 ... Spare parts
BH****T ... P2 ... Spare parts
BHA**** ... D23, D24, P2 ... Spare parts
BHE**** ... P2 ... Spare parts
BHF**** ... P2 ... Spare parts
BHF****B ... P2 ... Spare parts
BHF****L ... P2 ... Spare parts
BHF****R ... P2 ... Spare parts
BHF****S ... P2 ... Spare parts
BHF****T ... P2 ... Spare parts
BNB*** R/L ... M33 ... Boring bar
BNBB**R ... M32 ... Boring bar
BNBC ... M33 ... Spare parts
BNBP 2R***-*** * ... J49, M43 ... SUMIBORON Endmill
BNBW-* ... M33, P6 ... Spare parts
BNES**** ... J48, M42 ... SUMIBORON Endmill
BNGC R/L ... M36 ... Spare parts
BNGG R/L ****-TT ... M36 ... Tool holder
BNGS R/L TT ... M36 ... Spare parts
BNRS*** ... P5 ... Spare parts
BNTT**** R/L ... M36 ... SUMIBORON insert
BNZ***R ... M33 ... Boring bar
BSM**** ... J47 ... Solid endmill
BSME R/L *****D*S6 ... M30 ... Boring bar
BT**** ... M30, M31, M32, M37, P2 ... Spare parts
BT****K ... P2 ... Spare parts
BT*****T ... E24 ... Spare parts
BTD**** ... G42, G45, M38, M41, P3 ... Spare parts
BTD****T ... P3 ... Spare parts
BTR**** ... D30 ... Indexable insert
BTT**** ... D31, D32, P3 ... Spare parts
BW****F ... G9, G11, G12, G31, ... Spare parts
... H6, H7, H13, H15, P3 ...
BW****F-SD ... D35 ... Spare parts
BWS** ... F25, F27 ... Spare parts
BX**** ... D11, E11, F12, F13, F14, F15, ... Spare parts
... F17, F25, F27, G16, G42, K49 ...
... M36, M38, P3 ...
BX****T ... M35 ... Spare parts
BXBR*****R ... E24 ... Boring bar
BXBR*****R-NB ... E24 ... Boring bar
BXD*****IP ... K44, K49, P3 ... Spare parts
C***-SCLP R/L ** ... E15 ... Boring bar
C***-SSKP R/L ** ... E18 ... Boring bar
C***-STUB R/L ** ... E20 ... Boring bar
C***-STUP R/L ** ... E20 ... Boring bar
C***-SWUB R/L ** ... E23 ... Boring bar
CBC* ... D25 ... Spare parts
CBC**** ... D25 ... Spare parts
CBD4 R/L ... D25 ... Spare parts
CBS** ... D25 ... Spare parts
CCET******LFY/RFY ... C45 ... Indexable insert
CCET**T***LFY/RFY ... C45 ... Indexable insert
CCET**X***LFY/RFY ... C45 ... Indexable insert

Index

CCET**X****LFY/RFY ..... C45 ..... Indexable insert
CCGT******LFX/RFX ..... C46 ..... Indexable insert
CCGT*******LFX/RFX..... C46 ..... Indexable insert
CCGT**T***LFX/RFX ..... C46 ..... Indexable insert
CCGT******M NFC..... C46 ..... Indexable insert
CCGT******M NSC ..... C47 ..... Indexable insert
CCGT******M NSI..... C47 ..... Indexable insert
CCGT******NAG ..... C47 ..... Indexable insert
CCGT******N-FV NC2 ..... M2 ..... SUMIBORON insert
CCGT******N-FV NU2 ..... M3 ..... SUMIBORON insert
CCGT******N-LV NC2..... M2 ..... SUMIBORON insert
CCGT******N-LV NU2..... M3 ..... SUMIBORON insert
CCGT******NSC ..... C47 ..... Indexable insert
CCGW****** ..... M4 ..... SUMIBORON insert
CCGW******HS-NC2 ..... M2 ..... SUMIBORON insert
CCGW******HS-NU2 ..... M3 ..... SUMIBORON insert
CCGW******LF-NU2 ..... M3 ..... SUMIBORON insert
CCGW******LS-NC2..... M2 ..... SUMIBORON insert
CCGW******NC-2 ..... M2 ..... SUMIBORON insert
CCGW******NC-W2 ..... M2 ..... SUMIBORON insert
CCGW******NC-WG2 ..... M2 ..... SUMIBORON insert
CCGW******NC-WH2 ..... M2 ..... SUMIBORON insert
CCGW******NS..... M4 ..... SUMIBORON insert
CCGW******NU..... M4 ..... SUMIBORON insert
CCGW******NU-2 ..... M3 ..... SUMIBORON insert
CCGW******NU-WG2 ..... M3 ..... SUMIBORON insert
CCGW******NU-WH2 ..... M3 ..... SUMIBORON insert
CCH***..... G39, H9, H10, ... Spare parts
CCLN R/L ****-*** ..... D25 ..... Tool holder
CCM 8 LONG ..... D25, D26..... Spare parts
CCM 8 UL..... D25, F21 ..... Spare parts
CCM 8 UR ..... F21..... Spare parts
CCMT******..... M5 ..... SUMIDIA insert
CCMT******L/R-DM NU .... M5 ..... SUMIDIA insert
CCMT******NF ..... M5 ..... SUMIDIA insert
CCMT******NFB..... C48 ..... Indexable insert
CCMT******NFP..... C48 ..... Indexable insert
CCMT******N-GD NF..... M5 ..... SUMIDIA insert
CCMT******N-LD NF..... M5 ..... SUMIDIA insert
CCMT******NLB..... C48 ..... Indexable insert
CCMT******NLU..... C48 ..... Indexable insert
CCMT******NLU-W..... C48 ..... Indexable insert
CCMT******NMU..... C48 ..... Indexable insert
CCMT******NSK ..... C48 ..... Indexable insert
CCMT******NSU ..... C48 ..... Indexable insert
CCMW******..... C48 ..... Indexable insert
CCS**T*..... D43 ..... Spare parts
CGA R/L **** ***..... M35 ..... SUMIBORON insert
CNEQ******N ..... G34 ..... Indexable insert
CNGA******HS-NC2 ..... M6 ..... SUMIBORON insert
CNGA******HS-NU2 ..... M7 ..... SUMIBORON insert
CNGA******LF-NU2 ..... M7 ..... SUMIBORON insert
CNGA******LS-NC2..... M6 ..... SUMIBORON insert
CNGA******NC-4 ..... M6 ..... SUMIBORON insert
CNGA******NC-W4 ..... M6 ..... SUMIBORON insert
CNGA******NC-WG4 ..... M6 ..... SUMIBORON insert
CNGA******NC-WH4 ..... M6 ..... SUMIBORON insert
CNGA******NS-2..... M7 ..... SUMIBORON insert
CNGA******NU-2 ..... M7 ..... SUMIBORON insert
CNGA******NU-W2..... M7 ..... SUMIBORON insert
CNGA******NU-WG2 ..... M7 ..... SUMIBORON insert
CNGA******NU-WH2 ..... M7 ..... SUMIBORON insert
CNGG******N-FV NC4..... M6 ..... SUMIBORON Insert
CNGG******N-LV NC4 ..... M6 ..... SUMIBORON Insert
CNGG******N-SV NC4..... M6 ..... SUMIBORON Insert
CNGG******NSU..... C20 ..... Indexable insert
CNGM******N-LV NU2..... M7 ..... SUMIBORON Insert
CNGN******..... M8 ..... SUMIBORON Insert
CNGX******..... M8 ..... SUMIBORON Insert
CNMA******..... C20 ..... Indexable insert
CNMA******..... M8 ..... SUMIBORON Insert
CNMA******NS..... M8 ..... SUMIBORON IInsert
CNMA******NU ..... M8 ..... SUMIBORON Insert
CNMA******NU-W..... M8 ..... SUMIBORON Insert
CNMG******NEF ..... C16 ..... Indexable insert
CNMG******NEG ..... C17 ..... Indexable insert
CNMG******NEM ..... C17 ..... Indexable insert
CNMG******NEX..... C17 ..... Indexable insert
CNMG******NFA ..... C16 ..... Indexable insert
CNMG******NFL ..... C16 ..... Indexable insert
CNMG******NGE ..... C17 ..... Indexable insert
CNMG******NGU ..... C17 ..... Indexable insert
CNMG******NGU-W..... C17 ..... Indexable insert
CNMG******NGZ..... C18 ..... Indexable insert
CNMG******NLU..... C16 ..... Indexable insert
CNMG******NLU-W ..... C16 ..... Indexable insert
CNMG******NME ..... C18 ..... Indexable insert
CNMG******NMU ..... C18 ..... Indexable insert
CNMG******NMX ..... C18 ..... Indexable insert
CNMG******NSE..... C16 ..... Indexable insert
CNMG******NSE-W ..... C16 ..... Indexable insert
CNMG******NSU..... C16 ..... Indexable insert
CNMG******NSX..... C16 ..... Indexable insert
CNMG******NUG ..... C17 ..... Indexable insert
CNMG******NUP..... C17 ..... Indexable insert
CNMG******NUX..... C18 ..... Indexable insert
CNMG******NUZ..... C18 ..... Indexable insert
CNMM******NHG..... C19 ..... Indexable insert
CNMM******NHP ..... C19 ..... Indexable insert
CNMM******NHU ..... C19 ..... Indexable insert
CNMM******NHW ..... C19 ..... Indexable insert
CNMM******NMP..... C19 ..... Indexable insert
CNMQ******N..... G38 ..... Indexable insert
CNMU******N-G..... G38 ..... Indexable insert
CNMU******N-H..... G38 ..... Indexable insert
CNMX******NF..... M8 ..... SUMIDIA Insert
CNMX******L..... C20 ..... Indexable insert
CNMX******R..... C20 ..... Indexable insert
CNP*****RS..... G38 ..... Cutter
CNPF****RS ..... G38 ..... Cutter
CNS**** ..... D12, D41 ..... Spare parts
CNS****B..... E8..... Spare parts
CPB** ..... P6..... Spare parts
CPB**C..... P6..... Spare parts
CPB**S..... P6..... Spare parts
CPB**T ..... P6..... Spare parts
CPGT******NSD..... C49 ..... Indexable insert
CPM**N ..... D23, D24, P6 ..... Spare parts

Index

CPM**S ..... D24, P6 ..... Spare parts
CPMH******NSS ..... C49 ..... Indexable insert
CPMT******NFB ..... C50 ..... Indexable insert
CPMT******NLB ..... C50 ..... Indexable insert
CPMT******NLU ..... C50 ..... Indexable insert
CPMT******NLU-W ..... C50 ..... Indexable insert
CPMT******NMU ..... C50 ..... Indexable insert
CPMT******NSU ..... C50 ..... Indexable insert
CPMT******NUS ..... C50 ..... Indexable insert
CPMW******NF ..... M8 ..... SUMIDIA Insert
CPU***C ..... P6 ..... Spare parts
CPV**N ..... D38 ..... Spare parts
CPZ*** ..... P6 ..... Spare parts
CPZ***V ..... P6 ..... Spare parts
CR** ..... G39, H9, H10, ... Spare parts
CRDN N****-*** ..... D26 ..... Tool holder
CRSN R/L ****-*** ..... D26 ..... Tool holder
CSBN R/L ****-*** ..... D25 ..... Tool holder
CSKN R/L ****-*** ..... D25 ..... Tool holder
CTL******L ..... F22 ..... Indexable insert
CTL******N ..... F22 ..... Indexable insert
CTR******N ..... F22 ..... Indexable insert
CTR******R ..... F22 ..... Indexable insert
D***-DCLC R/L ****-** ..... E8 ..... Tool holder
D***-DDUN R/L ****-** ..... E9 ..... Tool holder
D***-DTFN R/L ****-** ..... E12 ..... Tool holder
D***-DWLN R/L ****-** ..... E13 ..... Tool holder
D***-SCLC R/L ****-** ..... E14 ..... Tool holder
D***-SDQC R/L ****-** ..... E17 ..... Tool holder
D***-SDUC R/L ****-** ..... E16 ..... Tool holder
D***-STUP R/L ****-** ..... E20 ..... Tool holder
D***-SVUB R/L ****-** ..... E21 ..... Tool holder
D***-SVZB R/L ****-** ..... E21 ..... Tool holder
DABB***B-R ..... M37 ..... Boring bar
DABB***C-R ..... M37 ..... Boring bar
DABB***N-R ..... M37 ..... Boring bar
DAL****H ..... K63, M44 ..... SUMIDIA Drill
DC R/L-* ..... D25 ..... Spare parts
DCGT******LFX/RFX ..... C51 ..... Indexable insert
DCGT*******LFX/RFX ..... C51 ..... Indexable insert
DCGT******LSD/RSD ..... C51 ..... Indexable insert
DCGT******M NFC ..... C51 ..... Indexable insert
DCGT******M NSC ..... C52 ..... Indexable insert
DCGT******M NSI ..... C52 ..... Indexable insert
DCGT******NAG ..... C51 ..... Indexable insert
DCGT******N-FV NC2 ..... M9 ..... SUMIBORON Insert
DCGT******N-FV NU2 ..... M10 ..... SUMIBORON Insert
DCGT******N-LV NC2 ..... M9 ..... SUMIBORON Insert
DCGT******N-LV NU2 ..... M10 ..... SUMIBORON Insert
DCGT******NSC ..... C52 ..... Indexable insert
DCGW******HS-NC2 ..... M9 ..... SUMIBORON insert
DCGW******HS-NU2 ..... M10 ..... SUMIBORON insert
DCGW******LF-NU2 ..... M10 ..... SUMIBORON insert
DCGW******LS-NC2 ..... M9 ..... SUMIBORON insert
DCGW******NC-2 ..... M9 ..... SUMIBORON Insert
DCGW******NC-WG2 ..... M9 ..... SUMIBORON Insert
DCGW******NC-WH2 ..... M9 ..... SUMIBORON Insert
DCGW******NS ..... M10 ..... SUMIBORON Insert
DCGW******NU ..... M10 ..... SUMIBORON Insert
DCGW******NU-2 ..... M10 ..... SUMIBORON Insert
DCGW******NU-WG2 ..... M10 ..... SUMIBORON Insert
DCGW******NU-WH2 ..... M10 ..... SUMIBORON Insert
DCLN R/L ****-*** ..... D12 ..... Tool holder
DCMT****** ..... M11 ..... SUMIDIA Insert
DCMT******L/R-DM NU ..... M11 ..... SUMIDIA Insert
DCMT******NF ..... M11 ..... SUMIDIA Insert
DCMT******NFB ..... C53 ..... Indexable insert
DCMT******NFP ..... C53 ..... Indexable insert
DCMT******N-GD NF ..... M11 ..... SUMIDIA Insert
DCMT******N-LD NF ..... M11 ..... SUMIDIA Insert
DCMT******NLB ..... C53 ..... Indexable insert
DCMT******NLU ..... C53 ..... Indexable insert
DCMT******NMU ..... C53 ..... Indexable insert
DCMT******NSK ..... C53 ..... Indexable insert
DCMT******NSU ..... C53 ..... Indexable insert
DCMW****** ..... C53 ..... Indexable insert
DCS**T* ..... D43 ..... Spare parts
DDHN R/L ****-*** ..... D13 ..... Tool holder
DDJN R/L ****-*** ..... D13 ..... Tool holder
DDL***V ..... K63, M44 ..... SUMIDIA Drill
DDNN N ****-*** ..... D13 ..... Tool holder
DFC*****E ..... H13 ..... Cutter
DFC*****E** ..... H13 ..... Cutter
DFCF*****E ..... H13 ..... Cutter
DFCM*****E ..... H13 ..... Cutter
DFC*****RS ..... G26 ..... Cutter
DFCF*****RS ..... G26 ..... Cutter
DFCM*****RS ..... G26 ..... Cutter
DGC*****EW ..... H6 ..... Indexable endmill
DGC*****RS ..... G8 ..... Cutter
DGCF*****RS ..... G8 ..... Cutter
DGCM*****RS ..... G8 ..... Cutter
DGCS**R ..... G9, H6 ..... Spare parts
DML***V ..... K63, M45 ..... SUMIDIA Drill
DNGA****** ..... C26 ..... Indexable insert
DNGA******HS-NC2 ..... M12 ..... SUMIBORON insert
DNGA******LS-NC2 ..... M12 ..... SUMIBORON insert
DNGA******NC-2 ..... M12 ..... SUMIBORON Insert
DNGA******NC-4 ..... M12 ..... SUMIBORON Insert
DNGA******NC-WG4 ..... M12 ..... SUMIBORON Insert
DNGA******NC-WH4 ..... M12 ..... SUMIBORON Insert
DNGA******NU-2 ..... M13 ..... SUMIBORON Insert
DNGA******NU-WG2 ..... M13 ..... SUMIBORON Insert
DNGA******NU-WH2 ..... M13 ..... SUMIBORON Insert
DNGG******LUM/RUM ..... C26 ..... Indexable insert
DNGG******N-FV NC4 ..... M12 ..... SUMIBORON Insert
DNGG******N-LV NC4 ..... M12 ..... SUMIBORON Insert
DNGG******NSU ..... C26 ..... Indexable insert
DNGG******N-SV NC4 ..... M12 ..... SUMIBORON Insert
DNGM******N-LV NU2 ..... M13 ..... SUMIBORON Insert
DNMA****** ..... C25 ..... Indexable insert
DNMA****** ..... M14 ..... SUMIBORON Insert
DNMA******NS ..... M14 ..... SUMIBORON Insert
DNMA******NU ..... M14 ..... SUMIBORON Insert
DNMG******LHM/RHM ..... C23 ..... Indexable insert
DNMG******LUM/RUM ..... C22 ..... Indexable insert
DNMG******NEF ..... C21 ..... Indexable insert
DNMG******NEG ..... C22 ..... Indexable insert

Index

DNMG******NEM ..... C23 ..... Indexable insert
DNMG******NEX ..... C22 ..... Indexable insert
DNMG******NFA ..... C21 ..... Indexable insert
DNMG******NFL ..... C21 ..... Indexable insert
DNMG******NGE ..... C22 ..... Indexable insert
DNMG******NGU ..... C22 ..... Indexable insert
DNMG******NGZ ..... C23 ..... Indexable insert
DNMG******NLU ..... C21 ..... Indexable insert
DNMG******NME ..... C23 ..... Indexable insert
DNMG******NMU ..... C23 ..... Indexable insert
DNMG******NMX ..... C23 ..... Indexable insert
DNMG******NSE ..... C21 ..... Indexable insert
DNMG******NSU ..... C21 ..... Indexable insert
DNMG******NSX ..... C21 ..... Indexable insert
DNMG******NUG ..... C22 ..... Indexable insert
DNMG******NUP ..... C22 ..... Indexable insert
DNMG******NUX ..... C23 ..... Indexable insert
DNMG******NUZ ..... C23 ..... Indexable insert
DNMM******NHG ..... C24 ..... Indexable insert
DNMM******NHP ..... C24 ..... Indexable insert
DNMM******NMP ..... C24 ..... Indexable insert
DNMX******L/R ..... C25 ..... Indexable insert
DNMX******NSE-W ..... C25 ..... Indexable insert
DNS**** ..... D13, D41 ..... Spare parts
DNS****B ..... E9 ..... Spare parts
DNX***** RS ..... G16 ..... Cutter
DNXF***** RS ..... G16 ..... Cutter
DNXK**R ..... G16 ..... Spare parts
DSBN R/L ****-*** ..... D14 ..... Tool holder
DSDN N ****-*** ..... D14 ..... Tool holder
DSLX* ..... D27 ..... Spare parts
DSP* ..... D25 ..... Spare parts
DTFN R/L ****-*** ..... D15 ..... Tool holder
DTGN R/L ****-*** ..... D15 ..... Tool holder
DTJN R/L ****-*** ..... D15 ..... Tool holder
DTR**C R/L ****-*** ..... D11 ..... Tool holder
DTR**Q R/L ****-*** ..... D11 ..... Tool holder
DVJN R/L ****-*** ..... D16 ..... Tool holder
DVQN R/L ****-*** ..... D16 ..... Tool holder
DVVN N ****-*** ..... D16 ..... Tool holder
DWLN R/L ****-*** ..... D17 ..... Tool holder
ECXA***X**LE NU* ..... M31 ..... SUMIBORON Insert
ECXA***X**LF NU* ..... M31 ..... SUMIBORON Insert
E**D*SEXCR/L**-**P ..... M31 ..... Boring bar
EHBX**** ..... P3 ..... Spare parts
EHHM****ZX ..... J34 ..... Solid endmill
ELSM**** ..... J45 ..... Solid endmill
ER** ..... D23, D24 ..... Spare parts
ESS** ..... P5 ..... Spare parts
EST** ..... P5 ..... Spare parts
FBH**** ..... P3 ..... Spare parts
FBU ..... P2 ..... Spare parts
FBUP*-A*-* ..... G42, M33, M38, P2, P3 ..... Spare parts
FBUP*-V*-* ..... P3 ..... Spare parts
FBX**** ..... P3 ..... Spare parts
FMJ ..... M36 ..... Spare parts
FMU****R-S ..... G45, M41 ..... Cutter
FMUE ..... G45, M41 ..... Spare parts
FMUJ ..... G45, M41, P3 ..... Spare parts
FMUU ..... G45, M41 ..... Spare parts
GCM N**** MG ..... F18 ..... Indexable insert
GCM N**** ML ..... F18 ..... Indexable insert
GCM N**** GG ..... F18 ..... Indexable insert
GCM N**** GL ..... F18 ..... Indexable insert
GCM N**** GF ..... F18 ..... Indexable insert
GCM N**** RG ..... F18 ..... Indexable insert
GCM R/L**** CG** ..... F18 ..... Indexable insert
GLB****SF ..... J37 ..... Solid endmill
GLM****SF ..... J25 ..... Solid endmill
GLM****SF-R** ..... J25 ..... Solid endmill
GNDM R/L ****JX*** ..... F12 ..... Tool holder
GNDM R/L ****K*** ..... F14 ..... Tool holder
GNDM R/L ****M*** ..... F14 ..... Tool holder
GNDM R/L ****P*** ..... F14 ..... Tool holder
GNDMS R/L****K*** ..... F14 ..... Tool holder
GNDMS R/L****M*** ..... F14 ..... Tool holder
GNDL R/L ****JX*** ..... F12 ..... Tool holder
GNDL R/L ****K*** ..... F15 ..... Tool holder
GNDL R/L ****M*** ..... F15 ..... Tool holder
GNDL R/L ****P*** ..... F15 ..... Tool holder
GNDLS R/L ****K*** ..... F15 ..... Tool holder
GNDLS R/L ****M*** ..... F15 ..... Tool holder
GNDF R/L ****K***-*** ..... F17 ..... Tool holder
GNDF R/L ****M***-*** ..... F17 ..... Tool holder
GNDI R/L ****T*** ..... F16 ..... Tool holder
GNDS R/L ****K*** ..... F13 ..... Tool holder
GNDS R/L ****M*** ..... F13 ..... Tool holder
GSP* ..... M36 ..... Spare parts
GSP** ..... D27, M35 ..... Spare parts
GSH****SF ..... J26 ..... Solid endmill
GSRE****SF ..... J27 ..... Solid endmill
GSX*****C-***D ..... J7, J12, J15 ..... Solid endmill
GSX*****C-*D ..... J9, J10, J11, J13, J17 ..... Solid endmill
..... J18, J19 .....
GSX*****S-*D ..... J8, J16 ..... Solid endmill
GSXB***** ..... J36 ..... Solid endmill
GSXSLT*****C-***D ..... J14 ..... Solid endmill
GSXVL****-***D ..... J20 ..... Solid endmill
GSXVL****S-R**-***D ..... J21 ..... Solid endmill
GSXVL****-R**-***D ..... J21 ..... Solid endmill
GSXVL****S-***D ..... J20 ..... Solid endmill
GWB R/L ****-*** ..... M35 ..... Tool holder
GWC R/L ****-** ..... F21 ..... Tool holder
GWCI R/L *** ..... F21 ..... Tool holder
GWCS R/L ****-** ..... F21 ..... Tool holder
HBB*** ..... M32, M37 ..... Tool holder
HBB**** ..... M37 ..... Tool holder
HBSM**** ..... M30, M31 ..... Boring bar
HD*** ..... K49 ..... Spare parts
HE******E ..... E13 ..... Spare parts
HE******P ..... E13 ..... Spare parts
HE******W ..... E13 ..... Spare parts
HSM**** ..... J46 ..... Solid endmill
HSM****ZX ..... J35 ..... Solid endmill
KDS***DAK ..... K40, K41 ..... Multi-Drill
KDS***FA ..... K42 ..... Multi-Drill
KDS***LAK ..... K38, K39 ..... Multi-Drill
KDS***MAK ..... K36, K37 ..... Multi-Drill

Index

KGBS**** D43, D44, D45 Spare parts
KSS**** D43, D44, D45 Spare parts
KY** P7 Spare parts
LCL* P4 Spare parts
LCL** D31, D32, D34, P4 Spare parts
LCL*C-SD E8, E10, P4 Spare parts
LCL*D-SD D19, E9, P4 Spare parts
LCL*DB-SD E9, P4 Spare parts
LCL*S D34, P4 Spare parts
LCL*-SD D18, D20, D21, D22, D24 Spare parts
E8, E10, E12, F32, P4
LCL*T-SD E8, E10, E12, P4 Spare parts
LCS* D34, P3 Spare parts
LCS** D34, P3 Spare parts
LCS**B-SD P3 Spare parts
LCS**BS-SD D18, D20, D21, D22, E8 Spare parts
E10, E12, P3
LCS**SD P3 Spare parts
LCS*B-SD D18, D20, D21, E8, E10 Spare parts
E12, P3
LCS*CA D18, P3 Spare parts
LCS*DB-SD D19, E9, P3 Spare parts
LCS*T-SD P3 Spare parts
LCS*TB-SD D18, D19, D20, D22, D24 Spare parts
E12, P3
LCS*TE F32, P3 Spare parts
LH*** D12, D13, D14, D15, D16, Spare parts
D17, D18, D19, D20, D21, D22,
D23, D24, D25, D27, D34, D35,
D38, D41, D42, E8, E9
E10, E12, E13, E21, E22
F12, F13, F14, F15, F16, F17
F25, F27, F32, G9, G11, G12, G16
G31, G45, H6, H7
H15, M36, M41, P7
LH***K D43, D44, D45 Spare parts
LHHM****ZX J34 Solid endmill
LNMX******PNSN-H G37 Indexable insert
LNMX******PNSN-G G37 Indexable insert
LNMX******PNSR-L G33 Indexable insert
LNMX******PNSR-G G33 Indexable insert
LNMX******PNSR-R G33 Indexable insert
LP** D31, D32 Spare parts
LSC*** P4 Spare parts
LSC**CA P5 Spare parts
LSC**SD D18, E8, P4 Spare parts
LSD**SD D19, E9, P4 Spare parts
LSM**** J44 Solid endmill
LSM****ZX J33 Solid endmill
LSP*D D34 Spare parts
LSP* P6 Spare parts
LSP** D34, P6 Spare parts
LSP*SD D18, D19, D20, D21, D22, D24 Spare parts
E8, E9, E10, E12, F32
P6
LSR** D34, P4 Spare parts
LSR*** D34, P4 Spare parts
LSS** P4 Spare parts
LSS**CA P5 Spare parts
LSS**SD D20, D21, E10, P4 Spare parts
LST**SD D22, E12, P4 Spare parts
LST***SD D22, E12, P4 Spare parts
LST**CA P4 Spare parts
LST***CA P4 Spare parts
LST**SD E12 Spare parts
LSTE**-* F32, P5 Spare parts
LSW*** D24 Spare parts
LT** D25, D26, F21, P7 Spare parts
LT**-** F12, P7 Spare parts
LT**IP D35, P7 Spare parts
LT**K D43, D44, D45 Spare parts
LTER**** F32 Tool holder
MA**M**L***C H5 Tool holder
MA**M**L***S H5 Tool holder
MDS***MG K22, K23 Multi-Drill
MDS***MK K22, K23 Multi-Drill
MDS***MKHAK K19 Multi-Drill
MDS*****SDC* K33 Multi-Drill
MDS***SG K20, K21 Multi-Drill
MDS***SK K20, K21 Multi-Drill
MDS***SKHAK K18 Multi-Drill
MDSS**** K32 Multi-Drill
MDUS****-**C K32 Multi-Drill
MDW****GS* K14, K15 Multi-Drill
MDW****HGS* K16, K17 Multi-Drill
MDW****NHGS K28, K29 Multi-Drill
MDW****PHT K27 Multi-Drill
MDW***XHT-A**HAK K27 Multi-Drill
MDW***XHT-S**HAK K26 Multi-Drill
MIB*-* M31 Spare parts
MLDH****L** K31 Multi-Drill
MLDH****P K31 Multi-Drill
MMW** D23 Spare parts
MP*** D23, D24, P6 Spare parts
MSX*****EM H9 Indexable endmill
MSX*****EM** H9 Indexable endmill
MSX*****ES H9 Indexable endmill
MSX*****ES** H9 Indexable endmill
MSX*****EW H9 Indexable endmill
MSX*****M**Z* H10 Indexable endmill
MSX*****RS G39 Cutter
MTJN R/L ****-** D23 Tool holder
MTJN R/L V-** D23 Tool holder
MTXN R/L ****-** D23 Tool holder
MWLN R/L ****-*** D24 Tool holder
MWW** D24 Spare parts
ONEU****ANER L G9, H6 Indexable insert
ONEU****ANER G G9, H6 Indexable insert
ONMU****ANER L G9, H6 Indexable insert
ONMU****ANER G G9, H6 Indexable insert
P* G41, M41 Spare parts
P**** P6 Spare parts
P***U P6 Spare parts
P***US P6 Spare parts
P***W P6 Spare parts
P***WS P6 Spare parts
PCBN R/L ****-*** D18 Tool holder
PCLC R/L ****-*** D31 Tool holder

Index

PCLN R/L ****-*** ..... D18 ..... Tool holder
PCT***D*S** ..... K60, K61 ..... Multi-Drill
PDJC R/L ****-*** ..... D32 ..... Tool holder
PDJN R/L ****-*** ..... D19 ..... Tool holder
PDL***D*S** ..... K60, K61 ..... Multi-Drill
PRDC N****-*** ..... D34 ..... Tool holder
PRGC R/L ****-*** ..... D34 ..... Tool holder
PSBN R/L ****-*** ..... D20 ..... Tool holder
PSDN N ****-*** ..... D20 ..... Tool holder
PSKN R/L ****-*** ..... D21 ..... Tool holder
PSSN R/L ****-*** ..... D21 ..... Tool holder
PTFN R/L ****-*** ..... D22 ..... Tool holder
PTGN R/L ****-*** ..... D22 ..... Tool holder
PTTN R/L ****-*** ..... D22 ..... Tool holder
PWC**** R/L-S ..... G36 ..... Cutter
PWCF**** R/L-S ..... G36 ..... Cutter
PWLN R/L ****-*** ..... D24 ..... Tool holder
PWS**** RS ..... G34 ..... Cutter
PWSF**** RS ..... G34 ..... Cutter
PWSS*R ..... G34 ..... Spare parts
QPET******PPFR-S ..... G18, H34, H35 ..... Indexable insert
QPMT******PPEN ..... G18, H34, H35 ..... Indexable insert
QPMT******PPEN-CP ..... G18 ..... Indexable insert
QPMT******PPEN-H ..... G18, H34, H35 ..... Indexable insert
QPMT******PPER-R ..... G18 ..... Indexable insert
RCMT****M0 NRX ..... C54 ..... Indexable insert
RCMX****M0 NRP ..... C54 ..... Indexable insert
RDET**T*M0EN-G ..... G23, H36, H37 ..... Indexable insert
RDET**T*M0EN-H ..... G23, H36, H37 ..... Indexable insert
RDET****M0EN-G ..... G23 ..... Indexable insert
RDET****M0EN-H ..... G23 ..... Indexable insert
RF-SET ..... G41, G42, M38, M41 ..... Spare parts
RF****R-S ..... G42, M38 ..... Cutter
RFB ..... G42, M38 ..... SUMIDIA insert
RFBW ..... G42, M38 ..... SUMIDIA insert
RFC ..... G42, M38 ..... Spare parts
RFD ..... G42, M38 ..... Spare parts
RFF ..... G42, M38 ..... Spare parts
RFJ ..... G42, M38, P3 ..... Spare parts
RFR ..... G42, M38 ..... Spare parts
RFS ..... G42, M38 ..... Spare parts
RNGN****** ..... M14 ..... SUMIBORON Insert
RNGN******B ..... M14 ..... SUMIBORON Insert
RSX*****ES ..... G20, H36 ..... Indexable endmill
RSXF*****ES ..... G20, H36 ..... Indexable endmill
RSX*****M ..... G20, H37 ..... Indexable endmill
RSXF*****M ..... G20, H37 ..... Indexable endmill
RSX*****RS ..... G20, G22 ..... Cutter
RSXF*****RS ..... G20, G22 ..... Cutter
S***-DTR**C-R/L-** ..... E11 ..... Boring bar
S***-MWLN R/L ** ..... E13 ..... Boring bar
S***-PCLN R/L ** ..... E8 ..... Boring bar
S***-PDUN R/L ** ..... E9 ..... Boring bar
S***-PSKN R/L ** ..... E10 ..... Boring bar
S***-PTFN R/L ** ..... E12 ..... Boring bar
S***-SCLC R/L ** ..... E14 ..... Boring bar
S***-SCLP R/L ** ..... E15 ..... Boring bar
S***-SDQC R/L ** ..... E17 ..... Boring bar
S***-SDUC R/L ** ..... E16 ..... Boring bar
S***-SSKP R/L ** ..... E18 ..... Boring bar
S***-STFC R/L ** ..... E19 ..... Boring bar
S***-STUB R/L **-** ..... E20 ..... Boring bar
S***-STUP R/L ** ..... E20 ..... Boring bar
S***-STUP R/L **-** ..... E20 ..... Boring bar
S***-SVQB R/L ** ..... E22 ..... Boring bar
S***-SVUB R/L ** ..... E22 ..... Boring bar
S***-SVZB R/L ** ..... E22 ..... Boring bar
S***-SWUB R/L ** ..... E23 ..... Boring bar
S-SP*-** ..... D11, E11 ..... Spare parts
S-UF*S R/L ..... G14 ..... Spare parts
SBN**-** ..... F25, F27 ..... Tool holder
SBT**R**** ..... D30 ..... Tool holder
SBU**-** ..... F25, F27 ..... Tool holder
SCA** ..... H38 ..... Tool holder
SCAC R/L ****-*** ..... D31 ..... Tool holder
SCGT******M NSC ..... C55 ..... Indexable insert
SCGW******NU ..... M14 ..... SUMIBORON Insert
SCLC R/L ****-*** ..... D31 ..... Tool holder
SCMT******NFB ..... C55 ..... Indexable insert
SCMT******NFP ..... C55 ..... Indexable insert
SCMT******NLU ..... C55 ..... Indexable insert
SCMT******NMU ..... C55 ..... Indexable insert
SCMT******NSK ..... C55 ..... Indexable insert
SCMT******NSU ..... C55 ..... Indexable insert
SCN*** ..... P5 ..... Spare parts
SCN**** ..... D25 ..... Spare parts
SCND*** ..... D25, D27, P5 ..... Spare parts
SCP*** ..... H38 ..... Indexable endmill
SCP-* ..... D12, D13, D14, D15, D16, D17, D41, D42, E8, E9, E12, E13 ..... Spare parts
SCS**** ..... D43 ..... Spare parts
SCT L **** ..... F22 ..... Tool holder
SCT R **** ..... F22 ..... Tool holder
SCW*** ..... P5 ..... Spare parts
SDAC R/L ****-*** ..... D33 ..... Tool holder
SDBSM ..... M31 ..... Spare parts
SDET****ZDFR ..... G42, M38 ..... Indexable insert
SDHC R/L ****-*** ..... D32 ..... Tool holder
SDJC R/L ****-*** ..... D32 ..... Tool holder
SDMA****** ..... H38 ..... Indexable insert
SDMA******T ..... H38 ..... Indexable insert
SDNC N ****-*** ..... D33 ..... Tool holder
SDND*** ..... P5 ..... Spare parts
SDP****U*HAK ..... K9, K10, K11 ..... Multi-Drill
SDW*** ..... P5 ..... Spare parts
SECW****AGTN-N-NF ..... G13 ..... Indexable insert
SEET****AGFN-L ..... G13, H7 ..... Indexable insert
SEET****AGFR-L ..... G11 ..... Indexable insert
SEET****AGSN-G ..... G13 ..... Indexable insert
SEET****AGSN-N ..... G13 ..... Indexable insert
SEET****AGSR-L ..... G11, H7 ..... Indexable insert
SEET****AGSR-G ..... G11, H7 ..... Indexable insert
SEND*** ..... P5 ..... Spare parts
SEMT****AGSN-G ..... G13 ..... Indexable insert
SEMT****AGSN-H ..... G13 ..... Indexable insert
SEMT****AGSN-L ..... G13 ..... Indexable insert
SEMT****AGSR-L ..... G11, H7 ..... Indexable insert
SEMT****AGSR-G ..... G11, H7 ..... Indexable insert

Index

SEMT****AGSR-H ..... G11, H7 ..... Indexable insert
SEMT****AGSR-FG ..... G11, H7 ..... Indexable insert
SFKN****AZFN ..... G15 ..... Indexable insert
SFKN****AZTN ..... G15 ..... Indexable insert
SFKR****AZTN ..... G15 ..... Indexable insert
SFW*** ..... P5 ..... Spare parts
SL-* ..... F27, F28 ..... Spare parts
SMD ..... K43, K48 ..... Multi-Drill
SMDH***M* ..... K44 ..... Multi-Drill
SMDT****MTL ..... K49 ..... Indexable insert
SMDT****D MEL ..... K46 ..... Indexable insert
SMDT****D MTL ..... K45 ..... Indexable insert
SNB****DL ..... J40 ..... Solid endmill
SNB****ZX ..... J39 ..... Solid endmill
SNEU****ANER-FG ..... G9, H6 ..... Indexable insert
SNEU****ANER-FL ..... G9, H6 ..... Indexable insert
SNEU****ANER-G ..... G9, H6 ..... Indexable insert
SNEU****ANER-L ..... G9, H6 ..... Indexable insert
SNEW****ADFR-NF ..... G42, M38 ..... SUMIDIA insert
SNEW****ADFR-W-NF ..... G42, M38 ..... SUMIDIA Insert
SNEW****ADTR-NF ..... G43, M39 ..... SUMIDIA insert
SNEW****ADTR-R-NF ..... G43, M39 ..... SUMIDIA insert
SNEW****ADTR-U-NF ..... G43, M39 ..... SUMIDIA insert
SNEW****ADT L/R ..... G45, M41 ..... SUMIBORON Insert
SNEW****ADT L/R-S ..... G45, M41 ..... SUMIBORON Insert
SNGA****** ..... C31 ..... Indexable insert
SNGA******HS-NC2 ..... M15 ..... SUMIBORON insert
SNGA******HS-NC4 ..... M15 ..... SUMIBORON insert
SNGA******NC-4 ..... M15 ..... SUMIBORON Insert
SNGG******LST/RST ..... C31 ..... Indexable insert
SNGG******LUM/RUM ..... C31 ..... Indexable insert
SNGN****** ..... C31 ..... Indexable insert
SNGN****** ..... M15 ..... SUMIBORON Insert
SNGX****** ..... M15 ..... SUMIBORON Insert
SNMA****** ..... C31 ..... Indexable insert
SNMA******NS ..... M16 ..... SUMIBORON Insert
SNMA******NU ..... M16 ..... SUMIBORON Insert
SNMG******LUM/RUM ..... C28 ..... Indexable insert
SNMG******LHM/RHM ..... C29 ..... Indexable insert
SNMG******NEG ..... C28 ..... Indexable insert
SNMG******NEM ..... C29 ..... Indexable insert
SNMG******NEX ..... C28 ..... Indexable insert
SNMG******NFL ..... C27 ..... Indexable insert
SNMG******NGE ..... C28 ..... Indexable insert
SNMG******NGU ..... C28 ..... Indexable insert
SNMG******NGZ ..... C29 ..... Indexable insert
SNMG******NLU ..... C27 ..... Indexable insert
SNMG******NME ..... C29 ..... Indexable insert
SNMG******NMU ..... C29 ..... Indexable insert
SNMG******NMX ..... C29 ..... Indexable insert
SNMG******NSE ..... C27 ..... Indexable insert
SNMG******NSJ ..... C27 ..... Indexable insert
SNMG******NSU ..... C27 ..... Indexable insert
SNMG******NSX ..... C27 ..... Indexable insert
SNMG******NUG ..... C28 ..... Indexable insert
SNMG******NUP ..... C28 ..... Indexable insert
SNMG******NUX ..... C28 ..... Indexable insert
SNMG******NUZ ..... C29 ..... Indexable insert
SNMN****** ..... C31 ..... Indexable insert
SNMM******NHG ..... C30 ..... Indexable insert
SNMM******NHP ..... C30 ..... Indexable insert
SNMM******NHU ..... C30 ..... Indexable insert
SNMM******NHW ..... C30 ..... Indexable insert
SNMM******NMP ..... C30 ..... Indexable insert
SNMT****ZNEN-G ..... G17 ..... Indexable insert
SNMT****ZNEN-H ..... G17 ..... Indexable insert
SNMT****ZNEN-SH ..... G17 ..... Indexable insert
SNMU****ANER FG ..... G9, H6 ..... Indexable insert
SNMU****ANER FL ..... G9, H6 ..... Indexable insert
SNMU****ANER G ..... G9, H6 ..... Indexable insert
SNMU****ANER H ..... G9, H6 ..... Indexable insert
SNMU****ANER L ..... G9, H6 ..... Indexable insert
SNS**** ..... D14, D41 ..... Spare parts
SOET******PDFR-S ..... G28, G31, H15 ..... Indexable insert
SOET******PZER-G ..... G28, G30, H14 ..... Indexable insert
SOET******PZFR-S ..... G28, G30, H14 ..... Indexable insert
SOMT******PDER-L ..... G28, G31, H15 ..... Indexable insert
SOMT******PDER-G ..... G28, G31, H15 ..... Indexable insert
SOMT******PDER-H ..... G28, G31, H15 ..... Indexable insert
SOMT******PZER-L ..... G28, G30, H14 ..... Indexable insert
SOMT******PZER-G ..... G28, G30, H14 ..... Indexable insert
SOMT******PZER-H ..... G28, G30, H14 ..... Indexable insert
SPGN******T ..... C57 ..... Indexable insert
SPGT******LSD/RSD ..... C56 ..... Indexable insert
SPGW******T ..... C56 ..... Indexable insert
SPMA****** ..... H38 ..... Indexable insert
SPMA******T ..... H38 ..... Indexable insert
SPMR******NFK ..... C57 ..... Indexable insert
SPMR******NSF ..... C57 ..... Indexable insert
SPMT****** ..... H31 ..... Indexable insert
SPMT******NFB ..... C56 ..... Indexable insert
SPMT******NFK ..... C56 ..... Indexable insert
SPMT******NLU ..... C56 ..... Indexable insert
SPMT******NSF ..... C56 ..... Indexable insert
SPP* ..... D25, D26, D27, P6 ..... Spare parts
SPP*** ..... P6 ..... Spare parts
SRDC N ****-*** ..... D35 ..... Tool holder
SRF**R-ST ..... G43, M39 ..... Cutter
SRF**RS ..... G43, M39 ..... Cutter
SRFJ ..... G43, M39, P3 ..... Spare parts
SRND** ..... D26, P5 ..... Spare parts
SRNS***SD ..... D35 ..... Spare parts
SRPH*** ..... P5 ..... Spare parts
SRSC R/L ****-*** ..... D35 ..... Tool holder
SSBC R/L ****-*** ..... D36 ..... Tool holder
SSEH****-R** ..... J41 ..... Solid endmill
SSEH****W-R** ..... J24 ..... Solid endmill
SSEH****WS-R** ..... J24 ..... Solid endmill
SSEHVL****-R** ..... J41 ..... Solid endmill
SSEHVL****W-R** ..... J23 ..... Solid endmill
SSEHVL****WS-R** ..... J23 ..... Solid endmill
SSM**** ..... J42, J43 ..... Solid endmill
SSM****ZX ..... J32 ..... Solid endmill
SSN**** ..... D25 ..... Spare parts
SSND*** ..... D25, D27 ..... Spare parts
SSPD*** ..... P5 ..... Spare parts
SSUP****ZX ..... J29 ..... Solid endmill
SSUP****ZX-R** ..... J29 ..... Solid endmill

Index

SSW*** P5 Spare parts
STAC R/L ****-*** D37 Tool holder
STER**** F32 Tool holder
STFH**-* F24 Tool holder
STFS R/L ****-* F24 Tool holder
STGC R/L ****-*** D37 Tool holder
STIR*** F33 Tool holder
STND*** P4 Spare parts
STPD*** P5 Spare parts
STPL** P5 Spare parts
STW*** D23, P5 Spare parts
SUF*S R/L G14 Spare parts
SVJB R/L ****-*** D38 Tool holder
SVLC R/L ****-*** D39 Tool holder
SVP** D38, E21, E22 Spare parts
SVPB R/L ****-*** D38 Tool holder
SVPC R/L ****-*** D39 Tool holder
SVVB N ****-*** D38 Tool holder
SVW*** P5 Spare parts
SWW*** D24, P5 Spare parts
TBGN****** C64 Indexable insert
TBGN******B M16 SUMIBORON Insert
TBGN******NF M16 SUMIDIA Insert
TBGR******LW C64 Indexable insert
TBGT******LFW/RFW C58 Indexable insert
TBGT******LFX/RFX C58 Indexable insert
TBGT******LFY/RFY C58 Indexable insert
TBGT******LW/RW C58 Indexable insert
TBGW****** C58 Indexable insert
TBGW******NF M16 SUMIDIA Insert
TCGT******M NSC C59 Indexable insert
TCGT******M NSI C59 Indexable insert
TCGT******NAG C59 Indexable insert
TCGT******NSC C46 Indexable insert
TCGW******NC M17 SUMIBORON Insert
TCGW******NC-3 M17 SUMIBORON Insert
TCGW******NU M17 SUMIBORON Insert
TCMT******NF M17 SUMIDIA Insert
TCMT******NFB C60 Indexable insert
TCMT******NFP C60 Indexable insert
TCMT******NLU C60 Indexable insert
TCMT******NSK C60 Indexable insert
TCMT******NSU C60 Indexable insert
TCMW****** C60 Indexable insert
TCS**T* D44 Spare parts
TEGN****** C65 Indexable insert
TGA R/L ****BF F20 Indexable insert
TF** M35 Spare parts
TH*** D31, D32, G42, G43, G45 Spare parts
M30, M31, M32, M33, M37
M38, M39, M41, P7
TME****R F32 Indexable Insert
TME***R F32 Indexable Insert
TMI****R F33 Indexable Insert
TMI***R F33 Indexable Insert
TNGA****** C38 Indexable insert
TNGA******HS-NC3 M18 SUMIBORON insert
TNGA******HS-NU3 M18 SUMIBORON insert
TNGA******LS-NC3 M18 SUMIBORON insert
TNGA******LF-NU3 M18 SUMIBORON insert
TNGA******NC-6 M18 SUMIBORON Insert
TNGA******NU-3 M18 SUMIBORON Insert
TNGG******LFT/RFT C37 Indexable insert
TNGG******LFY/RFY C37 Indexable insert
TNGG******LFX/RFX C37 Indexable insert
TNGG******LST/RST C37 Indexable insert
TNGG******LUM/RUM C37 Indexable insert
TNGG******N-FV NC6 M18 SUMIBORON Insert
TNGG******N-LV NC6 M18 SUMIBORON Insert
TNGG******NSU C37 Indexable insert
TNGG******N-SV NC6 M18 SUMIBORON Insert
TNGM******N-LV NU3 M18 SUMIBORON Insert
TNMA****** C36 Indexable insert
TNMA****** M19 SUMIBORON Insert
TNMA******NU M19 SUMIBORON Insert
TNMG******LHM/RHM C34 Indexable insert
TNMG******LUM/RUM C33 Indexable insert
TNMG******NEF C32 Indexable insert
TNMG******NEG C33 Indexable insert
TNMG******NEM C34 Indexable insert
TNMG******NEX C33 Indexable insert
TNMG******NFA C32 Indexable insert
TNMG******NFL C32 Indexable insert
TNMG******NGE C33 Indexable insert
TNMG******NGU C33 Indexable insert
TNMG******NGZ C34 Indexable insert
TNMG******NLU C32 Indexable insert
TNMG******NME C34 Indexable insert
TNMG******NMU C34 Indexable insert
TNMG******NMX C34 Indexable insert
TNMG******NSE C32 Indexable insert
TNMG******NSU C32 Indexable insert
TNMG******NSX C32 Indexable insert
TNMG******NUG C33 Indexable insert
TNMG******NUP C33 Indexable insert
TNMG******NUX C33 Indexable insert
TNMG******NUZ C34 Indexable insert
TNMM******NHG C35 Indexable insert
TNMM******NHP C35 Indexable insert
TNMM******NMP C35 Indexable insert
TNS**** D15, D42, Spare parts
TNS****B E12 Spare parts
TPGN****** C64 Indexable insert
TPGN******NF M19 SUMIDIA Insert
TPGN******NU M19 SUMIBORON Insert
TPGR******LW/RW C64 Indexable insert
TPGT******LFW/RFW C61 Indexable insert
TPGT******LFX/RFX C61 Indexable insert
TPGT******LFY/RFY C61 Indexable insert
TPGT******LSD/RSD C62 Indexable insert
TPGX******L/R-SDW C62 Indexable insert
TPGT******LW/RW C62 Indexable insert
TPGT******N-FV NC3 M20 SUMIBORON Insert
TPGT******N-FV NU3 M20 SUMIBORON Insert
TPGW****** C62 Indexable insert
TPGW****** M20 SUMIBORON Insert
TPGW******NC M20 SUMIBORON Insert
TPGW******NF M20 SUMIDIA Insert

Index

TPGW******NU ..... M20 ..... SUMIBORON Insert
TPMH******NSF ..... C63 ..... Indexable insert
TPMN****** ..... C65 ..... Indexable insert
TPMR******NFK ..... C65 ..... Indexable insert
TPMR******NSF ..... C65 ..... Indexable insert
TPMR******NUJ ..... C65 ..... Indexable insert
TPMT******L-DM NU ..... M21 ..... SUMIDIA Insert
TPMT******NFB ..... C63 ..... Indexable insert
TPMT******NFK ..... C63 ..... Indexable insert
TPMT******N-GD NF ..... M21 ..... SUMIDIA Insert
TPMT******N-LD NF ..... M21 ..... SUMIDIA Insert
TPMT******NLB ..... C63 ..... Indexable insert
TPMT******NLU ..... C63 ..... Indexable insert
TPMT******NMU ..... C63 ..... Indexable insert
TPMT******NSF ..... C63 ..... Indexable insert
TPMT******NSU ..... C63 ..... Indexable insert
TRCP* ..... D11, E11 ..... Spare parts
TRD** ..... D12, D14, E24, G40, G41, ... Spare parts
..... G43, H22, H23, H25, H31, H33, ...
..... K51, K52, K53, K54, K61, M39, ...
..... P7 .....
TRDR**IP ..... G9, G11, G12, G16, G19 ..... Spare parts
..... G23, G26, G30, G31, G33, G34, G35, ...
..... G39, H6, H7, H9, H10, H13, H14, H15, ...
..... H18, H19, H27, H28, H34, H35, H36, ...
..... H37, K44, K49, P7 .....
TRM******-GU ..... C36, D11, E11 ..... Indexable insert
TRM******-LU ..... C36, D11, E11 ..... Indexable insert
TRM******-SU ..... C36, D11, E11 ..... Indexable insert
TRW**** ..... D11, E11 ..... Spare parts
TRX** ..... D11, D12, D13, D14, D15, D16 ..... Spare parts
..... D17, D30, D31, D32, D33, D36 .....
..... D37, D38, D39, D41, D42 .....
..... E8, E9, E11, E12, E13 .....
..... E14, E15, E16, E17, E18 .....
..... E19, E20, E21, E22, E23 .....
..... F21, F22, F32, F33, G45 .....
..... H31, H38, K51, K52, K53 .....
..... K54, K61, M33, M35, M41 .....
..... P7 .....
TRX**IP** ..... D35, P7 ..... Spare parts
TSW*** ..... D11, E11 ..... Spare parts
TT** ..... G14, P7 ..... Spare parts
TTR**IP ..... G29, P7 ..... Spare parts
TTX** ..... G42, M38, P7 ..... Spare parts
TTX**W ..... G36, G38, P7 ..... Spare parts
TWE****R ..... F26 ..... Insert
UF*K R/L ..... G14 ..... Spare parts
UF*S R/L ..... G14 ..... Spare parts
UFKW R/L ..... G14 ..... Spare parts
UFO**** R/L-S ..... G14 ..... Cutter
UFOF**** R/L-S ..... G15 ..... Cutter
UFTW R/L ..... G14 ..... Spare parts
UW*****R ..... G15 ..... Indexable Insert
VBGT******LFX/RFX ..... C67 ..... Indexable insert
VBGT******LFY/RFY ..... C67 ..... Indexable insert
VBGW******HS-NC2 ..... M22 ..... SUMIBORON insert
VBGW******LS-NC2 ..... M22 ..... SUMIBORON insert
VBGW******NC ..... M22 ..... SUMIBORON Insert
VBGW******NC-2 ..... M22 ..... SUMIBORON Insert
VBGW******NU ..... M22 ..... SUMIBORON Insert
VBGW******NU-2 ..... M22 ..... SUMIBORON Insert
VBMT******NFB ..... C66 ..... Indexable insert
VBMT******NFP ..... C66 ..... Indexable insert
VBMT******NLB ..... C66 ..... Indexable insert
VBMT******NLU ..... C66 ..... Indexable insert
VBMT******NMU ..... C66 ..... Indexable insert
VBMT******NSK ..... C66 ..... Indexable insert
VBMT******NSU ..... C66 ..... Indexable insert
VBMW****** ..... C66 ..... Indexable insert
VCGT******LFX/RFX ..... C68 ..... Indexable insert
VCGT******M NFC ..... C68 ..... Indexable insert
VCGT******M NSI ..... C68 ..... Indexable insert
VCGT******NAG ..... C68 ..... Indexable insert
VCGT******NFC ..... C52 ..... Indexable insert
VCMT******NF ..... M23 ..... SUMIDIA Insert
VCMT******NFB ..... C69 ..... Indexable insert
VCMT******N-LD NF ..... M23 ..... SUMIDIA Insert
VCMT******N-GD NF ..... M23 ..... SUMIDIA Insert
VCMT******NLU ..... C69 ..... Indexable insert
VCMT******NSK ..... C69 ..... Indexable insert
VCMT******NSU ..... C69 ..... Indexable insert
VCS**** ..... D44 ..... Spare parts
VNGA******NC-2 ..... M24 ..... SUMIBORON Insert
VNGA******NC-4 ..... M24 ..... SUMIBORON Insert
VNGA******NU-2 ..... M24 ..... SUMIBORON Insert
VNGG******N-FV NC2 ..... M24 ..... SUMIBORON Insert
VNGG******N-LV NC2 ..... M24 ..... SUMIBORON Insert
VNGM******N-LV NU2 ..... M24 ..... SUMIBORON Insert
VNMA****** ..... C39 ..... Indexable insert
VNMA****** ..... M24 ..... SUMIBORON Insert
VNMA******NU ..... M24 ..... SUMIBORON Insert
VNMG******NEF ..... C39 ..... Indexable insert
VNMG******NEG ..... C40 ..... Indexable insert
VNMG******NEX ..... C40 ..... Indexable insert
VNMG******NFA ..... C39 ..... Indexable insert
VNMG******NFL ..... C39 ..... Indexable insert
VNMG******NGE ..... C40 ..... Indexable insert
VNMG******NGU ..... C40 ..... Indexable insert
VNMG******NGZ ..... C40 ..... Indexable insert
VNMG******NLU ..... C39 ..... Indexable insert
VNMG******NSE ..... C39 ..... Indexable insert
VNMG******NSU ..... C39 ..... Indexable insert
VNMG******NSX ..... C39 ..... Indexable insert
VNMG******NUG ..... C40 ..... Indexable insert
VNMG******NUP ..... C40 ..... Indexable insert
VNMG******NUX ..... C40 ..... Indexable insert
VNMG******NUZ ..... C40 ..... Indexable insert
VNMX******NF ..... M24 ..... SUMIDIA Insert
VNS**** ..... D16 ..... Spare parts
VP** ..... D38 ..... Spare parts
VP**B ..... E21, E22 ..... Spare parts
WAS****** ..... K56 ..... Eccentric sleeve
WAX****E ..... H22, H23 ..... Indexable endmill
WAX****EL ..... H22, H23 ..... Indexable endmill
WAX****RS ..... G40, G41 ..... Indexable endmill
WB*-* ..... P4 ..... Spare parts
WB*-** ..... D25, E13, F25, F27, G45 ..... Spare parts

Index

..... M41, P4 .....
WB*F-** ..... P4 ..... Spare parts
WB*-**T ..... D25, D26, F21, G14, P4 ..... Spare parts
WB*F-**T ..... P4 ..... Spare parts
WB*-**TL ..... F21, P4 ..... Spare parts
WB*F-**TL ..... P4 ..... Spare parts
WB*R-**T ..... P4 ..... Spare parts
WBGT******LFW/RFW ..... C70 ..... Indexable insert
WBGT******LFX/RFX ..... C70 ..... Indexable insert
WBGT******LFY/RFY ..... C70 ..... Indexable insert
WBGT*******LFY/RFY ..... C70 ..... Indexable insert
WBGT******LW/RW ..... C70 ..... Indexable insert
WBMF****L ..... H33 ..... Indexable endmill
WBMF****M ..... H33 ..... Indexable endmill
WBMF****MM**N ..... H33 ..... Indexable endmill
WBMF****S ..... H33 ..... Indexable endmill
WBMR****LL ..... H31 ..... Indexable endmill
WBMR****LLW ..... H31 ..... Indexable endmill
WBMR****M ..... H31 ..... Indexable endmill
WBMR****MW ..... H31 ..... Indexable endmill
WBMR****S ..... H31 ..... Indexable endmill
WCFH**-* ..... F27, F28 ..... Tool holder
WCFL* ..... F23 ..... Indexable Inserts
WCFL*A/B ..... F23 ..... Indexable Inserts
WCFN* ..... F23 ..... Indexable Inserts
WCFN*A/B ..... F23 ..... Indexable Inserts
WCFR* ..... F23 ..... Indexable Inserts
WCFR*A/B ..... F23 ..... Indexable Inserts
WCFS R/L **-* ..... F28 ..... Tool holder
WCFS R/L ****-* ..... F28 ..... Tool holder
WDMT****ZDTR ..... G39, H9, H10, ... Indexable insert
WDMT****ZDTR-H ..... G39, H9, H10, ... Indexable insert
WDX***D2S** ..... K51, K57 ..... Multi-Drill
WDX***D3S** ..... K52, K57 ..... Multi-Drill
WDX***D4S** ..... K53, K57 ..... Multi-Drill
WDX***D5S** ..... K54, K57 ..... Multi-Drill
WDXT******-G ..... K51, K52, K53, K54, K61 ..... Indexable insert
WDXT******-H ..... K51, K52, K53, K54, K61 ..... Indexable insert
WDXT******-L ..... K51, K52, K53, K54, K61 ..... Indexable insert
WEX****E ..... H18, H19 ..... Indexable endmill
WEX****E ** ..... H19 ..... Indexable endmill
WEX****EL ..... H18, H19 ..... Indexable endmill
WEX****EL** ..... H18, ... Indexable endmill
WEX****EL**Z* ..... H18, ... Indexable endmill
WEX****EW ..... H18, H19 ..... Indexable endmill
WEX****F ..... G34 ..... Indexable endmill
WEX****M**Z* ..... H18, H19 ..... Indexable endmill
WFX*****E ..... G28, H14, H15 ..... Indexable endmill
WFX*****E ** ..... H14 ..... Indexable endmill
WFXF*****E ..... G28, H15 ..... Indexable endmill
WFXM*****E ..... G28, H14 ..... Indexable endmill
WFX*****M ..... G28 ..... Indexable endmill
WFX*****M**Z* ..... H14, ... Indexable endmill
WFX*****RS ..... G28, G30, G31 ..... Cutter
WFXF*****RS ..... G28, G30, G31 ..... Cutter
WFXM*****RS ..... G28, G30 ..... Cutter
WFXS*R ..... G31 H15 ..... Spare parts
WGC****RS ..... G12 ..... Cutter
WGCF****RS ..... G12 ..... Cutter
WGCM****RS ..... G12 ..... Cutter
WGCS**R ..... G11, G12, H7, P5 ..... Spare parts
WGX*****EW ..... H7 ..... Indexable endmill
WGX*****RS ..... G10 ..... Cutter
WGXF*****RS ..... G10 ..... Cutter
WGXM*****RS ..... G10 ..... Cutter
WMM****E ..... H25 ..... Indexable endmill
WMM****EL ..... H25 ..... Indexable endmill
WMM****ELW ..... H25 ..... Indexable endmill
WMM****EW ..... H25 ..... Indexable endmill
WMMH****ELW ..... H25 ..... Indexable endmill
WMMH****EW ..... H25 ..... Indexable endmill
WNGA******NC-6 ..... M25 ..... SUMIBORON Insert
WNGA******NC-WG6 ..... M25 ..... SUMIBORON Insert
WNGA******NC-WH6 ..... M25 ..... SUMIBORON Insert
WNGG******NSU ..... C44 ..... Indexable insert
WNMA****** ..... C44 ..... Indexable insert
WNMG******NEF ..... C41 ..... Indexable insert
WNMG******NEG ..... C42 ..... Indexable insert
WNMG******NEM ..... C42 ..... Indexable insert
WNMG******NEX ..... C42 ..... Indexable insert
WNMG******NFA ..... C41 ..... Indexable insert
WNMG******NFL ..... C41 ..... Indexable insert
WNMG******NGE ..... C42 ..... Indexable insert
WNMG******NGU ..... C42 ..... Indexable insert
WNMG******NGU-W ..... C42 ..... Indexable insert
WNMG******NGZ ..... C43 ..... Indexable insert
WNMG******NLU ..... C41 ..... Indexable insert
WNMG******NLU-W ..... C41 ..... Indexable insert
WNMG******NME ..... C43 ..... Indexable insert
WNMG******NMU ..... C43 ..... Indexable insert
WNMG******NMX ..... C43 ..... Indexable insert
WNMG******NSE ..... C41 ..... Indexable insert
WNMG******NSE-W ..... C41 ..... Indexable insert
WNMG******NSU ..... C41 ..... Indexable insert
WNMG******NSX ..... C41 ..... Indexable insert
WNMG******NUG ..... C42 ..... Indexable insert
WNMG******NUP ..... C42 ..... Indexable insert
WNMG******NUX ..... C43 ..... Indexable insert
WNMG******NUZ ..... C43 ..... Indexable insert
WNMM******NHG ..... C44 ..... Indexable insert
WNMM******NMP ..... C44 ..... Indexable insert
WNS**** ..... D17, D42 ..... Spare parts
WNS****B ..... E13 ..... Spare parts
WPMT******NLB ..... C71 ..... Indexable Insert
WRCX*****EL ..... H34 ..... Indexable endmill
WRCX*****EM ..... H34 ..... Indexable endmill
WRCX*****ES ..... H34 ..... Indexable endmill
WRCX*****M**Z* ..... H35 ..... Indexable endmill
WRCX*****RS ..... G19 ..... Cutter
WRCXF*****RS ..... G19 ..... Cutter
WRCXX*****RS ..... G19 ..... Cutter
WRX****RH **E** ..... H27, H28 ..... Indexable endmill
WRX****RH **F** ..... G35 ..... Indexable endmill
WRX****RH **W** ..... H27, H28 ..... Indexable endmill
XCLN R/L ****-*** ..... D27 ..... Tool holder
XEEW****AGER-W ..... G13, ... Indexable Insert
XEEW****AGER-WR ..... G11, H7 ..... Indexable Insert
XEEW****AGFR-W-NF ..... G13 ..... Indexable Insert

Index

XNEU****ANER-W ..... G9, H6 ..... Indexable Insert
XNMU****PNER-G ..... G25, G27, H12, H13 ..... Indexable Insert
XNMU****PNER-H ..... G25, G27, H12, H13 ..... Indexable Insert
XNMU****PNER-L ..... G25, G27, H12, H13 ..... Indexable Insert
XOEW******PDTR-W ..... G31, H15 ..... Indexable Insert
XOEW******PZTR-W ..... G30, H14 ..... Indexable Insert
XSBN R/L ****-*** ..... D27 ..... Tool holder
ZNEX******NC ..... M25 ..... SUMIBORON Insert
ZNEX******NU ..... M25 ..... SUMIBORON Insert
ZNMT******* ..... H31 ..... Indexable Insert
ZNMT*******-C ..... H31 ..... Indexable Insert
ZNMT*******-N ..... H31 ..... Indexable Insert
ZNMT*******-S ..... H31 ..... Indexable Insert
ZPGU******* ..... H33 ..... Indexable Insert

Notes

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Tool Engineering Services

In order to provide a higher level of support and satisfaction for our customers,
Sumitomo Electric Industries has created the Tool Engineering Service system.
We have created several Tool Engineering Centers around the world as bases for this support.
The Tool Engineering Centers provide a wide range of support to assist user manufacturing activities,
with services including training (at the Center), test cuts, technical consulting,
line diagnostics (at the user's site) and tooling proposals.



Tool Engineering Center Locations

Japan

- ▶Itami Tool Engineering Center (**I-TEC**)
- ▶Yokohama Tool Engineering Center (**Y-TEC**)
- ▶Hokkaido Igetalloy Tool Engineering Center (**Hi-TEC**)
- ▶Tokai Tool Engineering Center (**T-TEC**)
- ▶Kyushu Tool Engineering Center (**K-TEC**)

Overseas

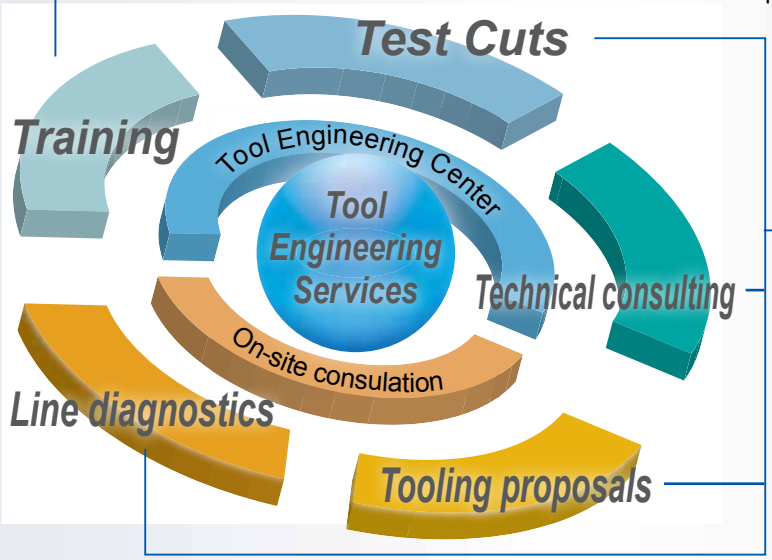
- ▶**Germany / European Design & Engineering Center** (**E-DEC**)
- ▶Thailand / Thailand Tool Engineering Center (**Ti-TEC**)
- ▶Shanghai / Shanghai Tool Engineering Center (**S-TEC**)
- ▶U.S.A. / Americas Tool Engineering Center (**A-TEC**)
- ▶Indonesia / Indonesia Tool Engineering Center (**In-TEC**)

1 Training

To make it easy for anyone to take part, the Centers offer six training courses designed for a variety of different training objectives and participants.
*Contact your nearest SEI sales office for detailed training curricula.

2 Performance evaluation technology

To attain improvements in machining on sites, manufacturers must rely on more than just the subjective guidance provided by experience and instinct. Today's advanced measuring instruments can make machining phenomena observable, and clarify problems.



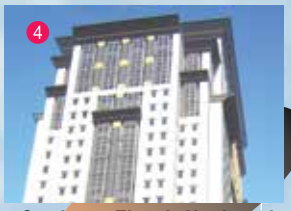
3 Test cuts and technical consulting

The Tool Engineering Centers can make test cuts on user workpieces, and work with users to create more detailed technical proposals. The Centers can also provide solutions to various machining problems, general line diagnostics for machining lines, and tooling support for new lines.
*Contact your nearest SEI sales office for more information.

Network

Sales Network

Sumitomo Electric Hardmetal Corp. is strengthening its global position for high-quality products and services, while contributing technology to market needs around the world.



Sumitomo Electric Hardmetal Trading (Shanghai) Co., Ltd.
(Shanghai, China)
Subsidiary sales company for chinese market.



Superior Engineering Tool Trading (Shanghai) Co., Ltd.



Sumitomo Electric Tool Net, Inc.
Sales and marketing subsidiary for domestic Japanese market.



Sumitomo Electric Carbide, Inc.
(Chicago / U.S.A.)
Sales and marketing headquarters for North, Central and South American markets.



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Sumitomo Electric Hardmetal Corp.
(Head Office)

TEC

Tool Engineering Center



Japanese Network
- Itami Tool Engineering Center (I-TEC)
- Yokohama Tool Engineering Center (Y-TEC)
- Hokkaido Tool Engineering Center (H-TEC)
- Tokai Tool Engineering Center (T-TEC)
- Kzushu Tool Engineering Center (K-TEC)

World Wide Network
- Thai Tool Engineering Center (Ti-TEC)
- Shanghai Tool Engineering Center (S-TEC)
- Europe Design & Engineering Center (E-DEC)
- Indonesia Tool Engineering Center (In-TEC)
- Americas Tool Engineering Center (A-TEC)

Production Network

Approved to ISO9001 Reg. No. YKA0955804



Hokkaido Sumiden Precision Industries, Ltd.
Production of carbide inserts.



ASDEX Corporation
Development, production and sales of forging dies.



PT. Sumiden Hardmetal Manufacturing Indonesia

Approved to ISO9001 Reg. No. YKA200689



Tokai Seimitsu Co., Ltd.
Production of MultiDrill and other carbide tools.

Approved to ISO9001 Reg. No. YKA200075



Kyushu Sumiden Precision Industries, Ltd.
Production of CBN drills, endmills and other carbide tools.

Approved to ISO9001 Reg. No. IRQSI0810488



Motherson Techno Tools. Ltd.
(Noida, India)
Production of CBN / PCD tools and sales of carbide tools.



Sumitomo Electric Hardmetal Asia Pacific Pte. Ltd.
(Singapore)
Sales and marketing headquarters for South East Asia market.



SEI carbide Australia Ltd.
(Sydney, Australia)
Subsidiary sales company for Australia market.

Approved to ISO9001 Reg. No. 63960-2009-AQ-GER-TGA



Sumitomo Electric Hartmetall GmbH
(Düsseldorf, Germany)
Sales and marketing headquarters for European market.



Sumitomo Electric Hardmetal Ltd.
(London, U.K.)
Subsidiary sales company for U.K. market.



Sumitomo Electric Hardmetal de Mexico S.A. de C.V
(Aguascalientes, Mexico)
Subsidiary sales company for Mexico market.



Sumitomo Electric Hardmetal do Brazil Ltda.
(Campinas, Brazil)
Subsidiary sales company for Brazil market.



PT. Sumitomo Electric Hardmetal Indonesia
(Jakarta, Indonesia)
Subsidiary sales company for Indonesia market.

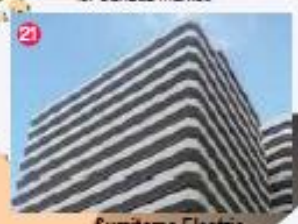


Sumi Sertmetal Ticaret ve Sanayi Ltd. Şirketi
(Istanbul, Turkey)
Subsidiary sales company for Turkey market.



Sumitcarbide Canada, Inc.
(Toronto, Canada)
Subsidiary sales company for Canada market.





Sumitomo Electric Hardmetal (Thailand) Ltd.



Sumitomo Electric Carbide Manufacturing (Changzhou) Co., Ltd.
(Changzhou, China)
Production of carbide drills and PCD inserts.

Approved to ISO9001 Reg. No. JQA-QMA12384



Sumitomo Electric Hardmetal Manufacturing (Thailand), Ltd.
(Bangkok, Thailand)
Production of drills, inserts and CBN / PCD tools.



Sumitomo Electric Carbide Manufacturing, Inc. Master Tool Division
(Cleveland, U.S.A.)
Production of specialtools for automotive part specific and general tooling

Approved to ISO9001 Reg. No. QC-GMHZ-04/019-001



Sumitomo Electric Hartmetallfabrik GmbH
(Baden-Württemberg, Germany)
Production of MultiDrill and CBN tools.



Sumitomo Electric Hartmetallfabrik GmbH, organizaci slozka.
(Jihlava, Czech Republic)
Production of MultiDrill and CBN tools.



Sumitomo Electric Carbide Manufacturing, Inc. SCM Division
(Milwaukee, U.S.A.)
Production of MultiDrill, CBN and PCD cutting tools.

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