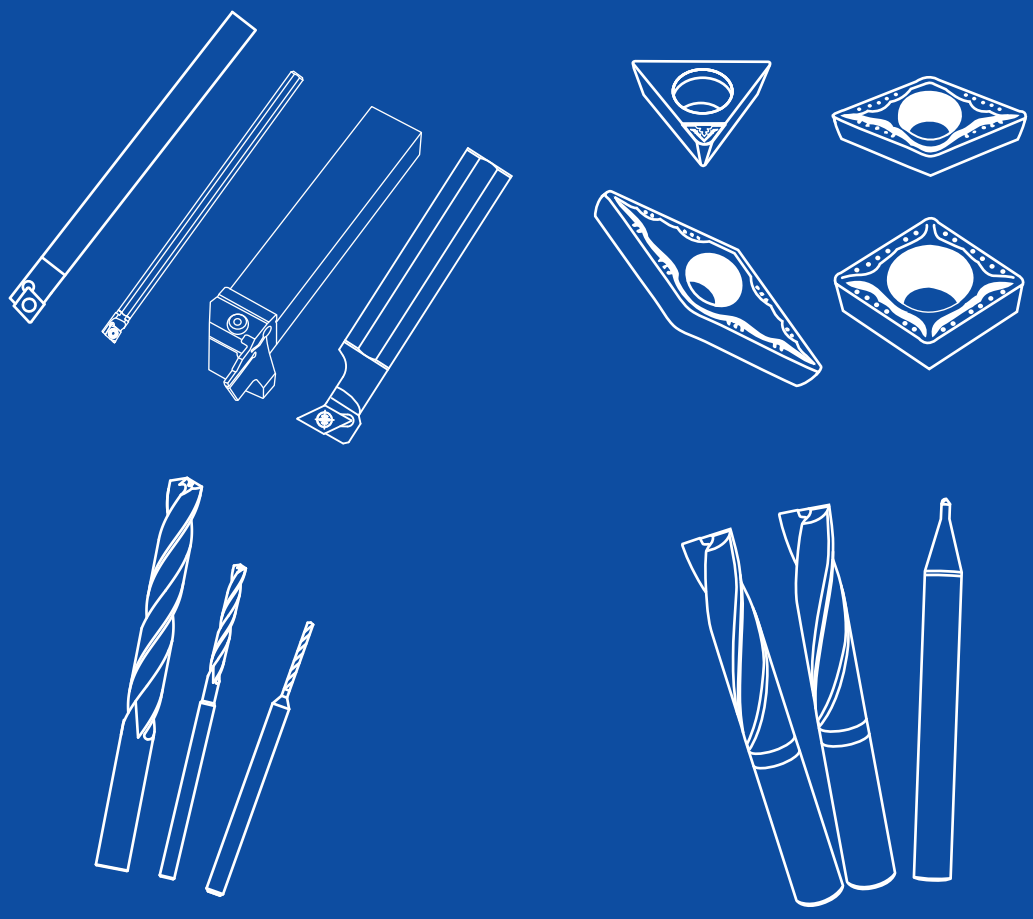
SUMITOMO

CARBIDE - CBN - DIAMOND

Small Cutting Tools Catalog

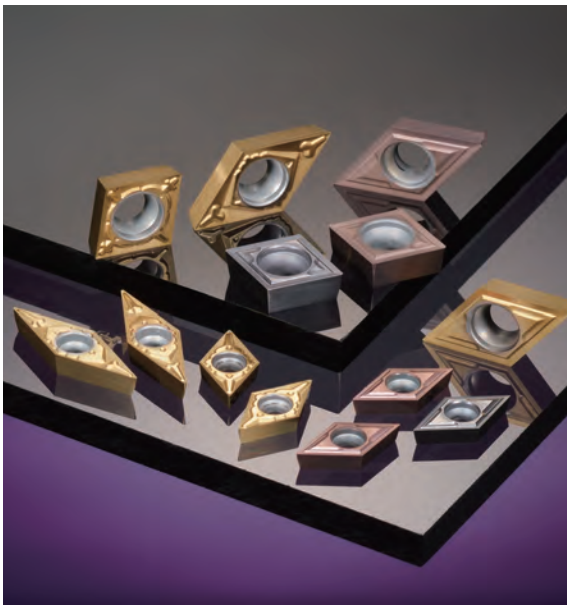


Ingenious Dynamics

Global Support.
Global Solutions.

General Information - Turning

Pages 2 - 12



A.N.S.I.	C	C	M	T	3
I.S.O.	C	C	M	T	09
	Insert Shape Chart 1	Relief Angle Chart 2	Tolerance Chart 3	Type Chart 4	I.C. Chart 5

Chart 1 Insert Shape

Symbol	Insert Shape
V	35˚ Diamond
D	55˚ Diamond
T	60˚ Triangle
C	80˚ Diamond
W	80˚ Trigon
S	90˚ Square
R	Round
A, K, M	Parallelogram

Chart 2 Relief Angle

Symbol	Relief Angle
N	0°
B	5°
C	7°
P	11°
D	15°
E	20°
F	25°

Chart 3 Tolerance

Symbol	Insert I.C.	Thickness	Nose Position
A	±.001	±.001	±.0002
C	±.001	±.001	±.0005
E	±.001	±.001	±.001
F	±.0005	±.001	±.0002
G	±.001	±.005	±.001
J	±..002	±.001	±.002
M	See Chart 3.1		
U	See Chart 3.1		

Chart 5 Inscribed Circle

Sumitomo Number	I.S.O. Number							
SHAPE / SIZE	R	S	T	C	D	V	W	I.C.
(5)			06				03	5/32"
(6)			08					3/16"
			09					7/32"
	06							(.236)
2		06	11	06	07		04	1/4"
2.5		07		08	09			5/16"
	08							(.315)
3	09	09	16	09	11	16	06	3/8"
	10							(.394)
	12							(.472)
4	12	12	22	12	15	22	08	1/2"
5	15	15	27	16				5/8"
	16							(.630)
6	19	19	33	19				3/4"
	20							(.787)
	25							(.984)
8	25	25						1
	31							1-1/4"
	32							(1.260)

Chart 6 Thickness

Sumitomo Number	I.S.O. Number	Thickness
(2)	01	1/16″
1.5	02	3/32″
2	03	1/8″
2.5	T3	5/32″
3	04	3/16″
—	05	7/32″
4	06	1/4″
5	07	5/16″
5	08	5/16″
6	09	3/8″

INSERT NOMENCLATURE

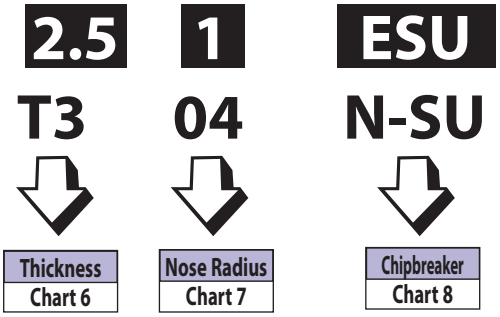


Chart 3.1 **"M" and "U" Class Tolerance's**

	Inscribed Circle		Nose Position Tolerance				Thickness
Symbol	M	U	M			U	M & U
Shapes	All	All	S,T, C, R, W	D	V	All	All
I.C. Size							±.005
5/32 - 3/8	±.002	±.003	±.003	±.004	±.007	±.005	
7/16 - 9/16	±.003	±.005	±.005	±.006	±.010	±.008	
5/8 - 3/4	±.004	±.007	±.006	±.006	–	±.001	
7/8	±.006	±.010	±.006	±.006	–	±.015	
1	±.006	±.010	±.007	±.007	–	±.015	
11/4	±.006	±.010	±.008	±.008	–	±.015	

Chart 4

Symbol	Hole	Chipbreaker	Hole Style
A	Yes	No	Straight
G	Yes	Double	Straight
M	Yes	Single	Straight
N	No	No	None
R	No	Single	None
D	Yes	No	Countersunk
T	Yes	Single	Countersunk
X	Yes	10˚ Rake Angle	Straight or Countersunk
E	No	No	None

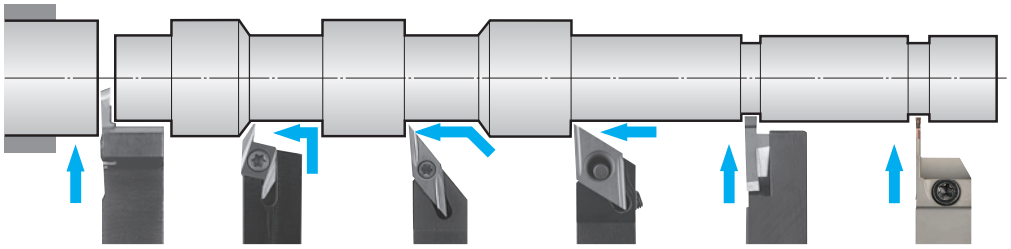
Chart 7 **Nose Radius**

Sumitomo Number	I.S.O. Number	Radius
v	00	.0012"
0	01	.0039"
0.5	02	.0079"
1	04	.0156"
—	05	.0197"
2	08	.0312"
—	10	.0394"
3	12	.0469"
—	15	.0591"
4	16	.0625"
6	24	.0938"
8	32	.1250"
—	40	.1575"

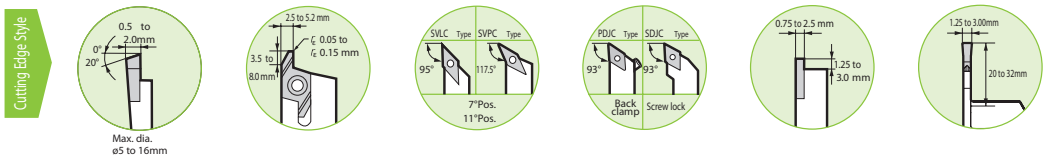
Chart 8 **Chipbreaker**

See Pages 10 for chipbreaker information.

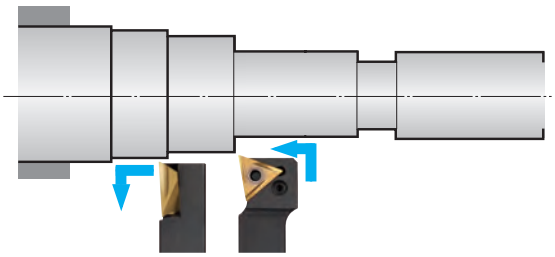
Turning (1)



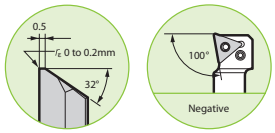
Usage/Type/Page	Cut-Off	Back Turning	Copying	General Turning	Grooving	Grooving & Cut-Off
	SCT Type	SBT Type PBT Type	SV Type	P Type/S Type	GWC Type	GND Type
	147	94	89,91	90	142	140



Turning (2)

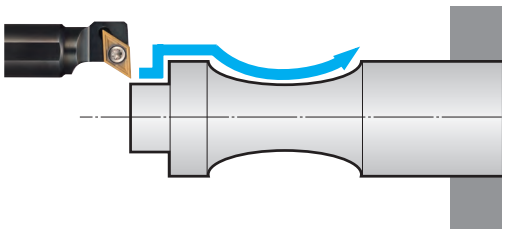


Usage/Type/Page	Turning	Turning
	SFT Type	PTXN-X Type
	96	92



Turning (3)

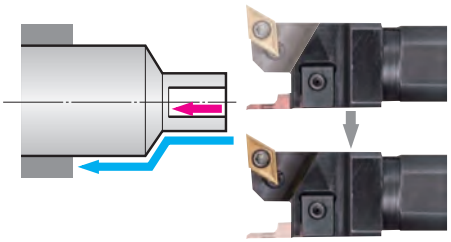
External turning made possible with holder sleeves.



Usage/Type/Page	Round Shank Holder
	RS Type
	98

Multi-functional Tool

A single holder capable of performing two operations.

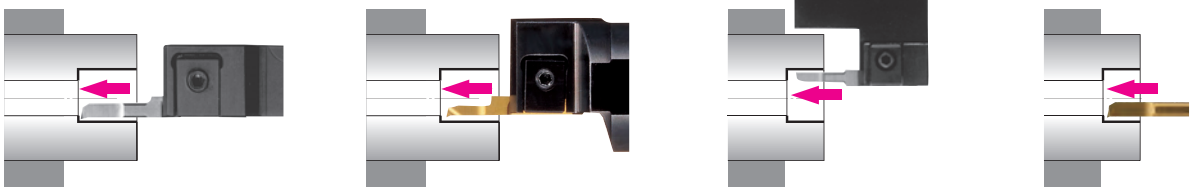


Usage/Type/Page	Twin Head Holder	
	ID + OD CKBE Type	ID + ID CKBB Type
	103	104

SUMITOMO Small Product Tool Selection

Boring (1)

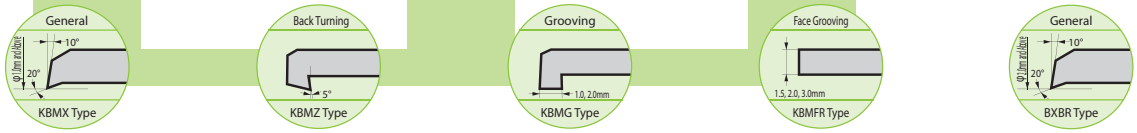
Machining of very small diameter 1mm or above



Usage/Type/Page

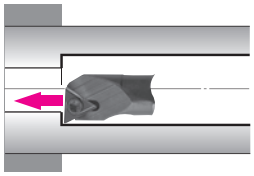
- Very Small Dia. Boring — CKB Type — 102
- Very Small Dia. Boring (Round Shank) — S-CKB Type / S-CKB-S Type — 102
- Gang-type Tool Post Very Small Dia. Boring — CKBS Type — 101
- Solid Carbide Bar — BXBR Type — 132

Cutting Edge Style



Boring (2)

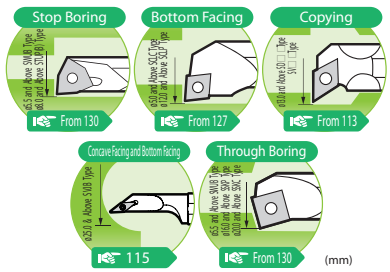
Machining of small diameter 5mm or above



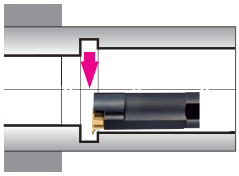
Usage/Type/Page

- Boring — SW/ST/SC/SD/SV/SS Type — 107 to 137

Cutting Edge Style



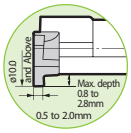
Grooving and Threading



Usage/Type/Page

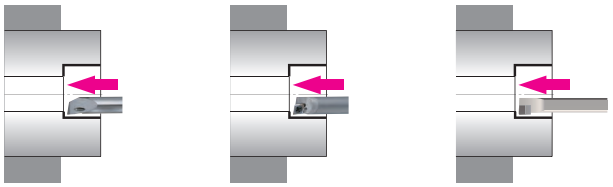
- Internal Grooving — SGIT Type — 146

Cutting Edge Style



SUMIBORON (CBN) Small Hole Boring Bars

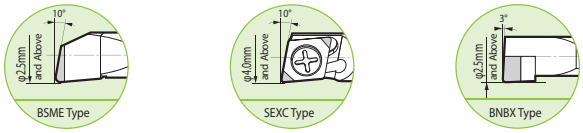
CBN



Usage/Type/Page

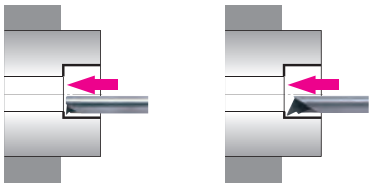
- Small Hole Boring Bars — BSME Type (New) — 135
- Small Hole Boring Bars — SEXC Type (New) — 136
- Small Hole Boring Bars — BNBX Type — 132

Cutting Edge Style



SUMIDIA (PCD) Small Hole Boring Bars

PCD



Usage/Type/Page

- Small Hole Boring Bars — DABB-C Type — 137
- Small Hole Boring Bars — DABB-N Type — 137

Cutting Edge Style

Sumitomo Cutting Tool Grades

Coated Cardbide Grades - For Turning

CVD Coated Grades

Class	Grade	Hardness (HRA)	TRS (GPa)	Coating Type	Coating Thickness (µm)	Characteristics	Old Grades
P Steel	**AC810P**	91.0	2.2	Super FF Coat	18	A new 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**	90.0	2.7	Absotech Coat	5	A general purpose grade featuring improved wear and fracture resistance during stainless steel cutting. Utilises a special tough carbide substrate with our patented Absotech Coat.	AC630M
K Cast Iron	**AC405K**	92.0	2.4	Super FF Coat	18	Employs an ultra-hard substrate and ultra-hard Super FF Coating 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 Coating 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

PVD Coated Grades

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 new super multi-layered PVD coating of nanometer 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 new super multi-layered PVD coating of nanometer thick TiAlN and AlCrN layers, coupled with a super tough substrate for excellent fracture resistance.	EH520Z EH20Z
M Stainless Steel	New **AC6040M**	91.4	3.8	Absotech Coat	3	• Heavy interrupted machining and stainless steel machining. • Utilizing the new super multi-layered PVD coating of nanometer thick TiAlN and AlCrN layers, coupled with a fine-grained super tough substrate for excellent fracture resistance.	ACZ310 AC530U
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 new super multi-layered PVD coating of nanometer 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 new super multi-layered PVD coating of nanometer 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 new super multi-layered PVD coating of nanometer 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.	—

Uncoated Carbide Grades

Application	Grade	Hardness (HRA)	TRS (GPa)	Young Modulus (GPa)	Thermal Conductivity (W/m·°C)	Compressive Strength (GPa)	Linear-Thermal Expansion Coefficient (X 10^{-6}/°C)
P Steel	**A30N**	91.2	2.2	520	-	-	-
M Stainless Steel	**EH510**	92.6	2.6	-	-	-	-
	EH520	91.7	3.0	-	-	-	-
K Cast Iron	**BL130**	94.3	2.9	-	-	-	-
	H1	92.9	2.1	650	109	6.1	4.7
	EH510	92.6	2.6	-	-	-	-
	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	-	-	-	-

PCD Grades

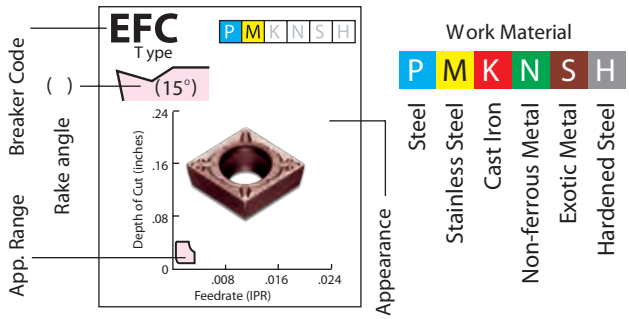
Class	Grade	Binder	Carbon Content (%)	Grain Size (µm)	Hardness HV (GPa)	TRS (GPa)	Characteristics
N Non-Ferrous Metal	**DA1000**	Co	90 to 95	Up to 0.5	110 to 120	≈ 2.60	High density sintered material made of ultra-fine diamond particles that demonstrates optimum wear and fracture resistance, and edge sharpness.
	DA2200	Co	85 to 90	0.5	90 to 100	≈ 2.45	Sintered material made of ultra-fine diamond particles that demonstrates optimum wear and fracture resistance, and edge sharpness.
	DA150	Co	85 to 90	5	100 to 120	≈ 1.95	Sintered material made of fine diamond particles that provides a good balance of workability and wear resistance.
	DA90	Co	90 to 95	50	100 to 120	≈ 1.10	Sintered material made of coarse diamond particles with high diamond content and excellent wear resistance.

CBN Grades

Class	Grade	Binder	Carbon Content (%)	Grain Size (µm)	Hardness HV (GPa)	TRS (GPa)	Series	Characteristics
H Hardened Steel	**BNC2010**	TiCN	50 to 55	2	30 to 32	1.10 to 1.20	Coated SUMIBORON (Coated)	Highly wear resistant coating makes this grade suited for high speed finishing.
	BNC2020	TiN	70 to 75	5	34 to 36	1.20 to 1.30		High crater wear and breakage resistance make this grade suited for high load and interrupted cutting.
	BNC100	TiN	40 to 45	1	29 to 32	1.05 to 1.15		Highly wear resistant coating makes this grade suited for high speed finishing.
	BNC160	TiN	60 to 65	3	31 to 33	1.10 to 1.20		Stable, high precision finishing of hardened steel.
	BNC200	TiN	65 to 70	4	34 to 36	1.15 to 1.25		Tough substrate with high wear resistant coating provide longer tool life.
	BNC300	TiN	60 to 65	1	33 to 35	1.15 to 1.25		Suited for finishing when there is a combination of continuous and interrupted cutting.
	BNX10	TiCN	40 to 45	3	27 to 31	0.80 to 0.90	SUMIBORON (Uncoated)	Optimum wear resistance. Suited to continuous, high-speed cutting.
	BN1000	TiCN	40 to 45	1	27 to 31	0.90 to 1.00		Ultimate wear and fracture resistance. Suited to high-speed cutting.
	BNX20	TiN	55 to 60	3	31 to 33	0.95 to 1.10		Crater resistant grade, suitable for high efficiency cutting under high temperature conditions.
	BNX25	TiN	65 to 70	4	29 to 31	1.00 to 1.10		Excellent fracture resistance during high speed cutting. Suited to high speed interrupted cutting of hardened steel.
	BN2000	TiN	50 to 55	2	31 to 34	1.05 to 1.15		A general purpose grade for hardened steel that provides a high degree of fracture and wear resistance.
	BN350	TiN	60 to 65	1	33 to 35	1.20 to 1.30		High cutting edge strength, suited to heavy interrupted cutting.
Sintered Components	**BN7500**	Co Compound	90 to 95	1	41 to 44	1.40 to 1.50		Maintains optimum cutting edge sharpness. Suited for finishing of sintered alloy.
	BN700	Co Compound	90 to 95	2	40 to 43	1.20 to 1.30		Maintains good wear and fracture resistance in rough cutting of sintered components.
	BN7000	Co Compound	90 to 95	2	41 to 44	1.30 to 1.40		Improved wear and fracture resistance in rough cutting of sintered components.
K Cast Iron	**BN700**	Co Compound	90 to 95	2	40 to 43	1.20 to 1.30		Maintains good wear and fracture resistance in rough cutting of cast iron and exotic alloy.
	BN7000	Co Compound	90 to 95	2	41 to 44	1.30 to 1.40		Improved wear and fracture resistance in rough cutting of cast iron and exotic alloy.
	BNC500	TiC	60 to 65	4	32 to 34	1.00 to 1.10	Coated SUMIBORON (Coated)	Substrate with excellent wear resistance and coating makes this grade suited for hard-to-cut cast iron.

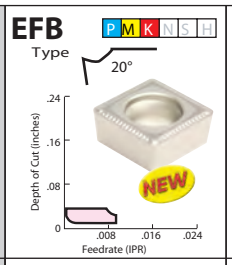
SUMITOMO Positive CHIPBREAKERS

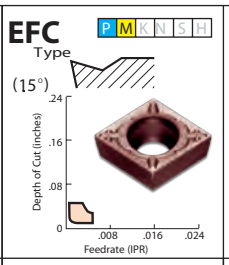
(Legend)

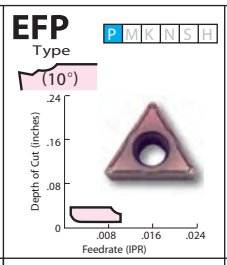


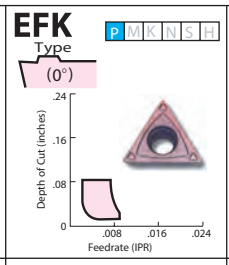
(Bumpy breaker Handed breaker)

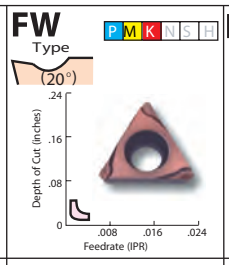
Finishing

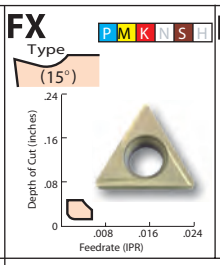


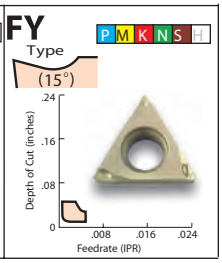




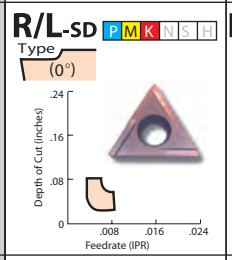


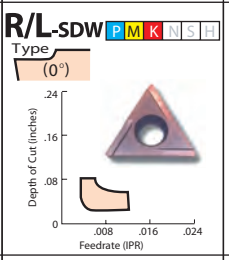


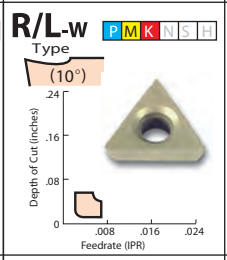


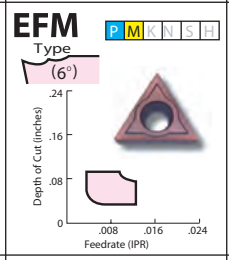


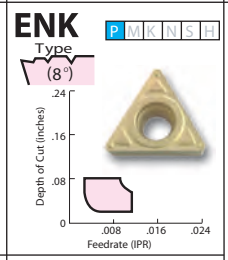
Finish~Light Cut



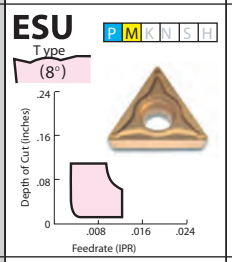


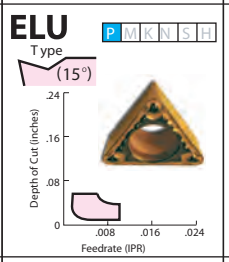


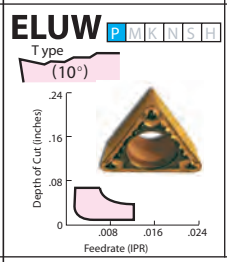


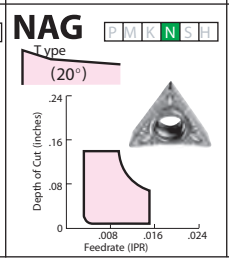


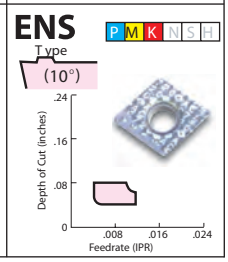
Light Cut



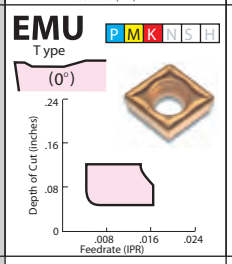


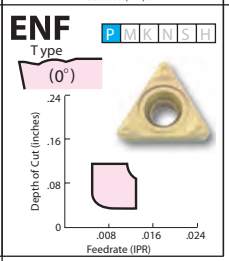




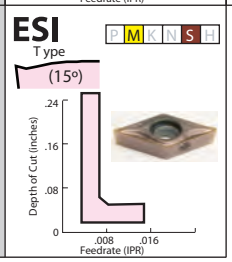


Light~Medium Cut





Rough~Heavy Cut



P Steel

Carbide Grades

Steel

Application	High Speed			Medium		
ISO Classification	-	P05	P10	P20	P30 (M30)	P40 (M40)
COATED CARBIDE			AC810P			
				AC820P		
					AC830P	
COATED CERMET			T1500Z			
				T3000Z		
CERMET			T1500A			
CERAMIC						
CARBIDE					A30	

K Cast Iron

Cast Iron

High Speed	Finishing	Medium		
—	K01	K10	K20	K30
	AC405K			
		AC415K		
			AC420K	
				AC820P
SN2000K				
	SN2100K			
		G10E		

M Stainless Steel

Stainless Steels

Application	Finishing~Light Cut	Medium~Roughing
COATED CARBIDE	AC610M	
	AC630M	
	AC6030M	
	AC520U	
	AC6040M	
		AC530U
CERMET	T1500A	

S Exotic Metal

Exotic Materials

Application	Finishing~Light Cut	Medium
COATED CARBIDE	AC510U	
	AC520U	
		AC530U
CARBIDE	EH510	
		EH520
CBN	BN7000	

CBN Grades

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

INDEXABLE INSERTS

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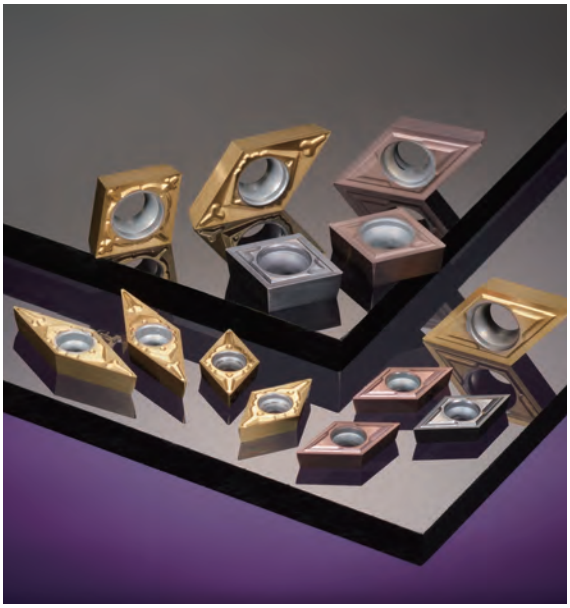


80° DIAMOND TYPE
POSITIVE INSERT

See page 248-259 for running parameters.

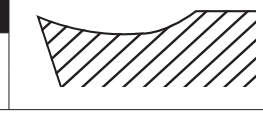
CC — 80° Diamond Type / 7° Relief / With Insert Hole

- **P Steel**
- **M Stainless Steel**
- **K Cast Iron**
- **N Non-ferrous**
- **S Exotic Materials**
- **H Hardened Steel**

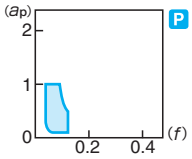
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item

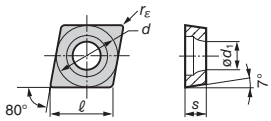
CCET FY

Rake Angle: 15°



Cutting Conditions:	Coated	Cermet	Uncoated
Continuous Cut	●		
Medium Cut	●		
Interrupted Cut	●		





Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC530U	Coated			Cermet				Uncoated							
CCET03X1003LFY	CCET03X1003LFY	.1378	.055	.0012	.071	★															
CCET03X101LFY	CCET03X101LFY			.0039		★															
CCET03X104LFY	CCET03X104LFY			.0156		★															
CCET04X1003LFY	CCET04X1003LFY	.1693	.071	.0012	.087	★															
CCET04X101LFY	CCET04X101LFY			.0039		★															
CCET04X102LFY	CCET04X102LFY			.0078		★															
CCET04X104LFY	CCET04X104LFY			.0156		★															

80° DIAMOND TYPE
POSITIVE INSERT

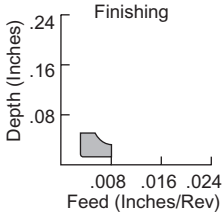
CC — 80° Diamond Type · 7° Relief · With Insert Hole

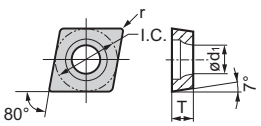
- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-ferrous
- S Exotic Materials
- H Hardened Steel

- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

CCGT FX

Rake Angle: 15°



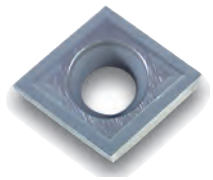


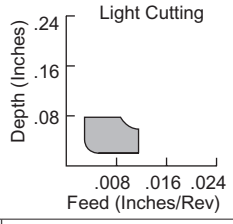
Cutting Conditions:	Coated				Cermet				Uncoated							
	AC530U				T1500Z	T2000Z	T1500A	T1200A								
Continuous Cut	●				●	●	●	●								
Medium Cut	◐				◐	◐	◐	◐								
Interrupted Cut	◌						◌	◌								

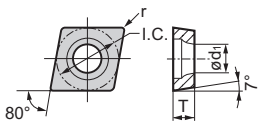
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC530U	T1500Z	T2000Z	T1500A	T1200A
CCGT21.5.001RFX	CCGT0602003R-FX	.250	.094	.0012	.110	★			★	●
CCGT21.5.001LFX	CCGT0602003L-FX			.0012		★			★	●
CCGT21.50RFX	CCGT060201R-FX			.0039		★			●	
CCGT21.50LFX	CCGT060201L-FX			.0039		●			★	●
CCGT21.50.5RFX	CCGT060202R-FX			.0078		★			★	●
CCGT21.50.5LFX	CCGT060202L-FX			.0078		●	●	●	★	●
CCGT21.51RFX	CCGT060204R-FX			.0156		★				
CCGT21.51LFX	CCGT060204L-FX			.0156		★		●		
CCGT32.5.001RFX	CCGT09T3003R-FX	.375	.156	.0012	.1732	★			★	●
CCGT32.5.001LFX	CCGT09T3003L-FX			.0012		★			★	
CCGT32.50RFX	CCGT09T301R-FX			.0039		★			●	●
CCGT32.50LFX	CCGT09T301L-FX			.0039		★			★	●
CCGT32.50.5RFX	CCGT09T302R-FX			.0078		★			●	●
CCGT32.50.5LFX	CCGT09T302L-FX			.0078		★			★	●
CCGT32.51RFX	CCGT09T304R-FX			.0156		●				
CCGT32.51LFX	CCGT09T304L-FX			.0156		★				

CCGT EFM

Rake Angle: 6°







Cutting Conditions:	Coated				Cermet				Uncoated							
	AC530U				T1500Z	T2000Z	T1500A	T1200A								
Continuous Cut	●				●	●	●	●								
Medium Cut	◐				◐	◐	◐	◐								
Interrupted Cut	◌						◌	◌								

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC530U	T1500Z	T2000Z	T1500A	T1200A
CCGT21.5.001EFM	CCGT0602003N-SC	.250	.094	.0012	.110	●			★	●
CCGT21.50EFM	CCGT060201N-SC			.0039		★		●		●
CCGT21.50MEFM	CCGT060201MN-SC			.0039					●	
CCGT21.50.5EFM	CCGT060202N-SC			.0078		●	●	●		●
CCGT21.50.5MEFM	CCGT060202MN-SC			.0078						
CCGT2.51.50EFM	CCGT080201N-SC	.3125		.0039	.134				★	●
CCGT2.51.50.5EFM	CCGT080202N-SC			.0078					●	●
CCGT32.5.001EFM	CCGT09T3003N-SC	.375	.156	.0012	.1732	●			★	●
CCGT32.50EFM	CCGT09T301N-SC			.0039		●		●		●
CCGT32.50MEFM	CCGT09T301MN-SC			.0039			●		●	
CCGT32.50.5EFM	CCGT09T302N-SC			.0078		●		●		●
CCGT32.50.5MEFM	CCGT09T302MN-SC			.0078			●		●	

M = Negative nose radius tolerance (-0.0001" to -0.0004")

80° DIAMOND TYPE
POSITIVE INSERT

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

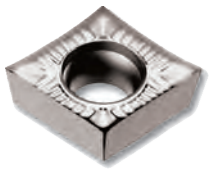
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

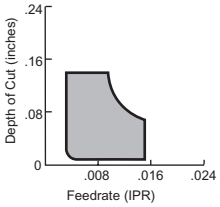
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

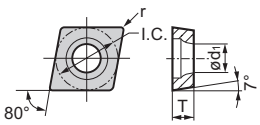
CCGT NAG

Rake Angle: 20°

Cutting Conditions:	Coated	Cermet	Uncoated
Continuous Cut			●
Medium Cut			●
Interrupted Cut			





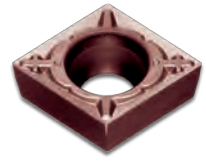


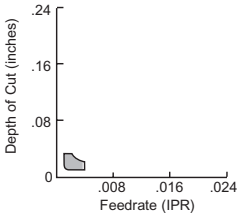
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	H1
CCGT21.51NAG	CCGT060204N-AG	.250	.094	.0156	.110	●
CCGT32.51NAG	CCGT09T304N-AG	.375	.156	.0156	.1732	●
CCGT32.52NAG	CCGT09T308N-AG			.0078		●

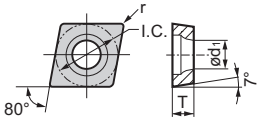
CCGT EFC

Rake Angle: 15°

Cutting Conditions:	Coated	Cermet	Uncoated
Continuous Cut	●	●	
Medium Cut	●	●	
Interrupted Cut	●	●	







Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC530U	T1500A
CCGT21.50EFC	CCGT060201N-FC	.250	.094	.0039	.110	●	●
CCGT21.50MEFC	CCGT060201MN-FC			.0039			●
CCGT21.50.5EFC	CCGT060202N-FC			.0078		●	●
CCGT21.50.5MEFC	CCGT060202MN-FC			.0078			●
CCGT21.51EFC	CCGT060204N-FC			.0156		●	●
CCGT21.51MEFC	CCGT060204MN-FC			.0156			●
CCGT32.5.001EFC	CCGT09T3003N-FC	.375	.156	.0012	.1732	●	
CCGT32.50EFC	CCGT09T301N-FC			.0039		●	●
CCGT32.50MEFC	CCGT09T301MN-FC			.0039			●
CCGT32.50.5EFC	CCGT09T302N-FC			.0078		●	●
CCGT32.50.5MEFC	CCGT09T302MN-FC			.0078			●
CCGT32.51EFC	CCGT09T304N-FC			.0156		●	●
CCGT32.51MEFC	CCGT09T304MN-FC			.0156			●

M = Negative nose radius tolerance (-0.0001" to -0.0004")

80° DIAMOND TYPE
POSITIVE INSERT

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

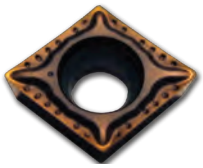
- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-ferrous
- S Exotic Materials
- H Hardened Steel

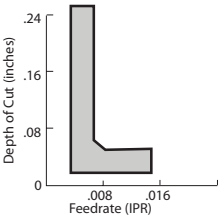
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

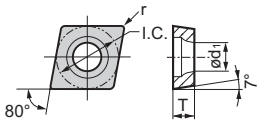
CCGT ESI

Rake Angle: 15°

Cutting Conditions:	Coated						Cermet		Uncoated						
Continuous Cut	●	●	●	●	●		●	●							
Medium Cut	●	●	●	●	●	●	●	●							
Interrupted Cut	●		●	●		●		●							







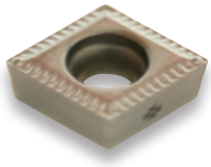
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC530U	AC610M	AC6030M	AC630M	AC510U	AC520U	T1500Z	T1500A
CCGT32.50MESI	CCGT09T301MN-SI	.375	.156	.0039	.1732	●	●	●	●	●	●	●	●
CCGT32.50.5MESI	CCGT09T302MN-SI			.0078		●	●	●	●	●	●	●	●
CCGT32.51MESI	CCGT09T304MN-SI			.0156		●	●	●	●	●	●	●	●

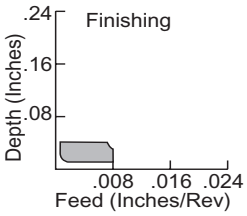
M = Negative nose radius tolerance (-0.0001" to -0.0004")

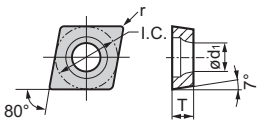
CCMT EFB

Rake Angle: 20°

Cutting Conditions:	Coated				Cermet				Uncoated						
Continuous Cut					●	●									
Medium Cut					●	●									
Interrupted Cut						●									



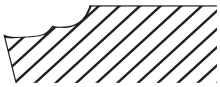




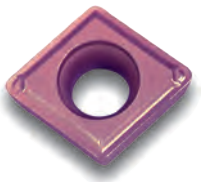
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	T1500Z	T1500A
CCMT21.51EFB	CCMT060204N-FB	.250	.094	.0156	.110	●	
CCMT32.51EFB	CCMT09T304N-FB	.375	.156	.0156	.1732	●	●
CCMT32.52EFB	CCMT09T308N-FB			.0313		●	●

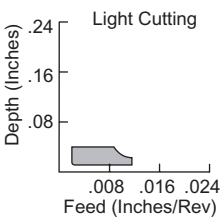
CCMT EFP

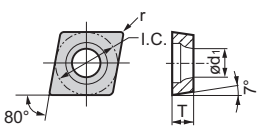
Rake Angle: 10°



Cutting Conditions:	Coated				Cermet				Uncoated						
Continuous Cut					●	●	●								
Medium Cut					●	●	●								
Interrupted Cut						●	●								







Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	T2000Z	T1500A	T1200A
CCMT21.51EFP	CCMT060204N-FP	.250	.094	.0156	.110	●		●
CCMT32.51EFP	CCMT09T304N-FP	.375	.156	.0156	.1732	●	●	●
CCMT32.52EFP	CCMT09T308N-FP			.0313		●		●

80° DIAMOND TYPE
POSITIVE INSERT

See page 248-259 for running parameters.

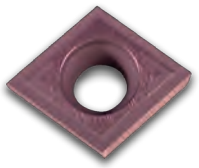
CC — 80° Diamond Type · 7° Relief · With Insert Hole

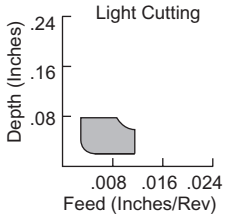
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

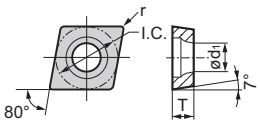
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

CCMT EFM

Rake Angle: 6°





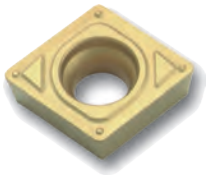


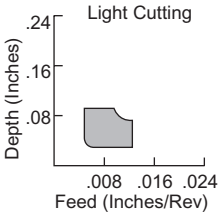
Cutting Conditions:	Coated	Cermet	Uncoated
	AC820P		
Continuous Cut	●		
Medium Cut	●		
Interrupted Cut	●		

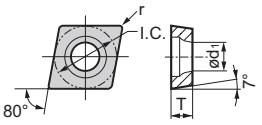
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC820P
CCMT21.51EFM	CCMT060204N-SC	.250	.094	.0156	.110	●
CCMT322EFM	CCMT090308N-SC	.375	.125	.0313	.1732	★

CCMT ENK

Rake Angle: 8°





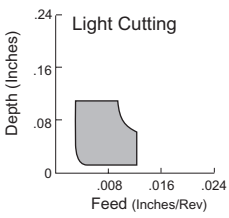


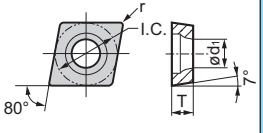
Cutting Conditions:	Coated			Cermet	Uncoated
	AC820P	AC830P	AC700G		
Continuous Cut	●		●		
Medium Cut	●	●	●		
Interrupted Cut	●	●	●		

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC820P	AC830P	AC700G
CCMT21.51ENK	CCMT060204N-SK	.250	.094	.0156	.110	●	●	●
CCMT21.52ENK	CCMT060208N-SK			.0313		●	●	●
CCMT32.51ENK	CCMT09T304N-SK	.375	.156	.0156	.1732	●	●	●
CCMT32.52ENK	CCMT09T308N-SK			.0313		●	●	●
CCMT431ENK	CCMT120404N-SK	.500	.1875	.0156	.2165	●	●	
CCMT432ENK	CCMT120408N-SK			.0313		●	●	

CCMT ESU

Rake Angle: 8°





Cutting Conditions:	Coated														Cermet					
	AC810P	AC820P	AC830P	AC700G	AC530U	AC610M	AC6030M	AC6040M	AC630M	AC405K	AC410K	AC415K	AC420K	AC510U	AC520U	T1500Z	T2000Z	T3000Z	T1500A	T1200A
Continuous Cut	○	○		○	○	○	○	○	○	○	○	○		○	○	○	○		○	○
Medium Cut	○	○	○	○	○	○	○	○	○		○	○	○	○	○	○	○	○	○	○
Interrupted Cut		○	○	○	○		○	○	○				○		○			○	○	○

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC810P	AC820P	AC830P	AC700G	AC530U	AC610M	AC6030M	AC6040M	AC630M	AC405K	AC410K	AC415K	AC420K	AC510U	AC520U	T1500Z	T2000Z	T3000Z	T1500A	T1200A
CCMT21.50.5ESU	CCMT060202N-SU	.250	.094	.0078	.110		●	●			●	●	●	●					●	●	●	●	●	●	●
CCMT21.51ESU	CCMT060204N-SU			.0156		●	●	●	●	●	●	●	●	●	●	▲	●	●	●	●	●	●	●	●	●
CCMT21.52ESU	CCMT060208N-SU			.0313		●	●	●	●	●	●	●	●	●	●	▲	●		●	●	●	●		●	●
CCMT32.50.5ESU	CCMT09T302N-SU	.375	.156	.0078	.1732		●	●			●	●	●	●					●	●	●	●	●		
CCMT32.51ESU	CCMT09T304N-SU			.0156		●	●	●	●	●	●	●	●	●	●	▲	●		●	●	●	●	●	●	●
CCMT32.52ESU	CCMT09T308N-SU			.0313		●	●	●	●	●	●	●	●	●	●	▲	●		●	●	●	●	●	●	●
CCMT431ESU	CCMT120404N-SU	.500	.1875	.0156	.2165		●	●							●		●	●							
CCMT432ESU	CCMT120408N-SU			.0313			●	●							●		●	●							

80° DIAMOND TYPE
POSITIVE INSERT

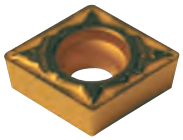
CC — 80° Diamond Type / 7° Relief / With Insert Hole

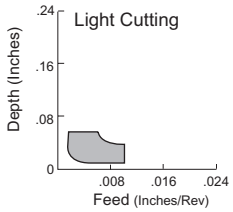
- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-ferrous
- S Exotic Materials
- H Hardened Steel

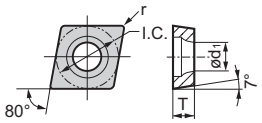
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

CCMT ELU

Rake Angle: 15°





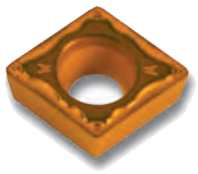


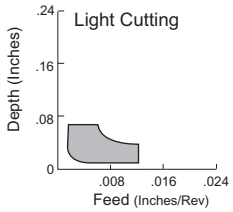
Cutting Conditions:	Coated										Cermet				Uncoated			
Continuous Cut	●	●	●	●	●	●					●	●						
Medium Cut	●	●	●	●	●	●					●	●	●					
Interrupted Cut		●	●	●	●	●							●					

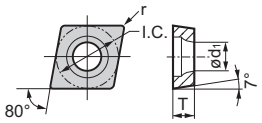
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC810P	AC820P	AC700G	AC6030M	AC6040M	AC630M					T1500Z	T2000Z	T3000Z				
CCMT21.50.5ELU	CCMT060202N-LU	.250	.094	.0078	.110	●	●	●	●	●	●					●	●	●				
CCMT21.51ELU	CCMT060204N-LU			.0156		●	●	●	●	●	●					●	●	●				
CCMT32.51ELU	CCMT09T304N-LU	.375	.156	.0156	.1732	●	●	●	●	●	●					●	●	●				
CCMT32.52ELU	CCMT09T308N-LU			.0313		●	●	●	●	●	●					●	●	●				

CCMT ELUW
Wiper Insert

Rake Angle: 12°







Cutting Conditions:	Coated										Cermet				Uncoated			
Continuous Cut	●	●	●	●	●						●	●		●				
Medium Cut	●	●	●		●	●					●	●	●	●				
Interrupted Cut		●	●			●							●	●				

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC810P	AC820P	AC700G	AC405K	AC415K	AC420K					T1500Z	T2000Z	T3000Z	T1500A			
CCMT32.51ELUW	CCMT09T304N-LUW	.375	.156	.0156	.1732	●	●	●	●	●	●					●	●	●	●			
CCMT32.52ELUW	CCMT09T308N-LUW			.0313		●	●	●	●	●	●					●	●	●	●			

See page 248-259 for running parameters.

80° DIAMOND TYPE
POSITIVE INSERT

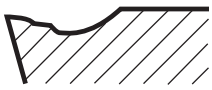
CC — 80° Diamond Type / 7° Relief / With Insert Hole

- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

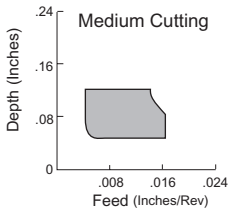
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

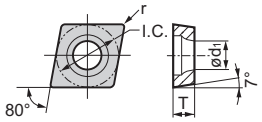
CCMT
EMU

Rake Angle: 0°



Cutting Conditions:	Coated										Cermet			Uncoated		
Continuous Cut	●	●		●	●	●	●									
Medium Cut	●	●	●	●		●	●	●								
Interrupted Cut		●	●	●				●								





Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC810P	AC820P	AC830P	AC700G	AC405K	AC410K	AC415K	AC420K
CCMT32.51EMU	CCMT09T304N-MU	.375	.156	.0156	.1732	●	●		●	●	▲	●	●
CCMT32.52EMU	CCMT09T308N-MU			.0313		●	●	●	●	●	▲	●	●

CCMA
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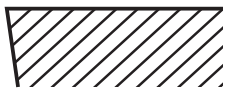
Rake Angle: 0°



Cutting Conditions:	Coated										Cermet			Uncoated		
Continuous Cut	●	●	●	●												
Medium Cut	●		●	●	●											
Interrupted Cut	●				●											

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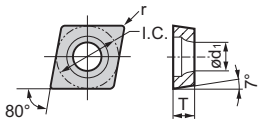

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC700G	AC405K	AC410K	AC415K	AC420K
CCMA21.51	CCMA060204	.250	.094	.0156	.110	●	●			●
CCMA32.51	CCMA09T304	.375	.156	.0156	.1732	●	●	▲	●	●
CCMA32.52	CCMA09T308			.0313		●	●	▲	●	●

See page 248-259 for running parameters.

80° DIAMOND TYPE
POSITIVE INSERT

CP — 80° Diamond Type / 11° Relief / With Insert Hole

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-ferrous
- S Exotic Materials
- H Hardened Steel

- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

CPGT

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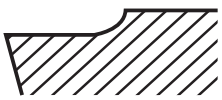
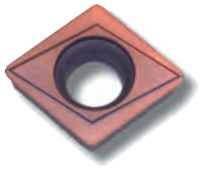
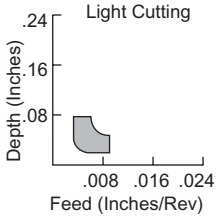
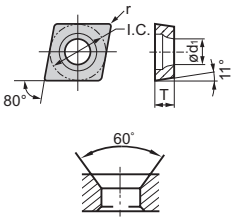
Rake Angle: 0°









Cutting Conditions:	Coated							Cermet					Uncoated					
Continuous Cut	●							●	●		●	●		●				
Medium Cut	●	●						●	●	●	●	●	●	●				
Interrupted Cut		●								●	●	●						
	AC510U	AC520U						T1500Z	T2000Z	T3000Z	T1500A	T1200A	G10E	EH510				

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
CPGT2.51.50.5	CPGT080202N-SD	.3125	.094	.0078	.134
CPGT2.51.51	CPGT080204N-SD			.0156	
CPGT2.51.52	CPGT080208N-SD			.0313	
CPGT320.5	CPGT090302N-SD	.375	.125	.0078	.1732
CPGT321	CPGT090304N-SD			.0156	
CPGT322	CPGT090308N-SD			.0313	
CPGT430.5	CPGT120402N-SD	.500	.1875	.0078	.2165
CPGT431	CPGT120404N-SD			.0156	
CPGT432	CPGT120408N-SD			.0313	

CPEW

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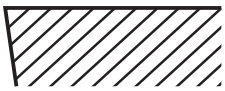
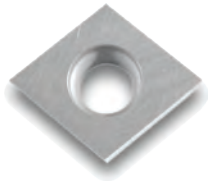
Rake Angle: 0°





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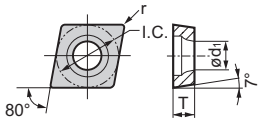


Cutting Conditions:	Coated				Cermet				Uncoated								
Continuous Cut									●								
Medium Cut									●								
Interrupted Cut																	
									H1								

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
CPEW1.81.51	CPEW050204	.219	.094	.0156	.102
CPEW21.51	CPEW060204	.250		.0156	.110
CPEW32.51	CPEW09T304	.375	.156	.0156	.1732
CPEW32.52	CPEW09T308			.0313	
CPEW432	CPEW120408	.500	.1875	.0313	.2165

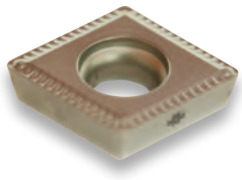
CP — 80° Diamond Type / 11° Relief / With Insert Hole

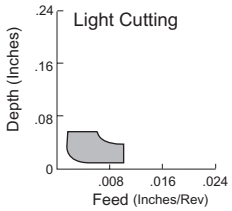
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

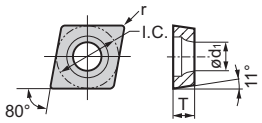
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

CPMT EFB

Rake Angle: 20°





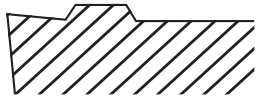


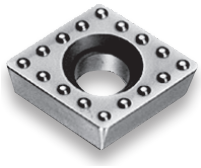
Cutting Conditions:	Coated										Cermet				Uncoated			
Continuous Cut											●							
Medium Cut											●							
Interrupted Cut											●							
											T1500A							

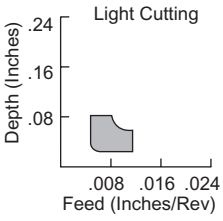
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
CPMT2.51.51EFB	CPMT080204N-FB	.375	.125	.0313	.1732

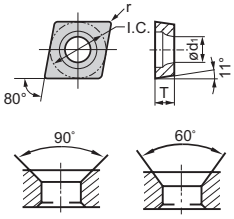
CPMT ENS

Rake Angle: 10°







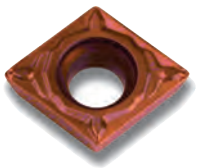


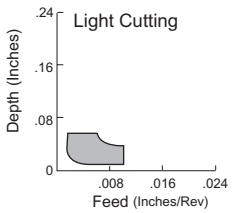
Cutting Conditions:	Coated										Cermet				Uncoated			
Continuous Cut	○	○																
Medium Cut	○	○																
Interrupted Cut	○	○																
	AC6030M	AC630M																

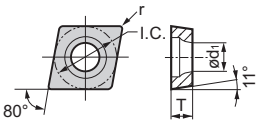
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
CPMT21.51ENS	CPMT060204N-US	.250	.094	.0156	.110
CPMT2.51.52ENS	CPMT080208N-US	.3125		.0313	.134
CPMT322ENS	CPMT090308N-US	.375	.125	.0313	.1732
CPMT32.52ENX	CPMT09T308N-US	.375	.156	.0156	.1732
CPMT432ENS	CPMH120408N-US	.500	.1875	.0313	.2165

CPMT ELU

Rake Angle: 15°







Cutting Conditions:	Coated										Cermet				Uncoated			
Continuous Cut	○	○	○	○	○	○					○	○						
Medium Cut	○	○	○	○	○	○					○	○	○					
Interrupted Cut		○	○	○	○	○							○					
	AC810P	AC820P	AC700G	AC6030M	AC6040M	AC630M					T1500Z	T2000Z	T3000Z					

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
CPMT321ELU	CPMT090304N-LU	.375	.125	.0156	.1732
CPMT322ELU	CPMT090308N-LU			.0313	

80° DIAMOND TYPE
POSITIVE INSERT

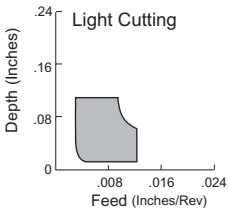
CP
80° Diamond Type
11° Relief
With Insert Hole

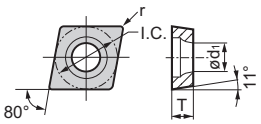
- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-ferrous
- S Exotic Materials
- H Hardened Steel

- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

CPMT ESU

Rake Angle: 8°



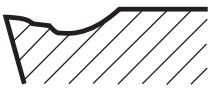


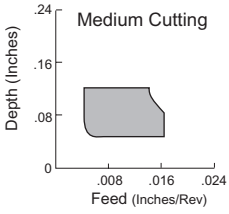
Cutting Conditions:	AC810P	AC820P	AC830P	AC700G	AC610M	AC6030M	AC6040M	AC630M	AC510U	AC520U	T1500Z	T2000Z	T3000Z	T1500A	T1200A
	Coated										Cermet				
Continuous Cut	●	●		●	●	●	●	●	●		●	●		●	●
Medium Cut	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Interrupted Cut		●	●	●		●	●	●		●			●	●	●

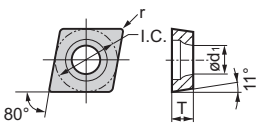
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC810P	AC820P	AC830P	AC700G	AC610M	AC6030M	AC6040M	AC630M	AC510U	AC520U	T1500Z	T2000Z	T3000Z	T1500A	T1200A
CPMT21.51ESU	CPMT060204N-SU	.250	.094	.0156	.110	●	●		●					●	●	●	●	●	●	●
CPMT21.52ESU	CPMT060208N-SU			.0313		●	●		●					●	●	●	●		●	●
CPMT2.51.51ESU	CPMT080204N-SU	.3125		.0156	.134	★	●	★		●	●	●	●			●	●			
CPMT2.51.52ESU	CPMT080208N-SU			.0313		★	●	★		●	●	●	●			●	●		●	●
CPMT321ESU	CPMT090304N-SU	.375	.125	.0156	.1732		●			●	●	●	●			★			★	●
CPMT322ESU	CPMT090308N-SU			.0313			●	●		●	●	●	●			★	●	●	★	●
CPMT32.51ESU	CPMT09T304N-SU		.156	.0156		●	●		●					●	●	●	●	●	●	●
CPMT32.52ESU	CPMT09T308N-SU			.0313		●	●		●					●	●	●	●	●	●	●

CPMT EMU

Rake Angle: 0°







Cutting Conditions:	AC810P	AC820P	AC700G	AC410K	AC415K	AC420K
	Coated					
Continuous Cut	●	●	●	●	●	
Medium Cut	●	●	●	●	●	●
Interrupted Cut		●	●			●

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC810P	AC820P	AC700G	AC410K	AC415K	AC420K
CPMT2.51.51EMU	CPMT080204N-MU	.3125	.094	.0156	.134		●			●	●
CPMT2.51.52EMU	CPMT080208N-MU			0313			●				●
CPMT321EMU	CPMT090304N-MU	.375	.125	.0156	.1732	★	●	●	▲	●	●
CPMT322EMU	CPMT090308N-MU			.0313		★	●			●	●

80° DIAMOND TYPE
POSITIVE INSERT

See page 248-259 for running parameters.

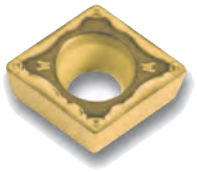
CP — 80° Diamond Type / 11° Relief / With Insert Hole

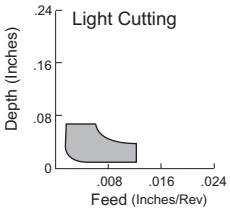
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

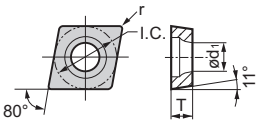
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

CPMT ELUW
Wiper Insert

Rake Angle: 12°





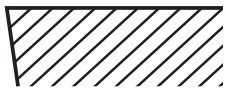


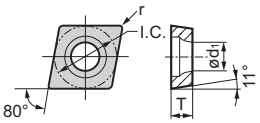
Cutting Conditions:	AC810P	AC820P	AC700G	T1500Z	T2000Z	T3000Z
Continuous Cut	●	●	●	●	●	
Medium Cut	●	●	●	●	●	●
Interrupted Cut		●	●			●

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC810P	AC820P	AC700G	T1500Z	T2000Z	T3000Z
CPMT321ELUW	CPMT090304N-LUW	.375	.125	.0156	.1732	★	★		★	●	●
CPMT322ELUW	CPMT090308N-LUW			.0313		★	★	●	★	●	●

CPMA
—

Rake Angle: 0°





Cutting Conditions:	AC700G	AC410K	AC415K	AC420K
Continuous Cut	●	●	●	
Medium Cut	●	●	●	●
Interrupted Cut	●			●

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC700G	AC410K	AC415K	AC420K
CPMA2.51.51	CPMA080204	.3125	.094	.0156	.134				●
CPMA2.51.52	CPMA080208			0313					●
CPMA321	CPMA090304	.375	.125	.0156	.1732	★	▲	●	●
CPMA322	CPMA090308			.0313				●	●

55° DIAMOND TYPE
POSITIVE INSERT

DC — 55° Diamond Type / 7° Relief / With Insert Hole

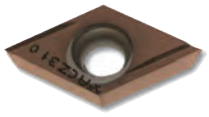
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

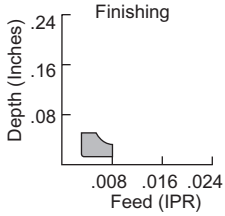
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

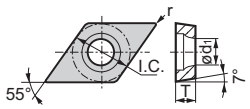
DCGT FX

Rake Angle: 15°

Cutting Conditions:	Coated	Cermet		Uncoated
Continuous Cut	●	●	●	
Medium Cut	●	●	●	
Interrupted Cut	●	●	●	





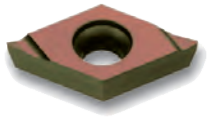


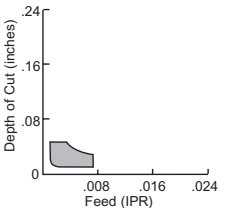
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC530U	T1500A	T1200A
DCGT21.5.001RFX	DCGT0702003R-FX	.250	.094	.0012	.110	●	●	●
DCGT21.5.001LFX	DCGT0702003L-FX			.0012		●	★	●
DCGT21.50 RFX	DCGT070201R-FX			.0039		★	★	●
DCGT21.50LFX	DCGT070201L-FX			.0039		●	★	
DCGT21.50.5RFX	DCGT070202R-FX			.0078		●	●	●
DCGT21.50.5LFX	DCGT070202L-FX			.0078		●	★	●
DCGT32.5.001RFX	DCGT11T3003R-FX	.375	.156	.0012	.1732	★	★	●
DCGT32.5.001LFX	DCGT11T3003L-FX			.0012		★	★	●
DCGT32.50RFX	DCGT11T301R-FX			.0039		★	★	●
DCGT32.50LFX	DCGT11T301L-FX			.0039		★	★	●
DCGT32.50.5RFX	DCGT11T302R-FX			.0078		★	★	●
DCGT32.50.5LFX	DCGT11T302L-FX			.0078		★	★	●

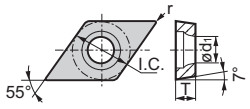
DCGT FY

Rake Angle: 15°

Cutting Conditions:	Coated	Cermet	Uncoated
Continuous Cut	●		
Medium Cut	●		
Interrupted Cut	●		







Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC530U
DCGT21.51RFY	DCGT070204L-FY	.250	.094	.0156	.110	★
DCGT21.51LFY	DCGT070204L-FY			.0156		★
DCGT32.51LFY	DCGT11T304L-FY	.375	.156	.0156	.1732	★

55° DIAMOND TYPE
POSITIVE INSERT

See page 248-259 for running parameters.

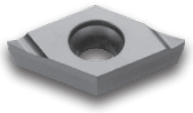
DC — 55° Diamond Type / 7° Relief / With Insert Hole

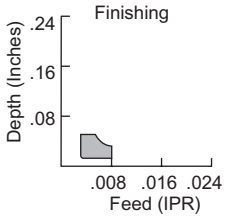
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

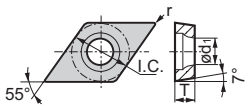
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

DCGT W

Rake Angle: 10°







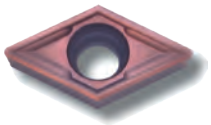
Cutting Conditions:	Coated				Cermet					Uncoated								
Continuous Cut					●	●												
Medium Cut					●	●												
Interrupted Cut					●	●												
					T1500A	T1200A												

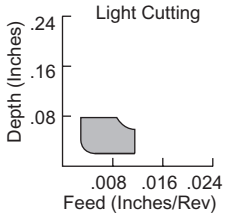
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
DCGT21.50.5R	DCGT070202R-W	.250	.094	.0078	.110
DCGT21.50.5L	DCGT070202L-W			.0078	
DCGT21.51R	DCGT070204R-W			.0156	
DCGT21.51L	DCGT070204L-W			.0156	
DCGT32.51R	DCGT11T304R-W	.375	.156	.0156	.1732
DCGT32.51L	DCGT11T304L-W			.0156	
DCGT32.52R	DCGT11T308R-W			.0313	
DCGT32.52L	DCGT11T308L-W			.0313	

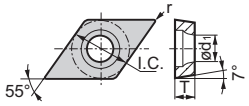
Sumitomo Catalog #	T1500A	T1200A
DCGT21.50.5R	★	●
DCGT21.50.5L	★	●
DCGT21.51R	★	●
DCGT21.51L	★	●
DCGT32.51R	●	●
DCGT32.51L	★	●
DCGT32.52R	★	●
DCGT32.52L	★	

DCGT EFM

Rake Angle: 6°







Cutting Conditions:	Coated				Cermet					Uncoated								
Continuous Cut	●				●	●		●	●									
Medium Cut	●				●	●	●	●	●									
Interrupted Cut	●						●	●	●									
	AC530U				T1500Z	T2000Z	T3000Z	T1500A	T1200A									

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
DCGT21.5.001EFM	DCGT0702003N-SC	.250	.094	.0012	.110
DCGT21.50EFM	DCGT070201N-SC			.0039	
DCGT21.50MEFM	DCGT070201MN-SC			.0039	
DCGT21.50.5EFM	DCGT070202N-SC			.0078	
DCGT21.50.5MEFM	DCGT070202MN-SC			.0078	
DCGT21.51EFM	DCGT070204N-SC			.0156	
DCGT21.51MEFM	DCGT070204MN-SC			.0156	
DCGT21.52EFM	DCGT070208N-SC			.0313	
DCGT21.52MEFM	DCGT070208MN-SC			.0313	
DCGT2.51.50EFM	DCGT090201N-SC	.3125		.0039	.134
DCGT2.51.50.5EFM	DCGT090202N-SC			.0078	
DCGT32.5.001EFM	DCGT11T3003N-SC	.375	.156	.0012	.1732
DCGT32.50EFM	DCGT11T301N-SC			.0039	
DCGT32.50MEFM	DCGT11T301MN-SC			.0039	
DCGT32.50.5EFM	DCGT11T302N-SC			.0078	
DCGT32.50.5MEFM	DCGT11T302MN-SC			.0078	
DCGT32.51EFM	DCGT11T304N-SC			.0156	
DCGT32.51MEFM	DCGT11T304MN-SC			.0156	
DCGT32.52EFM	DCGT11T308N-SC			.0313	
DCGT32.52MEFM	DCGT11T308MN-SC			.0313	

Sumitomo Catalog #	AC530U	T1500Z	T2000Z	T3000Z	T1500A	T1200A
DCGT21.5.001EFM	★				★	●
DCGT21.50EFM	●		●	●		●
DCGT21.50MEFM		●			●	
DCGT21.50.5EFM	★		●	●		●
DCGT21.50.5MEFM		●			●	
DCGT21.51EFM			●	●		●
DCGT21.51MEFM		●			●	
DCGT21.52EFM			●			●
DCGT21.52MEFM					●	
DCGT2.51.50EFM					★	●
DCGT2.51.50.5EFM					★	
DCGT32.5.001EFM	★				●	●
DCGT32.50EFM	●		●			●
DCGT32.50MEFM		●			●	
DCGT32.50.5EFM	●		●			●
DCGT32.50.5MEFM		●			●	
DCGT32.51EFM	●		●			●
DCGT32.51MEFM		●			●	
DCGT32.52EFM						
DCGT32.52MEFM		●	●		●	●

M = Negative nose radius tolerance (-0.0001" to -0.0004")

55° DIAMOND TYPE
POSITIVE INSERT

DC — 55° Diamond Type / 7° Relief / With Insert Hole

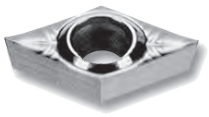
- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-ferrous
- S Exotic Materials
- H Hardened Steel

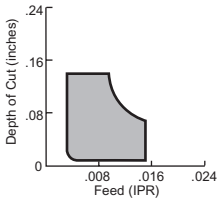
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

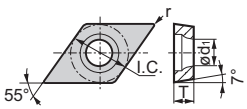
DCGT NAG

Rake Angle: 20°

Cutting Conditions:	Coated	Cermet	Uncoated
Continuous Cut			●
Medium Cut			●
Interrupted Cut			





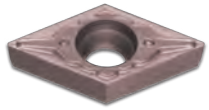


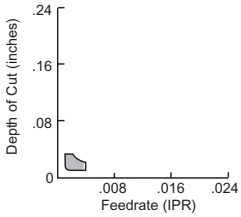
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	H1
DCGT21.50.5NAG	DCGT070202N-AG	.250	.094	.0078	.110	●
DCGT21.51NAG	DCGT070204N-AG			.0156		●
DCGT32.50.5NAG	DCGT11T302N-AG	.375	.156	.0078	.1732	●
DCGT32.51NAG	DCGT11T304N-AG			.0156		●
DCGT32.52NAG	DCGT11T308N-AG			.0313		●

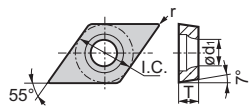
DCGT EFC

Rake Angle: 15°

Cutting Conditions:	Coated		Cermet	Uncoated
Continuous Cut	●		●	
Medium Cut	●	●	●	
Interrupted Cut	●	●	●	







Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC530U	AC520U	T1500A
DCGT21.5.001EFC	DCGT0702003N-FC	.250	.094	.0012	.110	●		
DCGT21.50EFC	DCGT070201N-FC			.0039		●		●
DCGT21.50MEFC	DCGT070201MN-FC			.0039				●
DCGT21.50.5EFC	DCGT070202N-FC			.0078		●		●
DCGT21.50.5MEFC	DCGT070202MN-FC			.0078				●
DCGT21.51EFC	DCGT070204N-FC			.0156	.134	●		●
DCGT21.51MEFC	DCGT070204MN-FC			.0156				●
DCGT32.5.001EFC	DCGT11T3003N-FC	.375	.156	.0012	.1732	●		
DCGT32.50EFC	DCGT11T301N-FC			.0039		●	●	●
DCGT32.50MEFC	DCGT11T301MN-FC			.0039				●
DCGT32.50.5EFC	DCGT11T302N-FC			.0078		●	●	●
DCGT32.50.5MEFC	DCGT11T302MN-FC			.0078				●
DCGT32.51EFC	DCGT11T304N-FC			.0156		●	●	●
DCGT32.51MEFC	DCGT11T304N-FC			.0156				●

M = Negative nose radius tolerance (-0.0001" to -0.0004")

See page 248-259 for running parameters.

55° DIAMOND TYPE
POSITIVE INSERT

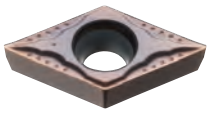
DC — 55° Diamond Type · 7° Relief · With Insert Hole

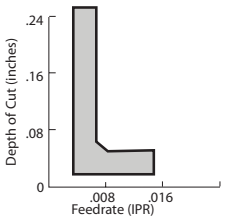
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

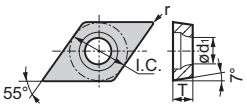
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

DCGT ESI

Rake Angle: 15°







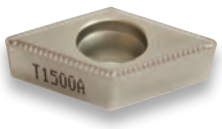
Cutting Conditions:	Coated						Cermet				Uncoated							
Continuous Cut	●	●	●	●	●		●	●										
Medium Cut	●	●	●	●	●	●	●	●										
Interrupted Cut	●		●	●		●		●										

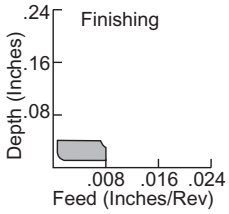
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC530U	AC610M	AC6030M	AC630M	AC510U	AC520U	T1500Z	T1500A
DCGT21.50MESI	DCGT070201MN-SI	.250	.094	.0039	.110	●	●	●	●	●	●	●	●
DCGT21.50.5MESI	DCGT070202MN-SI			.0078		●	●	●	●	●	●	●	●
DCGT21.51MESI	DCGT070204MN-SI			.0156		●	●	●	●	●	●	●	●
DCGT32.50MESI	DCGT11T301MN-SI	.375	.156	.0039	.1732	●	●	●	●	●	●	●	●
DCGT32.50.5MESI	DCGT11T302MN-SI			.0078		●	●	●	●	●	●	●	●
DCGT32.51MESI	DCGT11T304MN-SI			.0156		●	●	●	●	●	●	●	●
DCGT32.52MESI	DCGT11T308MN-SI			.0313		●	●	●	●	●	●	●	●

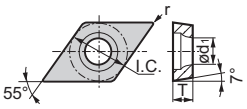
M = Negative nose radius tolerance (-0.0001" to -0.0004")

DCMT EFB

Rake Angle: 20°







Cutting Conditions:	Coated				Cermet				Uncoated							
Continuous Cut					●	●										
Medium Cut					●	●										
Interrupted Cut					●											

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	T1500A	T1500Z
DCMT21.50.5EFB	DCMT070202N-FB	.250	.094	.0078	.110	●	
DCMT21.51EFB	DCMT070204N-FB			.0156		●	
DCMT21.52EFB	DCMT060208N-FB			.0313		●	
DCMT32.50.5EFB	DCMT11T302N-FB	.375	.156	.0078	.1732	●	
DCMT32.51EFB	DCMT11T304N-FB			.0156			●
DCMT32.52EFB	DCMT11T308N-FB			.0313		●	●

55° DIAMOND TYPE
POSITIVE INSERT

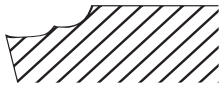
DC 55° Diamond Type / 7° Relief / With Insert Hole

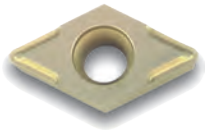
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

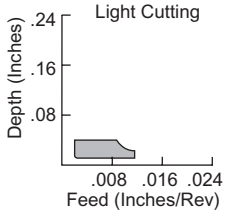
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

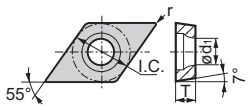
DCMT EFP

Rake Angle: 10°







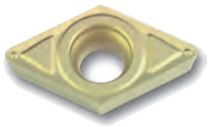


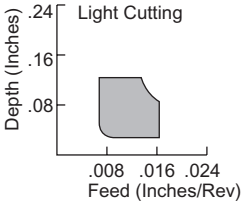
Cutting Conditions:	Coated				Cermet				Uncoated							
Continuous Cut					●	●										
Medium Cut					●	●										
Interrupted Cut					●	●										
					T1500A	T1200A										

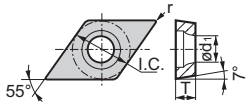
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
DCMT21.50.5EFP	DCMT070202N-FP	.250	.094	.0078	.110
DCMT21.51EFP	DCMT070204N-FP			.0156	
DCMT32.51EFP	DCMT11T304N-FP	.375	.156	.0156	.1732
DCMT32.52EFP	DCMT11T308N-FP			.0313	

DCMT ENK

Rake Angle: 8°





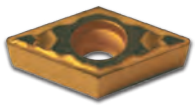


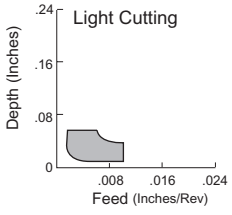
Cutting Conditions:	Coated								Cermet				Uncoated			
Continuous Cut	●															
Medium Cut	●	●														
Interrupted Cut	●	●														
	AC820P	AC830P														

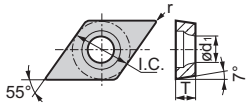
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
DCMT21.51ENK	DCMT070204N-SK	.250	.094	.0156	.110
DCMT32.51ENK	DCMT11T304N-SK	.375	.156	.0156	.1732
DCMT32.52ENK	DCMT11T308N-SK			.0313	

DCMT ELU

Rake Angle: 12°







Cutting Conditions:	Coated												Cermet			Uncoated				
Continuous Cut	●	●	●	●	●	●	●						●	●						
Medium Cut	●	●	●	●	●	●	●						●	●	●					
Interrupted Cut		●	●	●	●	●	●								●					
	AC810P	AC820P	AC700G	AC530U	AC6030M	AC6040M	AC630M						T1500Z	T2000Z	T3000Z					

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
DCMT21.50.5ELU	DCMT070202N-LU	.250	.094	.0078	.110
DCMT21.51ELU	DCMT070204N-LU			.0156	
DCMT32.50.5ELU	DCMT11T302N-LU	.375	.156	.0078	.1732
DCMT32.51ELU	DCMT11T304N-LU			.0156	
DCMT32.52ELU	DCMT11T308N-LU			.0313	

55° DIAMOND TYPE
POSITIVE INSERT

See page 248-259 for running parameters.

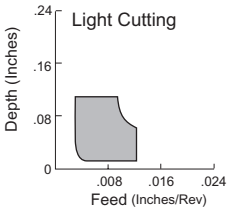
DC — 55° Diamond Type · 7° Relief · With Insert Hole

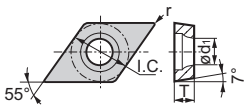
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

DCMT ESU

Rake Angle: 8°

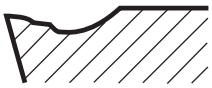


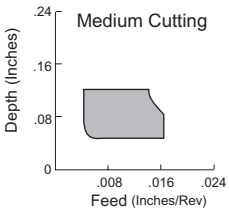


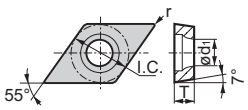
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC810P	AC820P	AC830P	AC700G	AC530U	AC610M	AC6030M	AC6040M	AC630M	AC410K	AC415K	AC510U	AC520U	T1500Z	T2000Z	T3000Z	T1500A	T1200A
DCMT21.50.5ESU	DCMT070202N-SU	.250	.094	.0078	.110		●	●			●	●	●	●			●	●	●	●	●	★	●
DCMT21.51ESU	DCMT070204N-SU			.0156		●	●	●	●	●	●	●	●	●	▲	●	●	●	●	●	●	●	●
DCMT21.52ESU	DCMT070208N-SU			.0313		●	●	●	●	●	●	●	●	●	▲	●	●	●	●	●	●	★	●
DCMT32.50.5ESU	DCMT11T302N-SU	.375	.156	.0078	.1732		●	●			●	●	●	●			●	●	●	●	●	●	●
DCMT32.51ESU	DCMT11T304N-SU			.0156		●	●	●	●	●	●	●	●	●	▲	●	●	●	●	●	●	●	●
DCMT32.52ESU	DCMT11T308N-SU			.0313		●	●	●	●	●	●	●	●	●	▲	●	●	●	●	●	●	●	●

DCMT EMU

Rake Angle: 0°



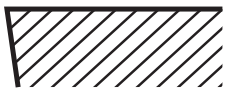




Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC810P	AC820P	AC830P	AC700G	AC405K	AC410K	AC415K	AC420K
DCMT32.51EMU	DCMT11T304N-MU	.375	.156	.0156	.1732	●	●		●	●	▲	●	●
DCMT32.52EMU	DCMT11T308N-MU			.0313		●	●	●	●	●	▲	●	●

DCMA

No Breaker



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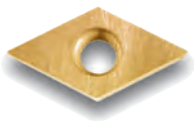

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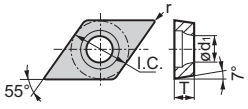


Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC700G	AC405K	AC410K	AC415K	AC420K
DCMA21.51	DCMA070204	.250	.094	.0156	.110	●	●	▲	●	●
DCMA21.52	DCMA070208			.0313			●	▲	●	●
DCMA32.51	DCMA11T304	.375	.156	.0156	.1732	●	●		●	●
DCMA32.52	DCMA11T308			.0313		●	●	▲	●	●

55° DIAMOND TYPE
POSITIVE INSERT

DP — 55° Diamond Type / 11° Relief / With Insert Hole

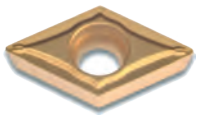
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

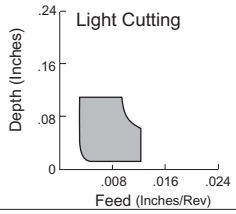
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

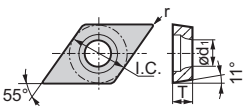
DPMT
ESU

Rake Angle: 8°

Cutting Conditions:	AC820P	AC510U	AC520U								T1500A	T1200A					
											Cermet				Uncoated		
Continuous Cut	●	●									●	●					
Medium Cut	●	●	●								●	●					
Interrupted Cut	●		●								●	●					







Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC820P	AC510U	AC520U	T1500A	T1200A
DPMT 21.51ESU	DPMT 070204N-SU	.250	.094	.0156	.110	●	●	●	●	●
DPMT 32.51ESU	DPMT 11T304N-SU	.375	.156	.0156	.1732	●	●	●	●	●
DPMT 32.52ESU	DPMT 11T308N-SU			.0313		●	●	●	●	●

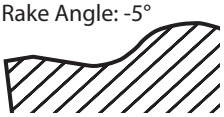
RC — Round Type | 7° Relief | With Insert Hole

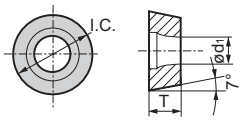
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

RCMT
RX

Rake Angle: -5°



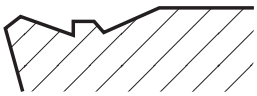


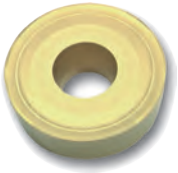
Cutting Conditions:	Coated						Cermet						Uncoated					
Continuous Cut	●	●																
Medium Cut	●	●	●															
Interrupted Cut		●	●															

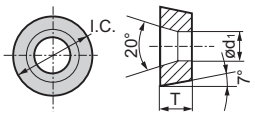
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC810P	AC820P	AC830P
RCMT100300	RCMT1003M0N-RX	.394	.125	-	.1417	●	●	●
RCMT120400	RCMT1204M0N-RX	.472	.1875	-	.1654	●	●	●
RCMT160600	RCMT1606M0N-RX	.630	.250	-	.2047	●	●	●
RCMT200600	RCMT2006M0N-RX	.787	.250	-	.2559	●	●	●
RCMT250700	RCMT2507M0N-RX	.984	.313	-	.2835	●	●	●

RCMX
RP

Rake Angle: -15°







Cutting Conditions:	Coated								Uncoated					
Continuous Cut	●	●		●	●	●		●						
Medium Cut	●	●	●	●	●	●	●	●						
Interrupted Cut		●	●	●			●							

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC810P	AC820P	AC830P	AC700G	AC410K	AC415K	AC420K	AC510U
RCMX100300	RCMX1003M0N-RP	.394	.125	-	.1417	●	●	●	●	▲	★	●	
RCMX120400	RCMX1204M0N-RP	.472	.1875	-	.1654	●	●	●	●	▲	★	●	
RCMX160600	RCMX1606M0N-RP	.630	.250	-	.2047	●	●	●	●	▲	★	●	
RCMX200600	RCMX2006M0N-RP	.787	.250	-	.2559	●	●	●					●
RCMX250700	RCMX2507M0N-RP	.984	.313	-	.2835	●	●	●					

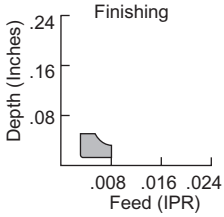
SC — 90° Square Type; 7° Relief; With Insert Hole

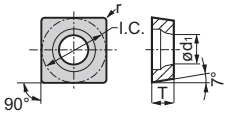
- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-ferrous
- S Exotic Materials
- H Hardened Steel

- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

SCGT FX

Rake Angle: 15°



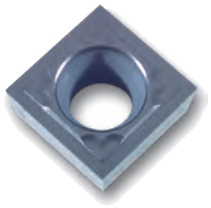


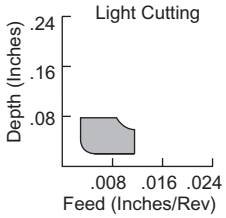
Cutting Conditions:	Coated				Cermet					Uncoated							
	AC530U																
Continuous Cut	●																
Medium Cut	◐																
Interrupted Cut	◌																

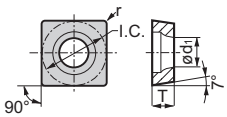
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC530U
SCGT32.50.5RFX	SCGT09T302R-FX	.375	.156	.0078	.1732	★
SCGT32.50.5LFX	SCGT09T302L-FX			.0078		★
SCGT32.51RFX	SCGT09T304R-FX			.0156		★
SCGT32.51LFX	SCGT09T304L-FX			.0156		★

SCGT EFM

Rake Angle: 6°





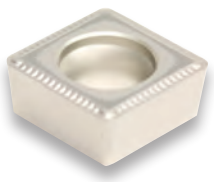


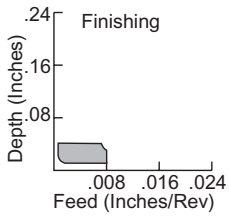
Cutting Conditions:	Coated				Cermet					Uncoated							
	AC530U				T1500A	T1200A											
Continuous Cut	●				●	●											
Medium Cut	◐				◐	◐											
Interrupted Cut	◌				◌	◌											

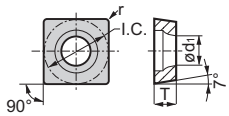
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC530U	T1500A	T1200A
SCGT2.51.50EFM	SCGT070201N-SC	.3125	.094	.0039	.134	★	★	●
SCGT2.51.50.5EFM	SCGT070202N-SC			.0078			●	●
SCGT32.50EFM	SCGT09T301N-SC	.375	.156	.0039	.1732	★		
SCGT32.50.5EFM	SCGT09T302N-SC			.0078		●	★	●

SCMT EFB

Rake Angle: 20°







Cutting Conditions:	Coated				Cermet					Uncoated							
					T1500Z	T1500A											
Continuous Cut					●	●											
Medium Cut					◐	◐											
Interrupted Cut						◌											

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	T1500Z	T1500A
SCMT32.51EFB	SCMT09T304N-FB	.375	.156	.0156	.1732	●	●
SCMT32.52EFB	SCMT09T308N-FB			.0313		●	●

90° SQUARE TYPE
POSITIVE INSERT

See page 248-259 for running parameters.

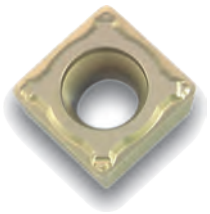
SC — 90° Square Type | 7° Relief | With Insert Hole

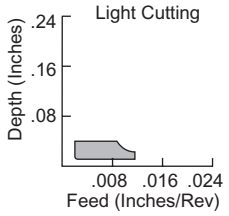
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

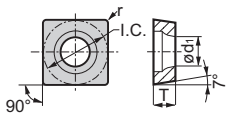
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

SCMT EFP

Rake Angle: 10°







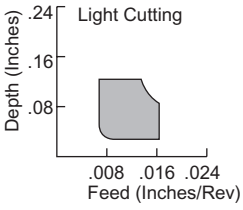
Cutting Conditions:	Coated				Cermet				Uncoated							
Continuous Cut					●	●										
Medium Cut					●	●										
Interrupted Cut					●	●										
					T1500A	T1200A										

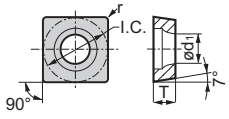
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
SCMT32.51EFP	SCMT09T304N-FP	.375	.156	.0156	.1732
SCMT32.52EFP	SCMT09T308N-FP			.0313	

★	●					
●	●					

SCMT ENK

Rake Angle: 8°





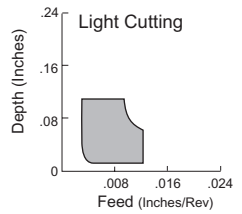
Cutting Conditions:	Coated			Cermet					Uncoated							
Continuous Cut	●		●													
Medium Cut	●	●	●													
Interrupted Cut	●	●	●													
	AC820P	AC830P	AC700G													

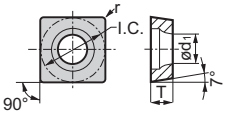
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
SCMT32.51ENK	SCMT09T304N-SK	.375	.156	.0156	.1732
SCMT32.52ENK	SCMT09T308N-SK			.0313	
SCMT431ENK	SCMT120404N-SK	.500	.1875	.0156	.2165
SCMT432ENK	SCMT120408N-SK			.0313	
SCMT433ENK	SCMT120412N-SK			.0469	

●	●					
●	●	●				
●	●					
●	●					
	●					

SCMT ESU

Rake Angle: 8°





Cutting Conditions:	Coated										Cermet			Uncoated				
Continuous Cut	●	●		●	●	●	●	●			●	●						
Medium Cut	●	●	●	●	●	●	●	●			●	●						
Interrupted Cut		●	●	●		●	●	●										
	AC810P	AC820P	AC830P	AC700G	AC610M	AC6030M	AC6040M	AC630M			T1500Z	T2000Z						

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
SCMT32.51ESU	SCMT09T304N-SU	.375	.156	.0156	.1732
SCMT32.52ESU	SCMT09T308N-SU			.0313	
SCMT431ESU	SCMT120404N-SU	.500	.1875	.0156	.2165
SCMT432ESU	SCMT120408N-SU			.0313	

●	●	●	●	★	●	●	●			●	●							
●	●	●	●	●	●	●	●											
	●																	
	●	★																

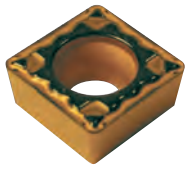
SC — 90° Square Type / 7° Relief / With Insert Hole

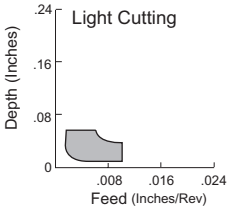
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

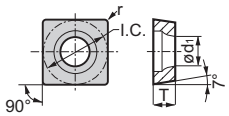
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

SCMT ELU

Rake Angle: 15°





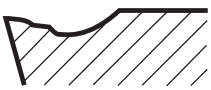


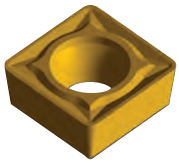
Cutting Conditions:	Coated										Cermet				Uncoated			
	AC810P	AC820P	AC700G	AC6030M	AC6040M	AC630M					T1500Z	T2000Z	T3000Z					
Continuous Cut	●	●	●	●	●	●					●	●						
Medium Cut	●	●	●	●	●	●					●	●	●					
Interrupted Cut		●	●	●	●	●							●					

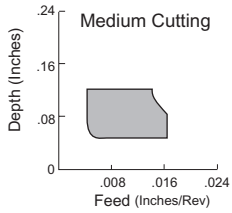
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
SCMT32.51ELU	SCMT09T304N-LU	.375	.156	.0156	.1732
SCMT32.52ELU	SCMT09T308N-LU			.0313	

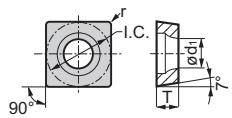
SCMT EMU

Rake Angle: 0°







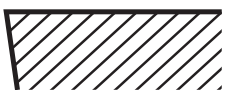


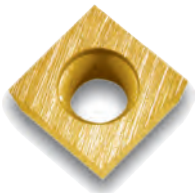
Cutting Conditions:	Coated														Cermet			Uncoated			
	AC810P	AC820P	AC700G	AC405K	AC415K	AC420K															
Continuous Cut	●	●	●	●	●																
Medium Cut	●	●	●		●	●															
Interrupted Cut		●	●			●															

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
SCMT32.52EMU	SCMT09T308N-MU	.375	.156	.0313	.1732
SCMT432EMU	SCMT120408N-MU	.500	.1875	.0313	.2165

SCMA —

No Breaker





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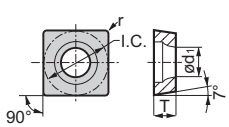


Cutting Conditions:	Coated										Cermet					Uncoated					
	AC700G	AC420K																			
Continuous Cut	●																				
Medium Cut	●	●																			
Interrupted Cut	●	●																			

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
SCMA32.52	SCMA09T308	.375	.156	.0313	.1732
SCMA432	SCMA120408	.500	.1875	.0313	.2165
SCMA433	SCMA120412			.0469	

90° SQUARE TYPE
POSITIVE INSERT

See page 248-259 for running parameters.

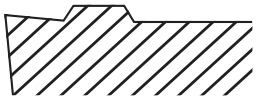
SP — 90° Square Type | 11° Relief | With Insert Hole

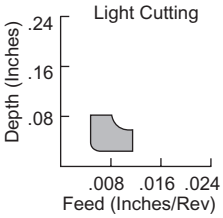
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

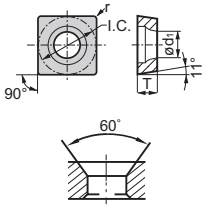
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

SPMT ENS

Rake Angle: 10°





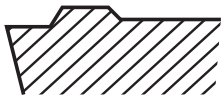


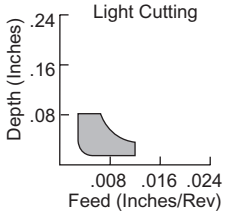
Cutting Conditions:	Coated			Cermet				Uncoated						
Continuous Cut	○	○	○											
Medium Cut	○	○	○											
Interrupted Cut	○	○	○											

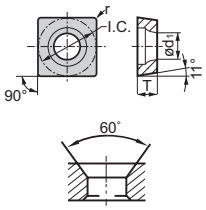
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC6030M	AC6040M	AC630M
SPMT21.51ENS	SPMT060204N-US	.250	.094	.0156	.1102	●	●	●
SPMT2.522ENS	SPMT070308N-US	.3125	.125	.0313	.134	●	●	●
SPMT322ENS	SPMT090308N-US	.375		.0313	.130	●	●	●
SPMT32.52ENX	SPMT09T308N-US	.375	.156	.0313	.1732	●	●	●
SPMT432ENS	SPMT120408N-US	.500	.1875	.0313	.2165	●	●	●

SPMT EFK

Rake Angle: 0°





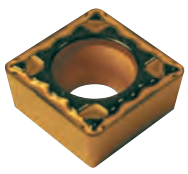


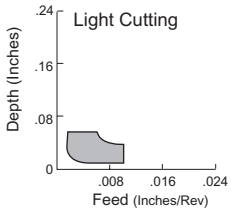
Cutting Conditions:	Coated				Cermet				Uncoated						
Continuous Cut					○	○	○	○							
Medium Cut					○	○	○	○							
Interrupted Cut							○	○							

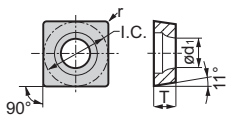
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	T1500Z	T2000Z	T1500A	T1200A
SPMT321EFK	SPMT090304N-FK	.375	.125	.0156	.130				●
SPMT322EFK	SPMT090308N-FK			.0313		●	●	●	●

SPMT ELU

Rake Angle: 15°







Cutting Conditions:	Coated							Cermet	Uncoated
Continuous Cut	○	○	○	○	○	○			
Medium Cut	○	○	○	○	○	○			
Interrupted Cut		○	○	○	○	○			

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC810P	AC820P	AC700G	AC6030M	AC6040M	AC630M
SPMT321ELU	SPMT090304N-LU	.375	.125	.0156	.130			●	●	●	●
SPMT322ELU	SPMT090308N-LU			.0313		★	★	●	●	●	●

90° SQUARE TYPE
POSITIVE INSERT

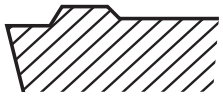
SP — 90° Square Type / 11° Relief / Without Insert Hole

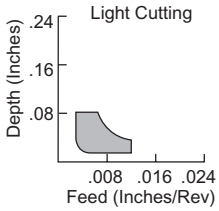
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

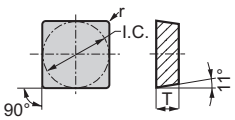
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

SPMR EFK

Rake Angle: 0°





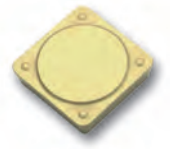


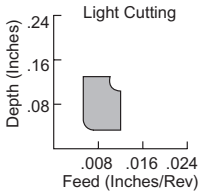
Cutting Conditions:	Coated							Cermet						Uncoated					
Continuous Cut								●	●	●	●								
Medium Cut								●	●	●	●								
Interrupted Cut										●	●								
								T1500Z	T2000Z	T1500A	T1200A								

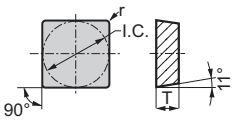
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
SPMR321EFK	SPMR090304N-FK	.375	.125	.0156	-
SPMR322EFK	SPMR090308N-FK			.0313	
SPMR421EFK	SPMR120304N-FK	.500		.0156	
SPMR422EFK	SPMR120308N-FK			.0313	
SPMR423EFK	SPMR120312N-FK			.0469	

SPMR ENF

Rake Angle: 0°







Cutting Conditions:	Coated							Cermet						Uncoated					
Continuous Cut	●																		
Medium Cut	●	●																	
Interrupted Cut	●	●																	
	AC820P	AC830P																	

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
SPMR321ENF	SPMR090304N-SF	.375	.125	.0156	-
SPMR322ENF	SPMR090308N-SF			.0313	
SPMR421ENF	SPMR120304N-SF	.500		.0156	
SPMR422ENF	SPMR120308N-SF			.0313	
SPMR423ENF	SPMR120312N-SF			.0469	

SP — 90° Square Type / 11° Relief / Without Insert Hole

- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

SPG

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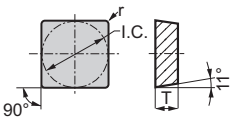
No Breaker



Cutting Conditions:	Coated				Cermet				Uncoated								
Continuous Cut	●	●			●	●	●	●									
Medium Cut	●	●			●	●	●	●	●								
Interrupted Cut	●						●	●									
	AC820P	AC510U			T1500Z	T2000Z	T1500A	T1200A	G10E								

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC820P	AC510U	T1500Z	T2000Z	T1500A	T1200A	G10E
SPG321	SPGN090304	.375	.125	.0156	-					●	●	●
SPG322	SPGN090308			.0313					●	●	●	
SPG421	SPGN120304	.500		.0156						●	★	●
SPG422	SPGN120308			.0313		●	●	●	●	●	●	▲
SPG423	SPGN120312			.0469		●						
SPG424	SPGN120316			.0625							●	
SPG432	SPGN120408		.1875	.0313		●			●			
SPG433	SPGN120412			.0469		●						
SPG632	SPGN190408	.750		.0313		●						
SPG633	SPGN190412			.0469		●					●	
SPG634	SPGN190416			.0625		●						

SPMN

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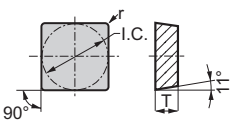
No Breaker



Cutting Conditions:	Coated					Cermet			Uncoated								
Continuous Cut	●	●	●	●		●	●										
Medium Cut	●	●	●	●	●	●	●		●								
Interrupted Cut	●	●			●	●	●										
	AC820P	AC700G	AC410K	AC415K	AC420K	T1500A	T1200A		G10E								

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC820P	AC700G	AC410K	AC415K	AC420K	T1500A	T1200A	G10E
SPMN321	SPMN090304	.375	.125	.0156	-			▲	●	●			
SPMN322	SPMN090308			.0313		●	●	▲	★	●	★	★	
SPMN421	SPMN120304	.500		.0156		●	★	▲	●	●			
SPMN422	SPMN120308			.0313		●		▲	●	●	★	★	
SPMN423	SPMN120312			.0469						●	★	★	★
SPMN532	SPMN150408	.625	.1875	.0313									★
SPMN533	SPMN150412			.0469									★
SPMN634	SPMN190416	.750		.0625		●							

TRIANGULAR TYPE
POSITIVE INSERT

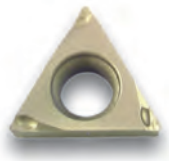
TB — Triangular Type · 5° Relief · With Insert Hole

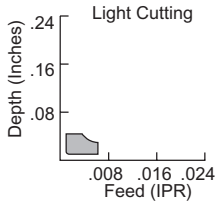
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

TBGT FW

Rake Angle: 15°



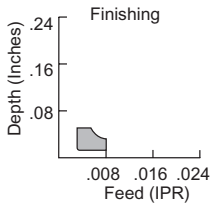


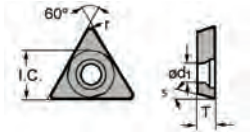
Cutting Conditions:	Coated				Cermet				Uncoated							
Continuous Cut					●	●	●	●								
Medium Cut					●	●	●	●								
Interrupted Cut							●	●								
					T1500Z	T2000Z	T1500A	T1200A								

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	T1500Z	T2000Z	T1500A	T1200A
TBGT520.5RFW	TBGT060102R-FW	.156	.0625	.0078	.090			★	●
TBGT520.5LFW	TBGT060102L-FW			.0078		●	●	●	●
TBGT521RFW	TBGT060104R-FW			.0156				★	●
TBGT521LFW	TBGT060104L-FW			.0156		●	●	●	●

TBGT FX

Rake Angle: 15°



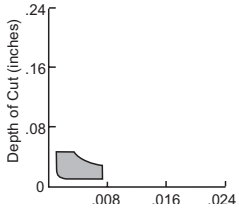


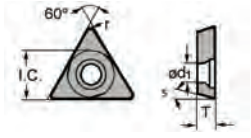
Cutting Conditions:	Coated			Cermet	Uncoated
Continuous Cut					
Medium Cut					
Interrupted Cut					
	AC820P	AC530U	AC510U		

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC820P	AC530U	AC510U
TBGT520.5RFX	TBGT060102R-FX	.156	.0625	.0078	.090		●	
TBGT520.5LFX	TBGT060102L-FX			.0078		●	★	●
TBGT521RFX	TBGT060104R-FX			.0156			★	●
TBGT521LFX	TBGT060104L-FX			.0156		●	★	●

TBGT FY

Rake Angle: 15°





Cutting Conditions:	Coated		Cermet		Uncoated											
Continuous Cut																
Medium Cut																
Interrupted Cut																
	AC530U		T1500A	T1200A												

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC530U	T1500A	T1200A
TBGT520RFY	TBGT060101R-FY	.156	.0625	.0039	.090	★		
TBGT520LFY	TBGT060101L-FY			.0039		●		
TBGT520.5RFY	TBGT060102R-FY			.0078			★	
TBGT521RFY	TBGT060104R-FY			.0156			★	●
TBGT521LFY	TBGT060104L-FY			.0156		★	●	●

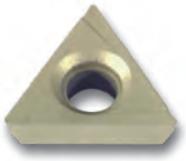
TB — Triangular Type / 5° Relief / With Insert Hole

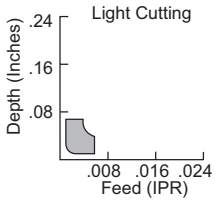
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

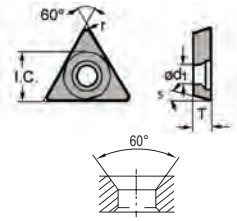
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

TBGT W

Rake Angle: 10°





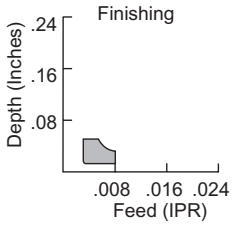


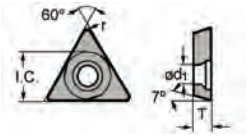
Cutting Conditions:	Coated				Cermet				Uncoated							
Continuous Cut					●	●										
Medium Cut					●	●										
Interrupted Cut						●										

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	T1500Z	T1500A
TBGT520.5R	TBGT060102R-W	.156	.0625	.0078	.090	●	●
TBGT520.5L	TBGT060102L-W			.0078		●	●
TBGT521R	TBGT060104R-W			.0156		●	●
TBGT521L	TBGT060104L-W			.0156		●	●

TCGT FX

Rake Angle: 15°



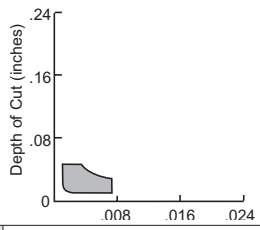


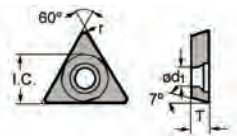
Cutting Conditions:	Coated				Cermet				Uncoated							
Continuous Cut	●															
Medium Cut	●															
Interrupted Cut	●															

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC530U
TCGT1.81.50RFX	TCGT090201R-FX	.219	.094	.0039	.098	★
TCGT1.81.50.5RFX	TCGT090202R-FX			.0078		★
TCGT1.81.50.5LFX	TCGT090202L-FX			.0078		★
TCGT21.50RFX	TCGT110201R-FX	.250		.0039	.110	★
TCGT21.50LFX	TCGT110201L-FX			.0039		★
TCGT21.50.5RFX	TCGT110202R-FX			.0078		★

TCGT FY

Rake Angle: 15°





Cutting Conditions:	Coated								Cermet				Uncoated			
Continuous Cut	●															
Medium Cut	●															
Interrupted Cut	●															

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC530U
TCGT1.81.50LFY	TCGT090201L-FY	.219	.094	.0039	.098	★
TCGT21.50.5LFY	TCGT110202L-FY	.250		.0078	.110	★

TC

Triangular Type
7° Relief
With Insert Hole

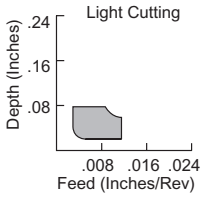
- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-ferrous
- S Exotic Materials
- H Hardened Steel

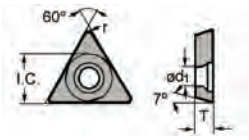
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

TCGT EFM

Rake Angle: 6°

Cutting Conditions:	Coated				Cermet				Uncoated							
	AC530U				T1500Z	T2000Z	T1500A	T1200A								
Continuous Cut	●				●	●	●	●								
Medium Cut	●				●	●	●	●								
Interrupted Cut	●						●	●								





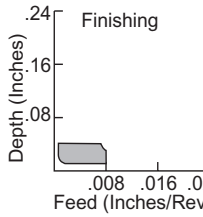
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
TCGT630EFM	TCGT080201N-SC	.1875	.094	.0039	.090
TCGT630MEFM	TCGT080201MN-SC			.0039	
TCGT630.5EFM	TCGT080202N-SC			.0078	
TCGT630.5MEFM	TCGT080202MN-SC			.0078	
TCGT1.81.50EFM	TCGT090201N-SC	.219		.0039	.098
TCGT1.81.50.5EFM	TCGT090202N-SC			.0078	
TCGT21.50EFM	TCGT110201N-SC	.250		.0039	.110
TCGT21.50MEFM	TCGT110201MN-SC			.0039	
TCGT21.50.5EFM	TCGT110202N-SC			.0078	
TCGT21.50.5MEFM	TCGT110202MN-SC			.0078	

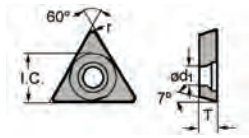
M = Negative nose radius tolerance (-0.0001" to -0.0004")

TCMT EFB

Rake Angle: 20°

Cutting Conditions:	Coated				Cermet				Uncoated							
					T1500Z	T1500A										
Continuous Cut					●	●										
Medium Cut					●	●										
Interrupted Cut						●										





Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
TCMT21.51EFB	TCMT110204N-FB	.250	.094	.0156	.110
TCMT21.52EFB	TCMT110208N-FB			.0313	

See page 248-259 for running parameters.

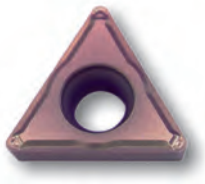
TC — Triangular Type / 7° Relief / With Insert Hole

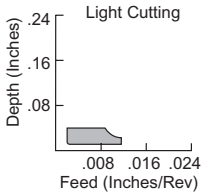
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

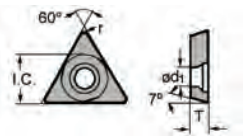
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

TCMT EFP

Rake Angle: 10°





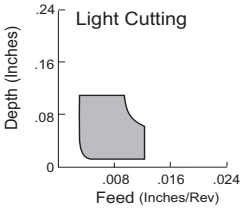


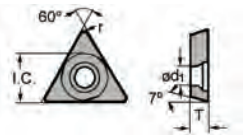
Cutting Conditions:	Coated				Cermet				Uncoated							
Continuous Cut					●	●	●	●								
Medium Cut					●	●	●	●								
Interrupted Cut							●	●								

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	T1500Z	T2000A	T1500A	T1200A
TCMT21.51EFP	TCMT110204N-FP	.250	.094	.0156	.110	●	●	●	●
TCMT21.52EFP	TCMT110208N-FP			.0313		●	●	●	●
TCMT32.51EFP	TCMT16T304N-FP	.375	.156	.0156	.1693	●	●	●	●
TCMT32.52EFP	TCMT16T308N-FP			.0313		●	●	●	●

TCMT ESU

Rake Angle: 8°



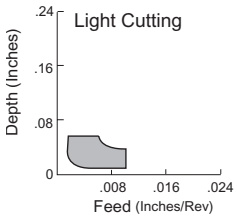


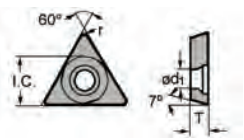
Cutting Conditions:	Coated													Cermet		
Continuous Cut	●	●		●	●	●	●	●	●	●	●	●		●	●	●
Medium Cut	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●
Interrupted Cut		●	●	●		●	●	●					●			●

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC810P	AC820P	AC830P	AC700G	AC610M	AC6030M	AC6040M	AC630M	AC405K	AC410K	AC415K	AC510U	AC520U	T1500Z	T2000Z	T1500A
TCMT21.51ESU	TCMT110204N-SU	.250	.094	.0156	.110	●	●	●	●	●	●	●	●	●	▲	●	●	●	●	●	
TCMT21.52ESU	TCMT110208N-SU			.0313		●	●		●	●	●	●	●	●	▲	●	●	●			
TCMT32.51ESU	TCMT16T304N-SU	.375	.156	.0156	.1693	●	●		●	●	●	●	●	●	▲	●	●	●			●
TCMT32.52ESU	TCMT16T308N-SU			.0313		●	●	●	●	●	●	●	●	●	▲	●	●	●			●

TCMT ELU

Rake Angle: 15°





Cutting Conditions:	Coated								Cermet			Uncoated		
Continuous Cut	●	●	●	●	●	●			●	●				
Medium Cut	●	●	●	●	●	●			●	●	●			
Interrupted Cut	●	●	●	●	●	●					●			

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC810P	AC820P	AC700G	AC6030M	AC6040M	AC630M	T1500Z	T2000Z	T3000Z
TCMT21.51ELU	TCMT110204N-LU	.250	.094	.0156	.110	●	●	●	●	●	●	●	●	●
TCMT21.52ELU	TCMT110208N-LU	.250	.094	.0313	.110	●	●	●	●		●	●	●	●
TCMT32.52ELU	TCMT16T308N-LU	.375	.156	.0313	.1693	●	●	●	●	●	●	●	●	●

See page 248-259 for running parameters.

TRIANGULAR TYPE
POSITIVE INSERT

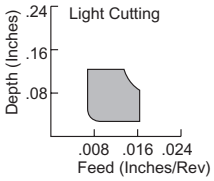
TC — Triangular Type · 7° Relief · With Insert Hole

- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

TCMT ENK

Rake Angle: 8°



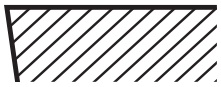
Cutting Conditions:	AC810P	AC820P	AC830P	AC700G
Continuous Cut	●	●		●
Medium Cut	●	●	●	●
Interrupted Cut		●	●	●

Coated · Cermet · Uncoated

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC810P	AC820P	AC830P	AC700G
TCMT21.51ENK	TCMT110204N-SK	.250	.094	.0156	.110	●	●	●	●
TCMT21.52ENK	TCMT110208N-SK			.0313		●	●	●	●
TCMT32.51ENK	TCMT16T304N-SK	.375	.156	.0156	.1693	●	●	●	●
TCMT32.52ENK	TCMT16T308N-SK			.0313		●	●	●	●
TCMT32.53ENK	TCMT16T312N-SK			.0469		●	●	●	

TCMA -

No Breaker



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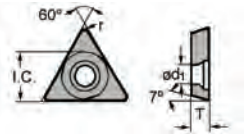


Cutting Conditions:	AC700G	AC405K	AC410K	AC415K	AC420K
Continuous Cut	●	●	●	●	
Medium Cut	●		●	●	●
Interrupted Cut	●				●

Coated · Cermet · Uncoated

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC700G	AC405K	AC410K	AC415K	AC420K
TCMA21.51	TCMW 110204	.250	.094	.0156	.110	●	●	▲	●	●
TCMA21.52	TCMW 110208			.0313		●	●	▲	●	●
TCMA32.51	TCMW 16T304	.375	.156	.0156	.1693	●	●	▲	●	●
TCMA32.52	TCMW 16T308			.0313		●	●	▲	●	●
TCMA32.53	TCMW 16T312			.0469		●				●

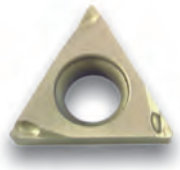
TP — Triangular Type / 11° Relief / With Insert Hole

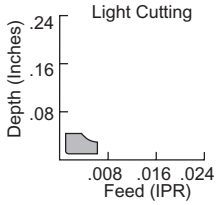
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

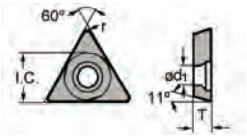
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

TPGT FW

Rake Angle: 15°







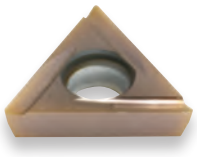
Cutting Conditions:	Coated							Cermet				Uncoated				
Continuous Cut								●	●	●	●					
Medium Cut								●	●	●	●					
Interrupted Cut										●	●					
								T1500Z	T2000Z	T1500A	T1200A					

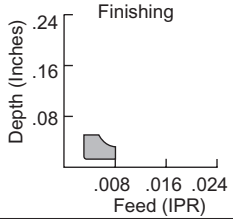
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
TPGT630.5RFW	TPGT080202R-FW	.1875	.094	.0078	.090
TPGT630.5LFW	TPGT080202L-FW			.0078	
TPGT631RFW	TPGT080204R-FW			.0156	
TPGT631LFW	TPGT080204L-FW			.0156	
TPGT21.50.5RFW	TPGT110202R-FW	.250		.0078	.110
TPGT21.50.5LFW	TPGT110202L-FW			.0078	
TPGT21.51RFW	TPGT110204R-FW			.0156	
TPGT21.51LFW	TPGT110204L-FW			.0156	

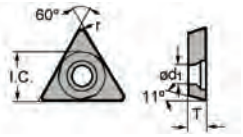
Sumitomo Catalog #	T1500Z	T2000Z	T1500A	T1200A
TPGT630.5RFW			●	●
TPGT630.5LFW	●	●	★	●
TPGT631RFW	●	●	★	●
TPGT631LFW	●	●	●	●
TPGT21.50.5RFW	●	●	★	●
TPGT21.50.5LFW	●	●	●	●
TPGT21.51RFW	●	●	★	●
TPGT21.51LFW	●	●	●	●

TPGT FX

Rake Angle: 15°







Cutting Conditions:	Coated										Cermet		Uncoated				
Continuous Cut	●	●									●	●					
Medium Cut	●	●									●	●					
Interrupted Cut	●										●	●					
	AC530U	AC510U									T1500A	T1200A					

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
TPGT630.5RFX	TPGT080202R-FX	.1875	.094	.0078	.090
TPGT630.5LFX	TPGT080202L-FX			.0078	
TPGT631RFX	TPGT080204R-FX			.0156	
TPGT631LFX	TPGT080204L-FX			.0156	
TPGT1.81.51LFX	TPGT090204L-FX	.219		.0156	.102
TPGT21.50.5RFX	TPGT110202R-FX	.250		.0078	.110
TPGT21.50.5LFX	TPGT110202L-FX			.0078	
TPGT21.51RFX	TPGT110204R-FX			.0156	
TPGT21.51LFX	TPGT110204L-FX			.0156	
TPGT21.52LFX	TPGT110208L-FX			.0313	
TPGT220.5RFX	TPGT110302R-FX		.125	.0078	.130
TPGT220.5LFX	TPGT110302L-FX			.0078	
TPGT221RFX	TPGT110304R-FX			.0156	
TPGT221LFX	TPGT110304L-FX			.0156	

Sumitomo Catalog #	AC530U	AC510U	T1500A	T1200A
TPGT630.5RFX	★	●		
TPGT630.5LFX	★	●		
TPGT631RFX	★	●		
TPGT631LFX	●	●		
TPGT1.81.51LFX			●	●
TPGT21.50.5RFX		●		
TPGT21.50.5LFX		●		
TPGT21.51RFX		●		
TPGT21.51LFX		●		
TPGT21.52LFX		●		
TPGT220.5RFX	★			
TPGT220.5LFX	★			
TPGT221RFX	★			
TPGT221LFX	●			

TP

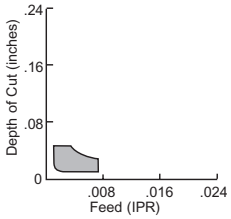
Triangular Type
11° Relief
With Insert Hole

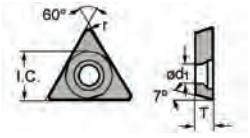
P Steel
M Stainless Steel
K Cast Iron
N Non-ferrous
S Exotic Materials
H Hardened Steel

● USA Stocked Item
★ Worldwide Warehouse Item
▲ USA Limited Availability Item
○ Available 2nd Quarter 2015

TPGT FY

Rake Angle: 15°



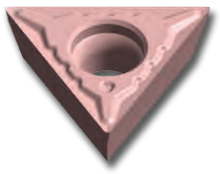


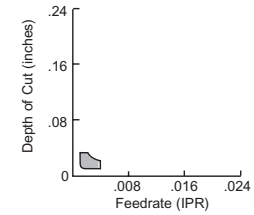
Cutting Conditions:	Coated	Cermet					Uncoated					
	AC530U	T1500Z	T2000Z	T3000Z	T1500A	T1200A						
Continuous Cut	●	●	●		●	●						
Medium Cut	●	●	●	●	●	●						
Interrupted Cut	●			●	●	●						

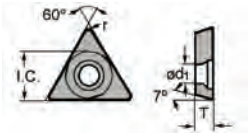
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC530U	T1500Z	T2000Z	T3000Z	T1500A	T1200A
TPGT630RFY	TPGT080201R-FY	.1875	.094	.0039	.090	★					
TPGT630LFY	TPGT080201L-FY			.0039		★					
TPGT630.5RFY	TPGT080202R-FY			.0078		★				★	●
TPGT630.5LFY	TPGT080202L-FY			.0078		★				★	●
TPGT631RFY	TPGT080204R-FY			.0156						●	●
TPGT631LFY	TPGT080204L-FY			.0156		★				★	●
TPGT21.50.5RFY	TPGT110202R-FY			.0078	.110					★	●
TPGT21.50.5LFY	TPGT110202L-FY			.0078						★	●
TPGT21.51RFY	TPGT110204R-FY			.0156						★	●
TPGT21.51LFY	TPGT110204L-FY			.0156						★	●
TPGT21.52LFY	TPGT110208L-FY			.0313						●	●
TPGT220RFY	TPGT110301R-FY	.250	.125	.0039	.130	★	●	●			
TPGT220LFY	TPGT110301L-FY			.0039		★					
TPGT220.5RFY	TPGT110302R-FY			.0078						★	▲
TPGT220.5LFY	TPGT110302L-FY			.0078			●	●	●	★	●
TPGT221RFY	TPGT110304R-FY			.0156			●	●		★	●
TPGT221LFY	TPGT110304L-FY			.0156		★	●	●		●	●
TPGT222RFY	TPGT110308R-FY			.0313		★				★	●
TPGT222LFY	TPGT110308L-FY			.0313		●					

TPGT EFC

Rake Angle: 15°







Cutting Conditions:	Coated	Cermet					Uncoated					
	AC530U	T1500A										
Continuous Cut	●	●										
Medium Cut	●	●										
Interrupted Cut	●	●										

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC530U	T1500A
TPGT220.5EFC	TPGT110302N-FC	.250	.125	.0078	.130	●	●
TPGT220.5MEFC	TPGT110302MN-FC			.0078			●
TPGT221EFC	TPGT110304N-FC			.0156		●	
TPGT221MEFC	TPGT110304MN-FC			.0156			●

M = Negative nose radius tolerance (-0.0001" to -0.0004")

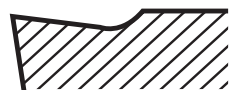
TP — Triangular Type / 11° Relief / With Insert Hole

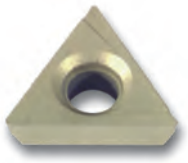
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

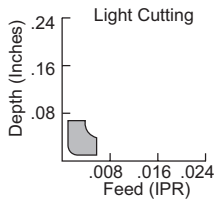
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

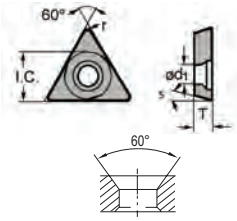
TPGT — W

Rake Angle: 10°







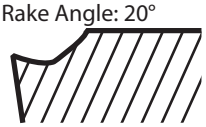


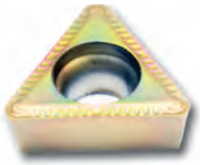
Cutting Conditions:	Coated				Cermet					Uncoated							
	AC530U	AC510U			T1500Z	T2000Z	T3000Z	T1500A	T1200A	G10E							
Continuous Cut	○	●			○	○		○	○								
Medium Cut	◐	◐			◐	◐	◐	◐	◐	◐							
Interrupted Cut	◌						◌	◌	◌								

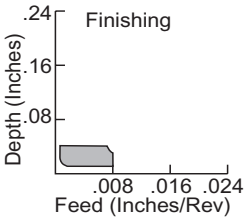
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC530U	AC510U	T1500Z	T2000Z	T3000Z	T1500A	T1200A	G10E
TPGT630.5R	TPGT080202R-W	.1875	.094	.0078	.090	★		●	●		●	●	▲
TPGT630.5L	TPGT080202L-W			.0078		★	●	●	●	●	●	●	●
TPGT631R	TPGT080204R-W			.0156		●		★	●		●	●	
TPGT631L	TPGT080204L-W			.0156		★		●	●	●	●	●	

TPMT — EFB

Rake Angle: 20°





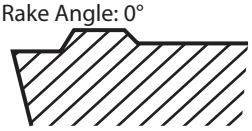


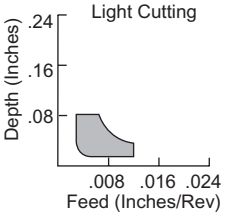
Cutting Conditions:	Coated				Cermet					Uncoated							
					T1500Z												
Continuous Cut					○												
Medium Cut					◐												
Interrupted Cut																	

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	T1500Z
TPMT222EFB	TPMT110308N-FB	.250	.125	.0313	.110	●

TPMT — EFK

Rake Angle: 0°





Cutting Conditions:	Coated				Cermet				Uncoated								
					T1500Z	T2000Z	T1500A	T1200A									
Continuous Cut					○	○	○	○									
Medium Cut					◐	◐	◐	◐									
Interrupted Cut							◌	◌									

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	T1500Z	T2000Z	T1500A	T1200A
TPMT221EFK	TPMT110304N-FK	.250	.125	.0156	.110	●	●	●	●
TPMT222EFK	TPMT110308N-FK			.0313			●	●	●
TPMT331EFK	TPMT160404N-FK	.375	.1875	.0156	.1693		●	●	●
TPMT332EFK	TPMT160408N-FK			.0313			●	●	●

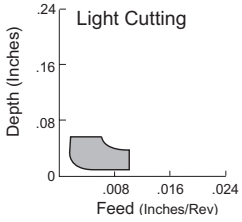
TP — Triangular Type / 11° Relief / With Insert Hole

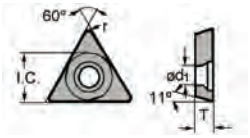
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

TPMT ELU

Rake Angle: 15°



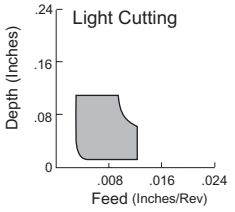


Cutting Conditions:	Coated							Cermet						Uncoated			
Continuous Cut	●	●	●	●	●	●	●	●	●								
Medium Cut	●	●	●	●	●	●	●	●	●	●							
Interrupted Cut		●	●	●	●	●	●			●							

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC810P	AC820P	AC700G	AC530U	AC6030M	AC6040M	AC630M	T1500Z	T2000Z	T3000Z
TPMT1.81.50.5ELU	TPMT090202N-LU	.219	.094	.0078	.110		●								
TPMT1.81.51ELU	TPMT090204N-LU			.0156			●								
TPMT221ELU	TPMT110304N-LU	.250	.125	.0156		●	●	●	★	●	●	●	●	●	●
TPMT222ELU	TPMT110308N-LU			.0313		●	●	●	★	●	●	●	●	●	

TPMT ESU

Rake Angle: 8°



Cutting Conditions:	Coated										Cermet					UC	
Continuous Cut	●	●		●	●	●	●	●	●		●	●		●	●		
Medium Cut	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
Interrupted Cut		●	●	●		●	●	●	●	●			●	●	●		

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC810P	AC820P	AC830P	AC700G	AC610M	AC6030M	AC6040M	AC630M	AC510U	AC520U	T1500Z	T2000Z	T3000Z	T1500A	T1200A
TPMT1.81.50.5ESU	TPMT090202N-SU	.219	.094	.0078	.102		●													▲
TPMT1.81.51ESU	TPMT090204N-SU			.0156			●												●	●
TPMT21.50.5ESU	TPMT110202N-SU	.250		.0078	.107	●	●		●					●	●				●	●
TPMT21.51ESU	TPMT110204N-SU			.0156		●	●		●					●	●				●	●
TPMT21.52ESU	TPMT110208N-SU			.0313		●	●		●					●	●				●	●
TPMT220.5ESU	TPMT110302N-SU		.125	.0078	.130		●	★		●	●	●	●			●	●		●	●
TPMT221ESU	TPMT110304N-SU			.0156		●	●	★		●	●	●	●			●	●	●	●	●
TPMT222ESU	TPMT110308N-SU			.0313		●	●	★		●	●	●	●			●	●	●	●	●
TPMT32.51ESU	TPMT16T304N-SU	.375	.156	.0156	.1693	●	●		●					●	●				●	●
TPMT32.52ESU	TPMT16T308N-SU			.0313		●	●		●					●	●				●	●
TPMT331ESU	TPMT160404N-SU		.1875	.0156			●	●		●	●	●	●			●	●	●	★	●
TPMT332ESU	TPMT160408N-SU			.0313			●	●		●	●	●	●			●	●	●	★	●

TRIANGULAR TYPE
POSITIVE INSERT

See page 248-259 for running parameters.

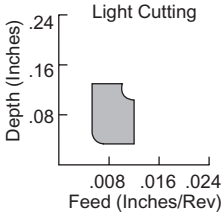
TP — Triangular Type / 11° Relief / With Insert Hole

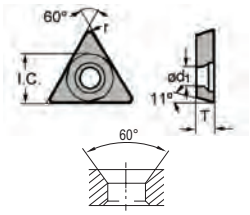
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

TPMT ENF

Rake Angle: 0°



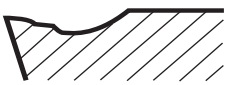


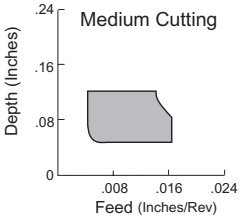
Cutting Conditions:	Coated								Cermet				Uncoated					
Continuous Cut	○		○	○														
Medium Cut	○	○	○	○														
Interrupted Cut	○	○	○															

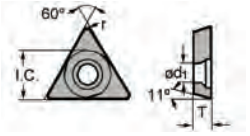
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC820P	AC830P	AC700G	AC510U
TPMT221ENF	TPMT110304N-SF	.250	.125	.0156	.130	●	●	●	●
TPMT222ENF	TPMT110308N-SF			.0313		●	●	●	●
TPMT331ENF	TPMT160404N-SF	.375	.1875	.0156	.1693	●	●	●	●
TPMT332ENF	TPMT160408N-SF			.0313		●	●	●	●

TPMT EMU

Rake Angle: 0°







Cutting Conditions:	Coated					Cermet			Uncoated					
Continuous Cut	○	○	○	○										
Medium Cut	○	○	○	○	○									
Interrupted Cut		○	○		○									

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC810P	AC820P	AC700G	AC410K	AC420K
TPMT221EMU	TPMT110304N-MU	.250	.125	.0156	.130	●	●	●	▲	●
TPMT222EMU	TPMT110308N-MU			.0313		●	●	●	▲	●
TPMT331EMU	TPMT160404N-MU	.375	.1875	.0156	.1693	●	●	●	▲	●
TPMT332EMU	TPMT160408N-MU			.0313		●	●	●	▲	●

TRIANGULAR TYPE
POSITIVE INSERT

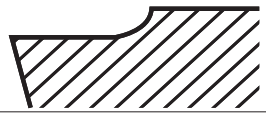
TP — Triangular Type / 11°Relief / With Insert Hole

- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

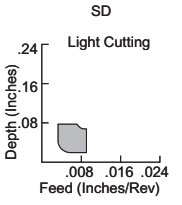
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USALimited Availability Item
- ○ New Product Arriving 2nd Quarter 2015

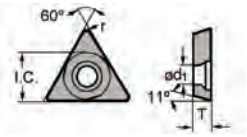
TPGG — SD

Rake Angle: 0°



Cutting Conditions:	Coated								Cermet						Uncoated			
Continuous Cut	●	●							●	●		●	●					
Medium Cut	●	●							●	●	●	●	●		●			
Interrupted Cut	●										●	●	●					



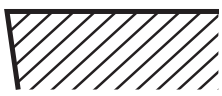


Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC530U	AC510U	T1500Z	T2000Z	T3000Z	T1500A	T1200A	G10E
TPGG220.5R	TPGT110302R-SD	.250	.125	.0078	.130	★		●	●		●	●	
TPGG220.5L	TPGT110302L-SD			.0078				★	●	●	●	●	
TPGG221R	TPGT110304R-SD			.0156		★	●	●	●	★	●	●	
TPGG221RW	TPGT110304RW-SD			.0156					●				
TPGG221L	TPGT110304L-SD			.0156		★	●		●	★	●	●	●
TPGG221LW	TPGT110304LW-SD			.0156					●				
TPGG222R	TPGT110308R-SD			.0313		★					●	●	
TPGG222RW	TPGT110308RW-SD			.0313					●	●			
TPGG222L	TPGT110308L-SD			.0313				●	●	★	●	●	
TPGG222LW	TPGT110308LW-SD			.0313						●			
TPGG321R	TPGT160304R-SD	.375		.0156	.1693						●	●	
TPGG321L	TPGT160304L-SD			.0156					●		●	●	
TPGG322R	TPGT160308R-SD			.0313							●	●	
TPGG322L	TPGT160308L-SD			.0313							●	●	
TPGG330R	TPGT160401R-SD		.1875	.0039									●
TPGG330L	TPGT160401L-SD			.0039							●	●	●
TPGG330.5R	TPGT160402R-SD			.0078							●	●	
TPGG330.5L	TPGT160402L-SD			.0078				●	●		●	●	
TPGG331R	TPGT160404R-SD			.0156			●	●	●	★	●	●	●
TPGG331L	TPGT160404L-SD			.0156			●	●	●	★	●	●	●
TPGG332R	TPGT160408R-SD			.0313							●	●	★
TPGG332L	TPGT160408L-SD			.0313				●	●		●	●	

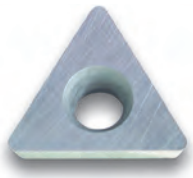
W = Wiper insert

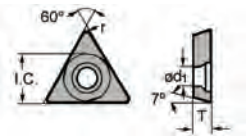
TPGA

No Breaker



Cutting Conditions:	Coated				Cermet		Uncoated							
Continuous Cut					●	●								
Medium Cut					●	●	●							
Interrupted Cut					●	●								





Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	T1500A	T1200A	G10E
TPGA220.5	TPGW110302	.250	.125	.0078	.130	●	●	
TPGA221	TPGW110304			.0156		●	●	★
TPGA222	TPGW110308			.0313		●	●	●
TPGA331	TPGW160404	.375	.1875	.0156				▲

See page 248-259 for running parameters.

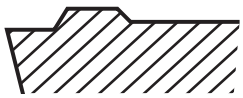
TP — Triangular Type / 11°Relief / Without Insert Hole

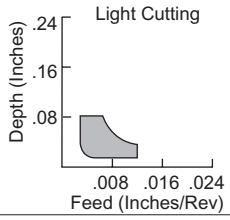
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

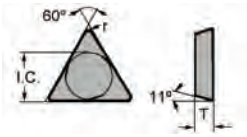
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USALimited Availability Item
- ○ New Product Arriving 2nd Quarter 2015

TPMR EFK

Rake Angle: 0°





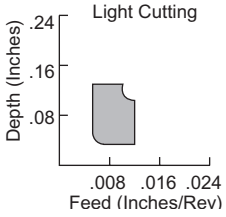


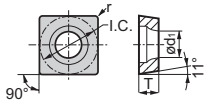
Cutting Conditions:	Coated				Cermet				Uncoated							
Continuous Cut					●	●	●	●								
Medium Cut					●	●	●	●								
Interrupted Cut							●	●								
					T1500Z	T2000Z	T1500A	T1200A								

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
TPMR1.81.50.5EFK	TPMR090202N-FK	.219	.094	.0078	-
TPMR1.81.51EFK	TPMR090204N-FK			.0156	
TPMR1.81.52EFK	TPMR090208N-FK			.0313	
TPMR220.5EFK	TPMR110302N-FK	.250	.125	.0078	
TPMR221EFK	TPMR110304N-FK			.0156	
TPMR222EFK	TPMR110308N-FK			.0313	
TPMR321EFK	TPMR160304N-FK	.375		.0156	
TPMR322EFK	TPMR160308N-FK			.0313	
TPMR323ENK	TPMR160312N-FK			.0469	

TPMR ENF

Rake Angle: 0°





Cutting Conditions:	Coated				Cermet			Uncoated			
Continuous Cut	●		●								
Medium Cut	●	●	●								
Interrupted Cut	●	●	●								
	AC820P	AC830P	AC700G								

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
TPMR221ENF	TPMR110304N-SF	.250	.125	.0156	-
TPMR222ENF	TPMR110308N-SF			.0313	
TPMR321ENF	TPMR160304N-SF	.375		.0156	
TPMR322ENF	TPMR160308N-SF			.0313	
TPMR323ENF	TPMR160312N-SF			.0469	
TPMR432ENF	TPMR220408N-SF	.500	.1875	.0313	
TPMR433ENF	TPMR220412N-SF			.0469	

TRIANGULAR TYPE
POSITIVE INSERT

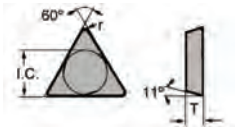
TP — Triangular Type / 11°Relief / Without Insert Hole

- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-ferrous
- S Exotic Materials
- H Hardened Steel

- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USALimited Availability Item
- ○ Available 2nd Quarter 2015

TPG

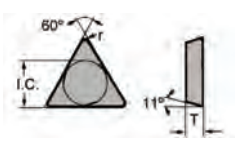
No Breaker



Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC820P	AC510U	T1500Z	T2000Z	T1500A	T1200A	A30	G10E	H1
TPG220.5	TPGN110302	.250	.125	.0078	-					●	●			●
TPG221	TPGN110304			.0156		●			●	●	●			★
TPG222	TPGN110308			.0313		●			●	●	●			★
TPG320.5	TPGN160302	.375		.0078				●	●	●	●		●	
TPG321	TPGN160304			.0156		●	●	●	●	●	●	▲	●	
TPG322	TPGN160308			.0313		●	●	●	●	●	●	★	●	
TPG323	TPGN160312			.0469		●							●	
TPG324	TPGN160316			.0625		●								
TPG332	TPGN160408		.1875	.0313		●								
TPG431	TPGN220404	.500		.0156		●				●	●			
TPG432	TPGN220408			.0313		●	●			●	●	★	●	
TPG433	TPGN220412			.0469		●					▲			
TPG434	TPGN220416			.0625		●					●			
TPG436	TPGN220424			.0938		●								

TPMN

No Breaker



Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC820P	AC700G	AC410K	AC420K	T1500A	T1200A	A30
TPMN221	TPMN110304	.250	.125	.0156	-		★	▲	●			★
TPMN222	TPMN110308			.0313			★	▲	●			★
TPMN321	TPMN160304	.375		.0156		●		▲	●			★
TPMN322	TPMN160308			.0313		●	●	▲	●	★	★	●
TPMN323	TPMN160312			.0469			★	▲	●			★
TPMN431	TPMN220404	.500	.1875	.0156								★
TPMN432	TPMN220408			.0313		●	●			★	★	●
TPMN433	TPMN220412			.0469		●	●					
TPMN434	TPMN220416			.0625								★

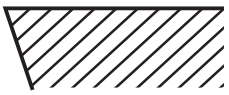
P Steel
M Stainless Steel
K Cast Iron
N Non-ferrous
S Exotic Materials
H Hardened Steel

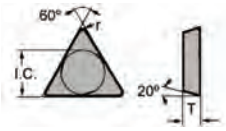
● USA Stocked Item
★ Worldwide Warehouse Item
▲ USALimited Availability Item
○ Available 2nd Quarter 2015

TP — Triangular Type / 11°Relief / Without Insert Hole

TEGE

No Breaker



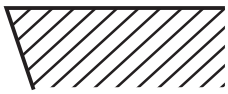


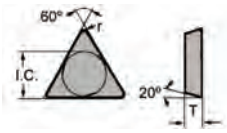
Cutting Conditions:	Coated				Cermet				Uncoated							
Continuous Cut									●							
Medium Cut									◖							
Interrupted Cut																
									H1							

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1												
TEGE21.50.5	TEGE110202	.250	.094	.0078	-											●	

TEGN

No Breaker





Cutting Conditions:	Coated				Cermet				Uncoated							
Continuous Cut					●	●			●							
Medium Cut					◖	◖			◖							
Interrupted Cut					◌	◌										
					T1500A	T1200A			H1							

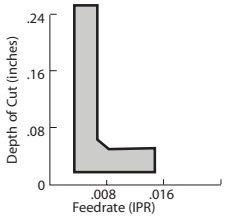
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1												
TEGN220.5	TEGN110302	.250	.125	.0078	-											●	
TEGN222	TEGN110308			.0313												★	
TEGN320.5	TEGN160302	.375		.0078												●	
TEGN322	TEGN160308			.0313												★	

VB — 35° Diamond Type / 5°Relief / With Insert Hole

♦ : Available 3rd Quarter 2015

VBGT
ESI

Rake Angle: 15°



Cutting Conditions:	Coated					Cermet					Uncoated					
Continuous Cut	●	◖	◖	◖												
Medium Cut	◖	◖	◖	◖	◖											
Interrupted Cut	◌		◌		◌											
	AC530U	AC610M	AC6030M	AC510U	AC520U											

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1												
VBGT220MESI	VBGT110301MN-SI	.250	.125	.0039	.134	♦	♦	♦	♦	♦							
VBGT220.5MESI	VBGT110302MN-SI			.0078		♦	♦	♦	♦	♦							
VBGT221MESI	VBGT110304MN-SI			.0156		♦	♦	♦	♦	♦							
VBGT222MESI	VBGT110308MN-SI			.0313		♦	♦	♦	♦	♦							
VBGT330MESI	VBGT160401MN-SI	.375	.1875	.0039	.1732	♦	♦	♦	♦	♦							
VBGT330.5MESI	VBGT160402MN-SI			.0078		♦	♦	♦	♦	♦							
VBGT331MESI	VBGT160404MN-SI			.0156		♦	♦	♦	♦	♦							
VBGT332MESI	VBGT160408MN-SI			.0313		♦	♦	♦	♦	♦							

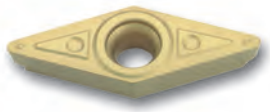
VB — 35° Diamond Type; 5° Relief; With Insert Hole

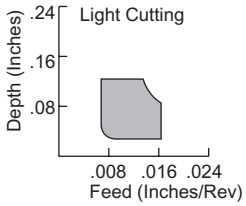
- P Steel
- M Stainless Steel
- K Cast Iron
- N Non-ferrous
- S Exotic Materials
- H Hardened Steel

- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USALimited Availability Item
- ○ Available 2nd Quarter 2015

VBMT ENK

Rake Angle: 8°



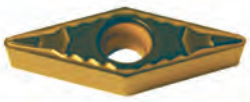


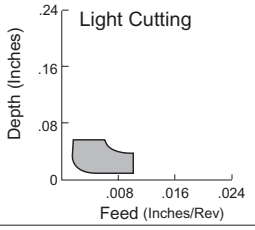
Cutting Conditions:	Coated								Cermet							Uncoated						
	AC820P																					
Continuous Cut	●																					
Medium Cut	●																					
Interrupted Cut	●																					

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC820P
VBMT332ENK	VBMT160408N-SK	.375	.1875	.0313	.1732	●

VBMT ELU

Rake Angle: 15°



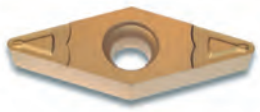


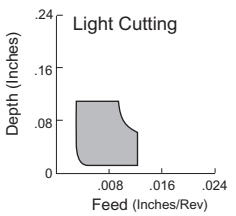
Cutting Conditions:	Coated											Cermet			Uncoated						
	AC810P	AC820P	AC700G	AC530U	AC6030M	AC6040M	AC630M					T1500Z	T2000Z	T3000Z							
Continuous Cut	●	●	●	●	●	●	●					●	●								
Medium Cut	●	●	●	●	●	●	●					●	●	●							
Interrupted Cut		●	●	●	●	●	●							●							

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC810P	AC820P	AC700G	AC530U	AC6030M	AC6040M	AC630M	T1500Z	T2000Z	T3000Z
VBMT221ELU	VBMT110304N-LU	.250	.125	.0156	.134	●	★	●	●	●	●	●	●	●	●
VBMT331ELU	VBMT110404N-LU	.375	.1875	.0156	.1732	●	★	●		●	●	●	●	●	●
VBMT332ELU	VBMT110408N-LU			.0313		●	●	●	★	●	●	●	●	●	●

VBMT ESU

Rake Angle: 8°





Cutting Conditions:	Coated										Cermet				
	AC810P	AC820P	AC830P	AC700G	AC610M	AC6030M	AC6040M	AC630M	AC510U	AC520U	T1500Z	T2000Z	T3000Z	T1500A	T1200A
Continuous Cut	●	●		●	●	●	●	●	●	●	●	●		●	●
Medium Cut	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Interrupted Cut		●	●	●		●	●	●		●			●	●	●

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC810P	AC820P	AC830P	AC700G	AC610M	AC6030M	AC6040M	AC630M	AC510U	AC520U	T1500Z	T2000Z	T3000Z	T1500A	T1200A
VBMT221ESU	VBMT110304N-SU	.250	.125	.0156	.134	●	●		●	●	●	●	●	●	●	●	●	●	●	●
VBMT222ESU	VBMT110308N-SU			.0313			●		●	●	●	●	●	●	●	●	●	●	●	●
VBMT331ESU	VBMT160404N-SU	.375	.1875	.0156	.1732	●	●	●	●	●	●	●	●	●	●				●	●
VBMT332ESU	VBMT160408N-SU			.0313		●	●	●	●	●	●	●	●	●	●				●	●

35° DIAMOND TYPE
POSITIVE INSERT

See page 248-259 for running parameters.

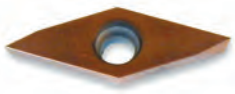
VB — 35° Diamond Type · 5° Relief · With Insert Hole

- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USALimited Availability Item
- ○ Available 2nd Quarter 2015

VBMA

No Breaker

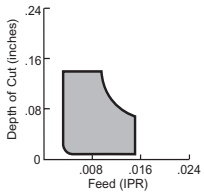


Cutting Conditions:	Coated			Cermet					Uncoated							
Continuous Cut	●	●														
Medium Cut	●	●	●													
Interrupted Cut	●		●													
	AC700G	AC410K	AC420K													

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC700G	AC410K	AC420K
VBMA331	VBMA160404	.375	.1875	.0156	.1732	★	▲	●
VBMA332	VBMA160408			.0313		★	▲	●

VCGT NAG

Rake Angle: 8°

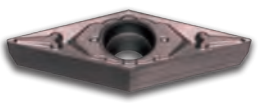


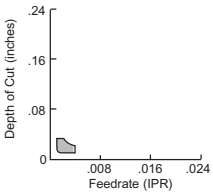
Cutting Conditions:	Coated						Cermet						Uncoated					
Continuous Cut													●					
Medium Cut													●					
Interrupted Cut																		
													H1					

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	H1
VCMT220.5NAG	VCMT110302N-AG	.250	.125	.0078	.134	●
VCMT221NAG	VCMT110304N-AG			.0156		●
VCMT332NAG	VCMT160408N-AG	.375	.1875	.0313	.1732	★

VCGT EFC

Rake Angle: 15°





Cutting Conditions:	Coated						Cermet						Uncoated					
Continuous Cut	●						●											
Medium Cut	◐						●											
Interrupted Cut	◌						●											
	AC530U						T1500A											

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC530U	T1500A
VCGT220EFC	VCGT110301N-FC	.250	.125	.0039	.134	●	●
VCGT220MEFC	VCGT110301MN-FC			.0039			●
VCGT220.5EFC	VCGT110302N-FC			.0078		●	●
VCGT220.5MEFC	VCGT110302MN-FC			.0078			●
VCGT221EFC	VCGT110304N-FC			.0156		●	●
VCGT221MEFC	VCGT110304MN-FC			.0156			●

M = Negative nose radius tolerance (-0.0001" to -0.0004")

See page 248-259 for running parameters.

35° DIAMOND TYPE
POSITIVE INSERT

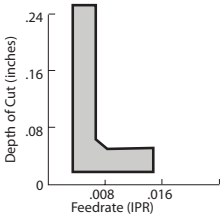
VC — 35° Diamond Type / 7°Relief / With Insert Hole

- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USALimited Availability Item
- ○ Available 2nd Quarter 2015

VCGT ESI

Rake Angle: 15°



Cutting Conditions:	Coated						Cermet		Uncoated					
	AC530U	AC610M	AC6030M	AC630M	AC510U	AC520U	T1500Z	T1500A						
Continuous Cut	●	●	●	●	●		●	●						
Medium Cut	●	●	●	●	●	●	●	●						
Interrupted Cut	●		●	●		●		●						

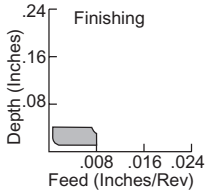
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	AC530U	AC610M	AC6030M	AC630M	AC510U	AC520U	T1500Z	T1500A
VCGT220MESI	VCGT110301MN-SI	.250	.125	.0039	.134	●	●	●	●	●	●	●	●
VCGT220.5MESI	VCGT110302MN-SI			.0078		●	●	●	●	●	●	●	●
VCGT221MESI	VCGT110304MN-SI			.0156		●	●	●	●	●	●	●	●
VCGT222MESI	VCGT110308MN-SI			.0313		●	●	●	●	●	●	●	●
VCGT330MESI	VCGT160401MN-SI			.0039		●	●	●	●	●	●	●	●
VCGT330.5MESI	VCGT160402MN-SI			.0078		●	●	●	●	●	●	●	●
VCGT331MESI	VCGT160404MN-SI	.375	.1875	.0313	.1732	●	●	●	●	●	●	●	●
VCGT332MESI	VCGT160408MN-SI			.0156		♦	♦	♦	♦	♦	♦	●	●

M = Negative nose radius tolerance (-0.0001″ to -0.0004″)

♦ : Available 3rd Quarter 2015

VCMT EFB

Rake Angle: 20°

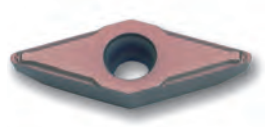


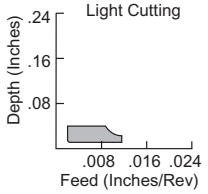
Cutting Conditions:	Coated				Cermet				Uncoated					
					T1500Z	T1500A								
Continuous Cut					●	●								
Medium Cut					●	●								
Interrupted Cut						●								

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	T1500Z	T1500A
VCMT331EFB	VCMT160404N-FB	.375	.1875	.0156	.1732	●	●
VCMT332EFB	VCMT160408N-FB			.0313		●	●

VCMT EFP

Rake Angle: 10°





Cutting Conditions:	Coated				Cermet				Uncoated					
					T2000Z	T1200A								
Continuous Cut					●	●								
Medium Cut					●	●								
Interrupted Cut						●								

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	T2000Z	T1200A
VCMT331EFP	VCMT160404N-FP	.375	.1875	.0156	.1732	●	●
VCMT332EFP	VCMT160408N-FP			.0313		●	●

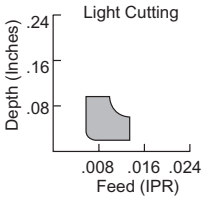
VC — 35° Diamond Type / 7° Relief / With Insert Hole

- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USALimited Availability Item
- ○ Available 2nd Quarter 2015

VCMT ENK

Rake Angle: 8°



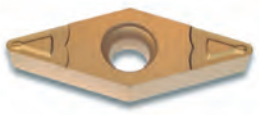
Cutting Conditions:	Coated										Cermet								Uncoated							
Continuous Cut	○																									
Medium Cut	○	○																								
Interrupted Cut	○	○																								
	AC820P	AC830P																								

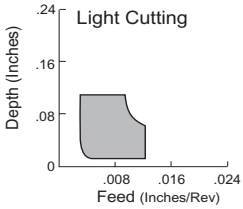
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
VCMT331ENK	VCMT160404N-SK	.375	.1875	.0156	.1732
VCMT332ENK	VCMT160408N-SK			.0313	

	AC820P	AC830P
VCMT331ENK	●	●
VCMT332ENK	●	●

VCMT ESU

Rake Angle: 8°





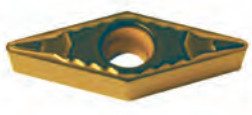
Cutting Conditions:	Coated										Cermet			Uncoated							
Continuous Cut	○	○		○	○	○	○	○													
Medium Cut	○	○	○	○	○	○	○	○	○												
Interrupted Cut		○	○		○	○	○		○												
	AC810P	AC820P	AC830P	AC610M	AC6030M	AC6040M	AC630M	AC510U	AC520U												

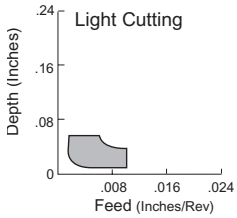
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
VCMT331ESU	VCMT160404N-SU	.375	.1875	.0156	.1732
VCMT332ESU	VCMT160408N-SU			.0313	

	AC810P	AC820P	AC830P	AC610M	AC6030M	AC6040M	AC630M	AC510U	AC520U
VCMT331ESU	●	●	●	●	●	●	●	●	●
VCMT332ESU	●	●	●	●	●	●	●	●	●

VCMT ELU

Rake Angle: 15°





Cutting Conditions:	Coated										Cermet			Uncoated							
Continuous Cut	○	○	○	○	○	○					○	○									
Medium Cut	○	○	○	○	○	○					○	○	○								
Interrupted Cut		○	○	○	○	○							○								
	AC810P	AC820P	AC700G	AC6030M	AC6040M	AC630M					T1500Z	T2000Z	T3000Z								

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
VCMT331ELU	VCMT160404N-LU	.375	.1875	.0156	.1732
VCMT332ELU	VCMT160408N-LU			.0313	

	AC810P	AC820P	AC700G	AC6030M	AC6040M	AC630M	T1500Z	T2000Z	T3000Z
VCMT331ELU	●	●	●	●	●	●	●	●	●
VCMT332ELU	●	●	●	●	●	●	●	●	●

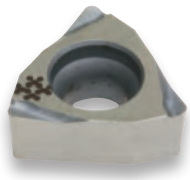
WB — 80° Trigon Type / 5° Relief / With Insert Hole

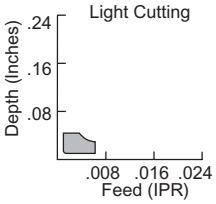
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

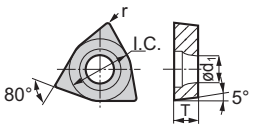
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USALimited Availability Item
- ○ Available 2nd Quarter 2015

WBGT FW

Rake Angle: 15°





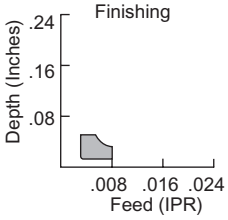


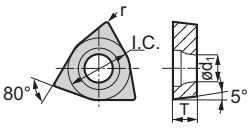
Cutting Conditions:	Coated							Cermet				Uncoated					
Continuous Cut								●	●	●	●						
Medium Cut								●	●	●	●						
Interrupted Cut										●	●						
								T1500Z	T2000Z	T1500A	T1200A						

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
WBGT520.5RFW	WBGT060102R-FW	.156	.0625	.0078	.090
WBGT520.5LFW	WBGT060102L-FW			.0078	
WBGT521RFW	WBGT060104R-FW			.0156	
WBGT521LFW	WBGT060104L-FW			.0156	
WBGT630.5RFW	WBGT080202R-FW	.1875	.094	.0078	
WBGT630.5LFW	WBGT080202L-FW			.0078	
WBGT631RFW	WBGT080204R-FW			.0156	
WBGT631LFW	WBGT080204L-FW			.0156	

WBGT FX

Rake Angle: 15°





Cutting Conditions:	Coated											Cermet			Uncoated		
Continuous Cut	●																
Medium Cut	●																
Interrupted Cut	●																
	AC530U																

Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1
WBGT630.5RFX	WBGT080202R-FX	.1875	.094	.0078	.090
WBGT630.5LFX	WBGT080202L-FX			.0078	
WBGT631RFX	WBGT080204R-FX			.0156	
WBGT631LFX	WBGT080204L-FX			.0156	

See page 248-259 for running parameters.

80° TRIGON TYPE
POSITIVE INSERT

WB — 80° Trigon Type / 5°Relief / With Insert Hole

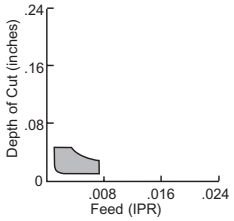
- **P** Steel
- **M** Stainless Steel
- **K** Cast Iron
- **N** Non-ferrous
- **S** Exotic Materials
- **H** Hardened Steel

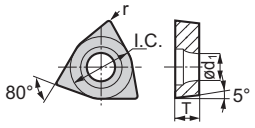
- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USALimited Availability Item
- ○ Available 2nd Quarter 2015

WBGT FY

Rake Angle: 15°

Cutting Conditions:	Coated	Cermet		Uncoated
Continuous Cut		●	●	
Medium Cut		●	●	
Interrupted Cut		●	●	



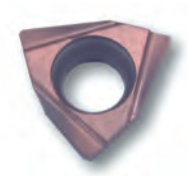


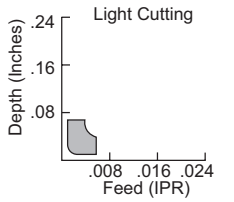
Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	T1500A	T1200A
WBGT520.5RFY	WBGT060102R-FY	.156	.0625	.0078	.090	★	●
WBGT520.5LFY	WBGT060102L-FY			.0078		★	●
WBGT521RFY	WBGT060104R-FY			.0156		★	●
WBGT521LFY	WBGT060104L-FY			.0156		●	●

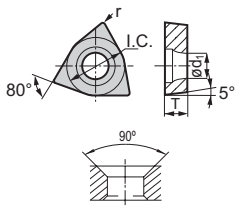
WBGT W

Rake Angle: 10°

Cutting Conditions:	Coated	Cermet		Uncoated
Continuous Cut		●	●	
Medium Cut		●	●	
Interrupted Cut			●	







Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	ød1	T1500Z	T1500A
WBGT520.5L	WBGT060102L-W	.156	.0625	.0078	.090		●
WBGT521R	WBGT060104R-W			.0156			★
WBGT521L	WBGT060104L-W			.0156		●	★

PCBN & PCD Inserts

Pages 59 - 79

Cubic Boron Nitride (PCBN) Inserts

See pages 244 - 245 for running parameters.

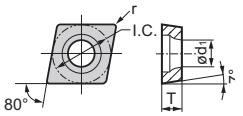
CC — 80° Diamond Type — 7° Relief

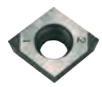
- **K Cast Iron**
- **S Exotic Materials**
- **H Hardened Steel**
- **S/M Sintered Materials**

- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

***EDGE PREPARATIONS:**
Please see page 246 for descriptions and performance ranges of CBN edge treatments.

CCGA



		Catalog No.	ISO Cat. No.	Coated H BNC2010	Coated H BNC2020	Coated H BNC100	Coated H BNC160	Coated H BNC200	Coated H BNC300	Coated K BNC500	Uncoated H BNX10	Uncoated H BNX20	Uncoated H BNX25	Uncoated H BN1000	Uncoated H BN2000	Uncoated H BN250	Uncoated H BN350	Uncoated K S BN7000	Uncoated K S BN700	Uncoated K S BNS800	Uncoated S M BN7500	Inscribed Circle	Thickness	Nose Radius	Max. D. O. C.	Hole Dia. (ød1)
Coated Mini Tip		NC-CCGA21.51	NC-CCGW060204	●	●	●	●	●														.250	.094	.0156	.015	.110
		2NC-CCGA21.50.5	2NC-CCGW060202		●			●		★												.250	.094	.0078	.015	.110
		2NC-CCGA21.50.5WG	2NC-CCGW060202WG	●	●		●	●														.250	.094	.0078	.015	.110
		2NC-CCGA21.51	2NC-CCGW060204		●			●		★												.250	.094	.0156	.015	.110
		2NC-CCGA21.51WG	2NC-CCGW060204WG	●	●		●	●														.250	.094	.0156	.015	.110
		2NC-CCGA21.52	2NC-CCGW060208							★												.250	.094	.0313	.015	.110
		2NC-CCGA21.52WG	2NC-CCGW060208WG	●	●		●	●														.250	.094	.0313	.015	.110
		2NC-CCGA32.50.5	2NC-CCGW09T302		●			●		★												.375	.156	.0078	.015	.1732
		2NC-CCGA32.50.5WG	2NC-CCGW09T302WG	●	●		●	●														.375	.156	.0078	.015	.1732
		2NC-CCGA32.51	2NC-CCGW09T304	●	●	●	●	●	●	★												.375	.156	.0156	.015	.1732
		2NC-CCGA32.51LS	2NC-CCGW09T304LS	●	●	●	●	●														.375	.156	.0156	.015	.1732
		2NC-CCGA32.51W	2NC-CCGW09T304W	●	●	●	●	●														.375	.156	.0156	.015	.1732
		2NC-CCGA32.51WG	2NC-CCGW09T304WG		●			●														.375	.156	.0156	.015	.1732
		2NC-CCGA32.52	2NC-CCGW09T308	●	●	●	●	●	●	★												.375	.156	.0313	.015	.1732
		2NC-CCGA32.52LS	2NC-CCGA32.52LS	●	●	●	●	●														.375	.156	.0313	.015	.1732
		2NC-CCGA32.52WG	2NC-CCGA32.52WG	●	●		●	●														.375	.156	.0313	.015	.1732
Mini Tip		NU-CCGA21.50.5	NU-CCGW060202												●	●						.250	.094	.0078	.015	.110
		NU-CCGA21.50.5HS*	NU-CCGW060202HS												●							.250	.094	.0078	.015	.110
		NU-CCGA21.50.5LT*	NU-CCGW060202LT												●							.250	.094	.0078	.015	.110
		NU-CCGA21.51	NU-CCGW060204											●	●	●						.250	.094	.0156	.015	.110
		NU-CCGA21.51HS*	NU-CCGW060204HS												●							.250	.094	.0156	.015	.110
		NU-CCGA21.51LT*	NU-CCGW060204LT												●							.250	.094	.0156	.015	.110
		NU-CCGA21.52	NU-CCGW060208												●							.250	.094	.0313	.015	.110
		NU-CCGA21.52LT*	NU-CCGW060208LT												●							.250	.094	.0313	.015	.110
		NU-CCGA32.50.5	NU-CCGW09T302											●	●	●						.375	.156	.0078	.015	.1732
		NU-CCGA32.50.5HS*	NU-CCGW09T302HS												●							.375	.156	.0078	.015	.1732
		NU-CCGA32.50.5LT*	NU-CCGW09T302LT												●							.375	.156	.0078	.015	.1732
		NU-CCGA32.51	NU-CCGW09T304											●	●	●						.375	.156	.0156	.015	.1732
		NU-CCGA32.51HS*	NU-CCGW09T304HS												●							.375	.156	.0156	.015	.1732
		NU-CCGA32.51LT*	NU-CCGW09T304LT												●							.375	.156	.0156	.015	.1732
		NU-CCGA32.52	2NU-CCGW09T308												●							.375	.156	.0313	.015	.1732
		NU-CCGA32.52HS*	2NU-CCGW09T308HS												●							.375	.156	.0313	.015	.1732
		NU-CCGA32.52LT*	2NU-CCGW09T308LT*												●							.375	.156	.0313	.015	.1732
Multi-Mini Tip		2NU-CCGA21.50.5	2NU-CCGW060202															●	●			.250	.094	.0078	.015	.110
		2NU-CCGA21.50.5WG	2NU-CCGW060202WG												●						●	.250	.094	.0078	.015	.110
		2NU-CCGA21.51	2NU-CCGW060204															●	●		●	.250	.094	.0156	.015	.110
		2NU-CCGA21.51WG	2NU-CCGW060204WG												●						●	.250	.094	.0156	.015	.110
		2NU-CCGA21.52	2NU-CCGW060208															●	●		●	.250	.094	.0313	.015	.110
		2NU-CCGA21.52WG	2NU-CCGW060208WG												●						●	.250	.094	.0313	.015	.110
		2NU-CCGA32.50.5WG	2NU-CCGW09T302WG												●						●	.375	.156	.0078	.015	.1732
		2NU-CCGA32.51	2NU-CCGW09T304											●			●	●	●		●	.375	.156	.0156	.015	.1732
		2NU-CCGA32.51W	2NU-CCGW09T304W																●			.375	.156	.0156	.015	.1732
		2NU-CCGA32.51WG	2NU-CCGW09T304WG												●						●	.375	.156	.0156	.015	.1732
		2NU-CCGA32.52	2NU-CCGW09T308											●			●	●	●		●	.375	.156	.0313	.015	.1732
		2NU-CCGA32.52LT	2NU-CCGW09T308LT											●								.375	.156	.0313	.015	.1732
		2NU-CCGA32.52W	2NU-CCGW09T308W																			.375	.156	.0313	.015	.1732
		2NU-CCGA32.52WG	2NU-CCGW09T308WG												●						●	.375	.156	.0313	.015	.1732
		2NU-CCGA431	2NU-CCGW120404															●	●			.500	.1875	.0156	.015	.2165
		2NU-CCGA432	2NU-CCGW120408															●	●			.500	.1875	.0313	.015	.2165

CC

80° Diamond Type

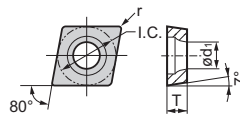
7° Relief

K Cast Iron
S Exotic Materials
H Hardened Steel
S/M Sintered Materials

● USA Stocked Item
★ Worldwide Warehouse Item
▲ USA Limited Availability Item
○ Available 2nd Quarter 2015

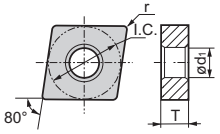
***EDGE PREPARATIONS:**
Please see page 246 for descriptions and performance ranges of CBN edge treatments.

CCGE



	Catalog No.	ISO Cat. No.	Coated H BNC2010	Coated H BNC2020	Coated H BNC100	Coated H BNC160	Coated H BNC200	Coated H BNC300	Coated K BNC500	Uncoated H BNX10	Uncoated H BNX20	Uncoated H BNX25	Uncoated H BN1000	Uncoated H **BN2000**	Uncoated H **BN250**	Uncoated H **BN350**	Uncoated K S **BN7000**	Uncoated K S **BN700**	Uncoated K S BNS800	Uncoated S M BN7500	Inscribed Circle	Thickness	Nose Radius	Max. D. O. C.	Hole Diameter
Mini Tip	NU-CCGE621	NU-CCGW040104												★	●						.1875	.062	.0156	.015	-
	NU-CCGE621HS*	NU-CCGW040104HS												★							.1875	.062	.0156	.015	-
	NU-CCGE622	NU-CCGW040108												★	●						.1875	.062	.0313	.015	-
	NU-CCGE622HS*	NU-CCGW040108HS												★							.1875	.062	.0313	.015	-

CCGT



	Catalog No.	ISO Cat. No.	Coated H **BNC2010**	Coated H **BNC2020**	Coated H BNC100	Coated H **BNC160**	Coated H **BNC200**	Coated H BNC300	Coated K BNC500	Uncoated H BNX10	Uncoated H BNX20	Uncoated H BNX25	Uncoated H BN1000	Uncoated H **BN2000**	Uncoated H BN250	Uncoated H BN350	Uncoated K S BN7000	Uncoated K S BN700	Uncoated K S **BNS800**	Uncoated S M BN7500	Inscribed Circle	Thickness	Nose Radius	Max. D. O. C.	Hole Dia. (ød1)
Coated Mini Tip	2NCCCGT21.50.5FV	2NC-CCGT060202N-FV	●	●		●	●														.250	.094	.0078	.015	.110
	2NCCCGT21.51FV	2NC-CCGT060204N-FV	●	●		●	●														.250	.094	.0156	.015	.110
	2NCCCGT21.52FV	2NC-CCGT060208N-FV	●	●		●	●														.250	.094	.0313	.015	.110
	2NCCCGT32.50.5LV	2NC-CCGT09T302N-LV	●	●		●	●														.375	.156	.0078	.015	.1732
	2NCCCGT32.51LV	2NC-CCGT09T304N-LV	●	●		●	●														.375	.156	.0156	.015	.1732
	2NCCCGT32.52LV	2NC-CCGT09T384N-LV	●	●		●	●														.375	.156	.0313	.015	.1732
Mini Tip	2NUCCGT21.50.5FV	2NU-CCGT060202N-FV												●							.250	.094	.0078	.015	.110
	2NUCCGT21.51FV	2NU-CCGT060204N-FV												●							.250	.094	.0156	.015	.110
	2NUCCGT21.52FV	2NU-CCGT060208N-FV												●							.250	.094	.0313	.015	.110
	2NUCCGT32.50.5LV	2NU-CCGT09T302N-LV												●							.375	.156	.0078	.015	.1732
	2NUCCGT32.51LV	2NU-CCGT09T304N-LV												●							.375	.156	.0156	.015	.1732
	2NUCCGT32.52LV	2NU-CCGT09T308N-LV												●							.375	.156	.0313	.015	.1732

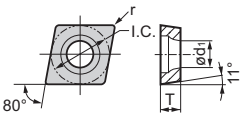
Note: Maximum depth of cut is based on hardened steel applications. Other materials may allow for increased maximum depths of cut.

CP

80° Diamond Type

11° Relief

CPGA



	Catalog No.	ISO Cat. No.	Coated H BNC2010	Coated H BNC2020	Coated H BNC100	Coated H BNC160	Coated H BNC200	Coated H BNC300	Coated K BNC500	Uncoated H BNX10	Uncoated H BNX20	Uncoated H BNX25	Uncoated H BN1000	Uncoated H **BN2000**	Uncoated H **BN250**	Uncoated H BN350	Uncoated K S **BN7000**	Uncoated K S **BN700**	Uncoated K S BNS800	Uncoated S M BN7500	Inscribed Circle	Thickness	Nose Radius	Max. D. O. C.	Hole Dia. (ød1)
Mini Tip	NU-CPGA2.51.50.5	NU-CPGW080202												●	●						.3125	.094	.0078	.015	.134
	NU-CPGA2.51.50.5HS*	NU-CPGW080202HS												★							.3125	.094	.0078	.015	.134
	NU-CPGA2.51.51	NU-CPGW080204												●	●						.3125	.094	.0156	.015	.134
	NU-CPGA2.51.51HS*	NU-CPGW080204HS												★							.3125	.094	.0156	.015	.134
	NU-CPGA2.51.51LT*	NU-CPGW080204LT												★							.3125	.094	.0156	.015	.134
	NU-CPGA2.51.52	NU-CPGW080208												●	●						.3125	.094	.0313	.015	.134
	NU-CPGA2.51.52HS*	NU-CPGW080208HS												★							.3125	.094	.0313	.015	.134
	NU-CPGA320.5	NU-CPGW090302												★	●						.375	.125	.0078	.015	.1732
	NU-CPGA320.5HS*	NU-CPGW090302HS												★							.375	.125	.0078	.015	.1732
	NU-CPGA320.5LT*	NU-CPGW090302LT												★							.375	.125	.0078	.015	.1732
	NU-CPGA321	NU-CPGW090304												★	●						.375	.125	.0156	.015	.1732
	NU-CPGA321HS*	NU-CPGW090304HS												★							.375	.125	.0156	.015	.1732
	NU-CPGA321LT*	NU-CPGW090304LT												★							.375	.125	.0156	.015	.1732
	NU-CPGA322	NU-CPGW090308												★	★						.375	.125	.0313	.015	.1732
	NU-CPGA322HS*	NU-CPGW090308HS												★							.375	.125	.0313	.015	.1732
	NU-CPGA322LT*	NU-CPGW090308LT												★							.375	.125	.0313	.015	.1732
Multi-Mini Tip	2NU-CPGA32.51	2NU-CPGW09T304															●	●			.375	.156	.0156	.015	.1732
	2NU-CPGA32.52	2NU-CPGW09T308															●	●			.375	.156	.0313	.015	.1732

Note: Maximum depth of cut is based on hardened steel applications. Other materials may allow for increased maximum depths of cut.

Cubic Boron Nitride (PCBN) Inserts

See pages 244 - 245 for running parameters.

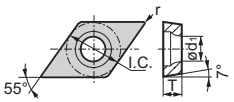
DC — 55° Diamond Type — 7° Relief

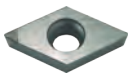
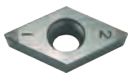
- **K Cast Iron**
- **S Exotic Materials**
- **H Hardened Steel**
- **S/M Sintered Materials**

● USA Stocked Item
★ Worldwide Warehouse Item
▲ USA Limited Availability Item
○ Available 2nd Quarter 2015

***EDGE PREPARATIONS:**
Please see page 246 for descriptions and performance ranges of CBN edge treatments.

DCGA DCGD



			Coated							Uncoated										Dimensions				
			H						K	H							K		S					
																	S		M					
		Catalog No.	ISO Cat. No.	BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	BNC500	BNX10	BNX20	BNX25	BN1000	BN2000	BN250	BN350	BN7000	BN700	BNS800	BN7500	Inscribed Circle	Thickness	Nose Radius	Max. D.O.C.	Hole Dia. (ød1)
Coated Mini Tip		2NC-DCGA21.50.5	2NC-DCGW070202		●			●														.250	.094	.0078	.015	.110
		2NC-DCGA21.50.5WG	2NC-DCGW070202WG	●	●		●	●														.250	.094	.0156	.015	.110
		2NC-DCGA21.51	2NC-DCGW070204	●	●	●	●	●		★												.250	.094	.0156	.015	.110
		2NC-DCGA21.51LS*	2NC-DCGW070204LS	●	●		●	●														.250	.094	.0156	.015	.110
		2NC-DCGA21.51WG	2NC-DCGW070204WG		●	●		●														.250	.094	.0156	.015	.110
		2NC-DCGA21.52WG	2NC-DCGW070208WG	●	●		●	●														.250	.094	.0156	.015	.110
		2NC-DCGA32.50.5	2NC-DCGW11T302		●			●		★												.375	.156	.0078	.015	.1732
		2NC-DCGA32.50.5WG	2NC-DCGW11T302WG	●	●		●	●														.375	.156	.0078	.015	.1732
		2NC-DCGA32.51	2NC-DCGW11T304	●	●	●	●	●	●	★												.375	.156	.0156	.015	.1732
		2NC-DCGA32.51LS*	2NC-DCGW11T304LS	●	●		●	●														.375	.156	.0156	.015	.1732
		2NC-DCGA32.51WG	2NC-DCGW11T304WG		●	●		●														.375	.156	.0156	.015	.1732
		2NC-DCGA32.52	2NC-DCGW11T308	●	●	●	●	●	●	★												.375	.156	.0313	.015	.1732
		2NC-DCGA32.52LS*	2NC-DCGW11T308LS		●	●		●														.375	.156	.0313	.015	.1732
		2NC-DCGA32.52WG	2NC-DCGW11T308WG	●	●		●	●														.375	.156	.0313	.015	.1732
Mini Tip		NU-DCGD21.50.5	NU-DCGW070202												●	●						.250	.094	.0078	.015	.110
		NU-DCGD21.51	NU-DCGW070204												●	●						.250	.094	.0156	.015	.110
		NU-DCGA21.50.5	NU-DCGW070202												●							.250	.094	.0078	.015	.110
		NU-DCGA21.50.5HS*	NU-DCGW070202HS												●							.250	.094	.0078	.015	.110
		NU-DCGA21.50.5LT*	NU-DCGW070202LT												●							.250	.094	.0078	.015	.110
		NU-DCGA21.51	NU-DCGW070204												●							.250	.094	.0156	.015	.110
		NU-DCGA21.51HS*	NU-DCGW070204HS												●							.250	.094	.0156	.015	.110
		NU-DCGA21.51LT*	NU-DCGW070204LT												●							.250	.094	.0156	.015	.110
		NU-DCGA21.52	NU-DCGW070208												●							.250	.094	.0313	.015	.110
		NU-DCGA21.52LT*	NU-DCGW070208LT												●							.250	.094	.0313	.015	.110
		NU-DCGA32.50.5	NU-DCGW11T302												●							.375	.156	.0078	.015	.1732
		NU-DCGA32.50.5HS*	NU-DCGW11T302HS												●							.375	.156	.0078	.015	.1732
		NU-DCGA32.50.5LT*	NU-DCGW11T302LT												●							.375	.156	.0078	.015	.1732
		NU-DCGA32.51	NU-DCGW11T304									▲			●	●						.375	.156	.0156	.015	.1732
		NU-DCGA32.51HS*	NU-DCGW11T304HS												●							.375	.156	.0156	.015	.1732
		NU-DCGA32.51LT*	NU-DCGW11T304LT												●							.375	.156	.0156	.015	.1732
		NU-DCGA32.52	NU-DCGW11T308												●							.375	.156	.0313	.015	.1732
		NU-DCGA32.52LS*	NU-DCGW11T308LS												●							.375	.156	.0313	.015	.1732
		NU-DCGA32.52LE*	NU-DCGW11T308LE												●							.375	.156	.0313	.015	.1732
		NU-DCGA32.53	NU-DCGW11T312												●							.375	.156	.0469	.015	.1732
		NU-DCGA32.53LT*	NU-DCGW11T312LT												●							.375	.156	.0469	.015	.1732
Multi-Mini Tip		2NU-DCGA21.50.5	2NU-DCGW070202															●	●			.250	.094	.0078	.015	.110
		2NU-DCGA21.50.5WG	2NU-DCGW070202WG												●						●	.250	.094	.0156	.015	.110
		2NU-DCGA21.51	2NU-DCGW070204											●				●	●		●	.250	.094	.0156	.015	.110
		2NU-DCGA21.51W	2NU-DCGW070204W															●				.250	.094	.0156	.015	.110
		2NU-DCGA21.51WG	2NU-DCGW070204WG												●						●	.250	.094	.0156	.015	.110
		2NU-DCGA21.52	2NU-DCGW070208											●				●	●		●	.250	.094	.0313	.015	.110
		2NU-DCGA21.52WG	2NU-DCGW070208WG												●						●	.250	.094	.0313	.015	.110
		2NU-DCGA32.50.5	2NU-DCGW11T302																		●	.375	.156	.0078	.015	.1732
		2NU-DCGA32.50.5LS*	2NU-DCGW11T302LS																		●	.375	.156	.0078	.015	.1732
		2NU-DCGA32.50.5LE*	2NU-DCGW11T302LE																		●	.375	.156	.0078	.015	.1732
		2NU-DCGA32.50.5LF*	2NU-DCGW11T302LF																		●	.375	.156	.0078	.015	.1732
		2NU-DCGA32.50.5WG	2NU-DCGW11T302WG												●						●	.375	.156	.0078	.015	.1732
		2NU-DCGA32.51	2NU-DCGW11T304											●			●	●	●		●	.375	.156	.0156	.015	.1732
		2NU-DCGA32.51LS*	2NU-DCGW11T304LS																		●	.375	.156	.0156	.015	.1732
		2NU-DCGA32.51LE*	2NU-DCGW11T304LE																		●	.375	.156	.0156	.015	.1732
		2NU-DCGA32.51LF*	2NU-DCGW11T304LF																		●	.375	.156	.0156	.015	.1732
		2NU-DCGA32.51W	2NU-DCGW11T304W															●				.375	.156	.0156	.015	.1732
		2NU-DCGA32.51WG	2NU-DCGW11T304WG												●						●	.375	.156	.0156	.015	.1732
		2NU-DCGA32.52	2NU-DCGW11T308											●			●	●	●		●	.375	.156	.0313	.015	.1732
		2NU-DCGA32.52LS*	2NU-DCGW11T308LS																		●	.375	.156	.0313	.015	.1732
		2NU-DCGA32.52LE*	2NU-DCGW11T308LE																		●	.375	.156	.0313	.015	.1732
		2NU-DCGA32.52LF*	2NU-DCGW11T308LF																		●	.375	.156	.0313	.015	.1732
		2NU-DCGA32.52W	2NU-DCGW11T308W															●				.375	.156	.0313	.015	.1732
		2NU-DCGA32.52WG	2NU-DCGW11T308WG												●						●	.375	.156	.0313	.015	.1732

Note: Maximum depth of cut is based on hardened steel applications. Other materials may allow for increased maximum depths of cut.

DC

55° Diamond Type

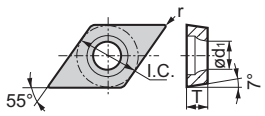
7° Relief

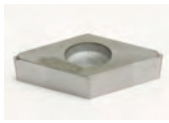
K Cast Iron
S Exotic Materials
H Hardened Steel
S/M Sintered Materials

● USA Stocked Item
★ Worldwide Warehouse Item
▲ USA Limited Availability Item
○ Available 2nd Quarter 2015

***EDGE PREPARATIONS:**
Please see page 246 for descriptions and performance ranges of CBN edge treatments.

DCGT



		Catalog No.	ISO Cat. No.	Coated H BNC2010	Coated H BNC2020	Coated H BNC100	Coated H BNC160	Coated H BNC200	Coated H BNC300	Coated K BNC500	Uncoated H BNX10	Uncoated H BNX20	Uncoated H BNX25	Uncoated H BN1000	Uncoated H BN2000	Uncoated K BN250	Uncoated K BN350	Uncoated S BN7000	Uncoated S BN700	Uncoated M BNS800	Uncoated M BN7500	Inscribed Circle	Thickness	Nose Radius	Max. D. O. C.	Hole Dia. (ød1)
Coated Mini Tip		2NCDCGT21.50.5FV	2NC-DCGT070202N-FV	●	●		●	●														.250	.094	.0078	.015	.110
		2NCDCGT21.51FV	2NC-DCGT070204N-FV	●	●		●	●														.250	.094	.0156	.015	.110
		2NCDCGT21.52FV	2NC-DCGT070208N-FV	●	●		●	●														.250	.094	.0313	.015	.110
		2NCDCGT32.50.5LV	2NC-DCGT11T302N-FV	●	●		●	●														.375	.156	.0078	.015	.1732
		2NCDCGT32.51LV	2NC-DCGT11T304N-FV	●	●		●	●														.375	.156	.0156	.015	.1732
		2NCDCGT32.52LV	2NC-DCGT11T308N-FV	●	●		●	●														.375	.156	.0313	.015	.1732
Mini Tip		2NUDCGT21.50.5FV	2NU-DCGT070202N-FV												●							.250	.094	.0078	.015	.110
		2NUDCGT32.50.5FV	2NU-DCGT11T302N-FV												●							.375	.156	.0078	.015	.1732
		2NUDCGT32.50.5LV	2NU-DCGT11T302N-LV												●							.375	.156	.0078	.015	.1732
		2NUDCGT32.51LV	2NU-DCGT11T304N-LV												●							.375	.156	.0156	.015	.1732
		2NUDCGT32.52LV	2NU-DCGT11T308N-LV												●							.375	.156	.0313	.015	.1732

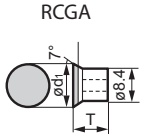
Note: Maximum depth of cut is based on hardened steel applications. Other materials may allow for increased maximum depths of cut.

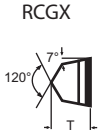
RC

Round Type

7° Relief

RCGA RCGX





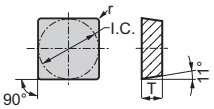
			Catalog No.	ISO Cat. No.	Coated H BNC2010	Coated H BNC2020	Coated H BNC100	Coated H BNC160	Coated H BNC200	Coated H BNC300	Coated K BNC500	Uncoated H BNX10	Uncoated H BNX20	Uncoated H BNX25	Uncoated H BN1000	Uncoated H BN2000	Uncoated K BN250	Uncoated K BN350	Uncoated S BN7000	Uncoated S BN700	Uncoated M BNS800	Uncoated M BN7500	Inscribed Circle	Thickness	Nose Radius	Max. D. O. C.	Hole Diameter
Full Tip	RCGA	RCGX	RCGA094	RCGA0906MO													★						.354	.250	-	.040	-
			RCGX25	RCGX060700															●				.250	.309	-	.040	-
			RCGX35	RCGX090700															●				.375	.309	-	.040	-
			RCGX45	RCGX120700															●				.500	.312	-	.040	-

SP

Square Type

11° Relief

SPG



		Catalog No.	ISO Cat. No.	Coated H BNC2010	Coated H BNC2020	Coated H BNC100	Coated H BNC160	Coated H BNC200	Coated H BNC300	Coated K BNC500	Uncoated H BNX10	Uncoated H BNX20	Uncoated H BNX25	Uncoated H BN1000	Uncoated H BN2000	Uncoated K BN250	Uncoated K BN350	Uncoated S BN7000	Uncoated S BN700	Uncoated M BNS800	Uncoated M BN7500	Inscribed Circle	Thickness	Nose Radius	Max. D. O. C.	Hole Diameter
Full Tip		SPG322	SPGN090308																●			.375	.125	.0313	.020	-
		SPG421	SPGN120304													●						.500	.125	.0156	.020	-
Mini Tip		NU-SPG321	NU-SPGN090304												●							.375	.125	.0156	.015	-
		NU-SPG321HS*	NU-SPGN090304HS												★							.375	.125	.0156	.015	-
		NU-SPG321LT*	NU-SPGN090304LT												★							.375	.125	.0156	.015	-
		NU-SPG322	NU-SPGN090308												●	●						.375	.125	.0313	.015	-
		NU-SPG322HS*	NU-SPGN090308HS												★							.375	.125	.0313	.015	-
		NU-SPG322LT*	NU-SPGN090308LT												★							.375	.125	.0313	.015	-

Note: Maximum depth of cut is based on hardened steel applications. Other materials may allow for increased maximum depths of cut.

Cubic Boron Nitride (PCBN) Inserts

See pages 244 - 245 for running parameters.

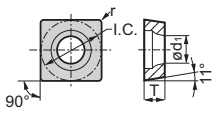
SP — Square Type — 11° Relief

K Cast Iron
S Exotic Materials
H Hardened Steel
S/M Sintered Materials

● USA Stocked Item
★ Worldwide Warehouse Item
▲ USA Limited Availability Item
○ Available 2nd Quarter 2015

***EDGE PREPARATIONS:**
Please see page 246 for descriptions and performance ranges of CBN edge treatments.

SPGA

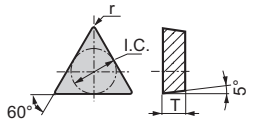


	Catalog No.	ISO Cat. No.	Coated H: BNC80	BNC100	BNC150	BNC160	BNC200	BNC300	Coated K: BNC500	Uncoated H: BNX10	BNX20	BNX25	BN1000	BN2000	BN250	BN350	Uncoated K: BN7000	BN700	Uncoated S: BNS800	Uncoated M: BN7500	Inscribed Circle	Thickness	Nose Radius	Max. D. O. C.	Hole Diameter
Full Tip	SPGA321	SPGW090304													▲						.375	.125	.0156	.020	.130
	SPGA322	SPGW090308													●						.375	.125	.0313	.020	.130

Note: Maximum depth of cut is based on hardened steel applications. Other materials may allow for increased maximum depths of cut.

TB — 60° Triangle Type — 5° Relief

TBGE

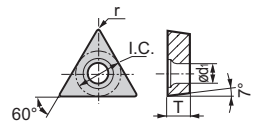


	Catalog No.	ISO Cat. No.	Coated H: BNC2010	BNC2020	BNC100	BNC160	BNC200	BNC300	Coated K: BNC500	Uncoated H: BNX10	BNX20	BNX25	BN1000	BN2000	BN250	BN350	Uncoated K: BN7000	BN700	Uncoated S: BNS800	Uncoated M: BN7500	Inscribed Circle	Thickness	Nose Radius	Max. D. O. C.	Hole Diameter
Full Top	TBGE520.5B	TBGE060102B									▲			●	●						.156	.0625	.0078	.020	-
	TBGE520.5BSN	TBGE060102-BSN									▲										.156	.0625	.0078	.020	-
	TBGE521B	TBGE060104B								▲				●	●		●	●			.156	.0625	.0156	.020	-
	TBGE522B	TBGE060108B												●	●						.156	.0625	.0313	.020	-

Note: Maximum depth of cut is based on hardened steel applications. Other materials may allow for increased maximum depths of cut.
BSN = Light edge preparation

TC — 60° Triangle Type — 7° Relief

TCGA



	Catalog No.	ISO Cat. No.	Coated H: BNC160	BNC200	BNC100	BNC160	BNC200	BNC300	Coated K: BNC500	Uncoated H: BNX10	BNX20	BNX25	BN1000	BN2000	BN250	BN350	Uncoated K: BN7000	BN700	Uncoated S: BNS800	Uncoated M: BN7500	Inscribed Circle	Thickness	Nose Radius	Max. D. O. C.	Hole Diameter
Multi-Mini Tip	3NU-TCGA21.51	3NU-TCGW110204															●	●			.250	.094	.0156	.015	.110
	3NU-TCGA21.52	3NU-TCGW110208															●	●			.250	.094	.0313	.015	.110
	3NU-TCGA32.51	3NU-TCGW160204																			.375	.156	.0156	.015	.1693
	3NU-TCGA32.52	3NU-TCGW160208															●				.375	.156	.0313	.015	.1693
Coated Mini Tip	3NC-TCGA32.52	3NC-TCGW160208							●												.375	.156	.0313	.015	.1693
	NC-TCGA21.51	NC-TCGW110204	●	●	●	●	●														.250	.094	.0156	.015	.110
	NC-TCGA21.52	NC-TCGW110208	●	●	●	●	●														.250	.094	.0313	.015	.110

Note: Maximum depth of cut is based on hardened steel applications. Other materials may allow for increased maximum depths of cut.

TP

60° Triangle Type

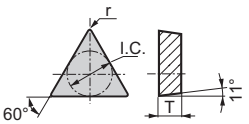
11° Relief

- **K Cast Iron**
- **S Exotic Materials**
- **H Hardened Steel**
- **S/M Sintered Materials**

- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

***EDGE PREPARATIONS:**
Please see page 246 for descriptions and performance ranges of CBN edge treatments.

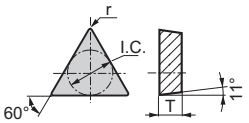
TPEE



	Catalog No.	ISO Cat. No.	Coated H BNC80	Coated H BNC100	Coated H BNC150	Coated H BNC160	Coated H BNC200	Coated H BNC300	Coated K BNC500	Uncoated H BNX10	Uncoated H BNX20	Uncoated H BNX25	Uncoated H BN1000	Uncoated H BN2000	Uncoated H BN250	Uncoated H BN350	Uncoated K BN500	Uncoated K S BN7000	Uncoated K S BN700	Uncoated S/M BNS800	Uncoated S/M BN7500	Inscribed Circle	Thickness	Nose Radius	Max. D. O. C.	Hole Diameter
Full Top	TPEE632B	TPEE080208B																	●			.1875	.094	.0313	.020	-
	TPEE632BH	TPEE080208BH																	●			.1875	.094	.0313	.020	-

Note: Maximum depth of cut is based on hardened steel applications. Other materials may allow for increased maximum depths of cut.
H = Hone only

TPG



	Catalog No.	ISO Cat. No.	Coated H BNC2010	Coated H BNC2020	Coated H BNC100	Coated H BNC160	Coated H BNC200	Coated H BNC300	Coated K BNC500	Uncoated H BNX10	Uncoated H BNX20	Uncoated H BNX25	Uncoated H BN1000	Uncoated H BN2000	Uncoated H BN250	Uncoated H BN350	Uncoated K BN7000	Uncoated K S BN700	Uncoated S/M BNS800	Uncoated S/M BN7500	Inscribed Circle	Thickness	Nose Radius	Max. D. O. C.	Hole Diameter
Full Tip	TPG1.81.51	TPGN090204												★							.219	.094	.0156	.020	-
	TPG1.81.51HS*	TPGN090204HS												★							.219	.094	.0156	.020	-
	TPG221	TPGN110304									▲			★	●		●	●			.250	.125	.0156	.020	-
	TPG221HS*	TPGN110304HS												★							.250	.125	.0156	.020	-
	TPG222	TPGN110308									▲			★	●		●	●			.250	.125	.0313	.020	-
	TPG222HS*	TPGN110308HS												★							.250	.125	.0313	.020	-
	TPG321	TPGN160304									▲			★	●						.375	.125	.0156	.020	-
	TPG321HS*	TPGN160304HS												★							.375	.125	.0156	.020	-
	TPG322	TPGN160308									▲			★	●		●	●			.375	.125	.0313	.020	-
	TPG322HS*	TPGN160308HS												★							.375	.125	.0313	.020	-
	TPG323	TPGN160312															●	●			.375	.125	.0469	.020	-
	TPG432	TPGN220408									▲			★							.500	.1875	.0313	.020	-
	TPG432HS*	TPGN220408HS												★							.500	.1875	.0313	.020	-
Multi-Mini Tip	3NU-TPG221	3NU-TPGN110304															●	●			.250	.125	.0156	.015	-
	3NU-TPG222	3NU-TPGN110308															●	●			.250	.125	.0313	.015	-
	3NU-TPG321	3NU-TPGN160304																●			.375	.125	.0156	.015	-
	3NU-TPG322	3NU-TPGN160308															●	●			.375	.125	.0313	.015	-
Mini Tip	NU-TPG220.5	NU-TPGN110302												●							.250	.125	.0078	.015	-
	NU-TPG220.5LT*	NU-TPGN110302LT												●							.250	.125	.0078	.015	-
	NU-TPG221	NU-TPGN110304									▲		●	●	●	●					.250	.125	.0156	.015	-
	NU-TPG221HS*	NU-TPGN110304HS												●							.250	.125	.0156	.015	-
	NU-TPG221LT*	NU-TPGN110304LT												●							.250	.125	.0156	.015	-
	NU-TPG222	NU-TPGN110308									▲		●	●	●	●					.250	.125	.0313	.015	-
	NU-TPG222HS*	NU-TPGN110308HS												●							.250	.125	.0313	.015	-
	NU-TPG222LT*	NU-TPGN110308LT												●							.250	.125	.0313	.015	-
	NU-TPG320.5	NU-TPGN160302												●							.375	.125	.0078	.015	-
	NU-TPG321	NU-TPGN160304								▲	▲		●	●	●	●					.375	.125	.0156	.015	-
	NU-TPG321HS*	NU-TPGN160304HS												●							.375	.125	.0156	.015	-
	NU-TPG321LT*	NU-TPGN160304LT												●							.375	.125	.0156	.015	-
	NU-TPG322	NU-TPGN160308								▲	▲		●	●	●	●					.375	.125	.0313	.015	-
	NU-TPG322HS*	NU-TPGN160308HS												●							.375	.125	.0313	.015	-
	NU-TPG322LT*	NU-TPGN160308LT												●							.375	.125	.0313	.015	-

Note: Maximum depth of cut is based on hardened steel applications. Other materials may allow for increased maximum depths of cut.

Cubic Boron Nitride (PCBN) Inserts

See pages 244 - 245 for running parameters.

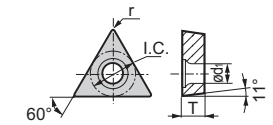
TP — 60° Triangle Type, 11° Relief

- **K Cast Iron**
- **S Exotic Materials**
- **H Hardened Steel**
- **S/M Sintered Materials**

● USA Stocked Item
★ Worldwide Warehouse Item
▲ USA Limited Availability Item
○ Available 2nd Quarter 2015

***EDGE PREPARATIONS:** Please see page 246 for descriptions and performance ranges of CBN edge treatments.

TPGA TPGD TPGX



		Catalog No.	ISO Cat. No.	Coated H BNC2010	Coated H BNC2020	Coated H BNC100	Coated H BNC160	Coated H BNC200	Coated H BNC300	Coated K BNC500	Uncoated H BNX10	Uncoated H BNX20	Uncoated H BNX25	Uncoated H BN1000	Uncoated H BN2000	Uncoated H BN250	Uncoated H BN350	Uncoated K/S BN7000	Uncoated K/S BN700	Uncoated S BNS800	Uncoated S/M BN7500	Inscribed Circle	Thickness	Nose Radius	Max. D.O.C.	Hole Diameter
Coated Mini Tip		NC-TPGA221	NC-TPGW110304	●	●	●	●	●														.250	.125	.0156	.015	.130
		NC-TPGA222	NC-TPGW110308	●	●	●	●	●														.250	.125	.0313	.015	.130
		3NC-TPGA1.81.50.5	3NC-TPGW090202							★												.219	.094	.0078	.015	.102
		3NC-TPGA1.81.51	3NC-TPGW090204							★												.219	.094	.0156	.015	.102
		3NC-TPGA221	3NC-TPGW110304		●			●		★												.250	.125	.0156	.015	.130
		3NC-TPGA221LS	3NC-TPGW110304LS	●	●	★	●	●														.250	.125	.0156	.015	.130
		3NC-TPGA222	3NC-TPGW110308		●			●		★												.250	.125	.0313	.015	.130
		3NC-TPGA222LS	3NC-TPGW110308LS		●			●														.250	.125	.0313	.015	.130
		3NC-TPGA331	3NC-TPGW160404	●	●	●	●	★		★				●								.375	.1875	.0156	.015	.1693
		3NC-TPGA331LS	3NC-TPGW160404LS		●	★		★														.375	.1875	.0156	.015	.1693
		3NC-TPGA332	3NC-TPGW160408	●	●	●	●	●		★				●								.375	.1875	.0313	.015	.1693
		3NC-TPGA332LS	3NC-TPGW160408LS		●			★														.375	.1875	.0313	.015	.1693
Full Tip		TPGA221	TPGW110304									▲			★	●						.250	.125	.0156	.020	.130
		TPGA221HS*	TPGW110304HS												★							.250	.125	.0156	.020	.130
		TPGA222	TPGW110308												★	●						.250	.125	.0313	.020	.130
		TPGA222HS*	TPGW110308HS												★							.250	.125	.0313	.020	.130
		TPGA331	TPGW160404									▲			★	●						.375	.1875	.0156	.020	.1693
		TPGA331HS*	TPGW160404HS												★							.375	.1875	.0156	.020	.1693
		TPGA332	TPGW160408									▲			★	●						.375	.1875	.0313	.020	.1693
		TPGA332HS*	TPGW160408HS												★							.375	.1875	.0313	.020	.1693
Multi-Mini Tip		3NU-TPGA21.51	3NU-TPGW110204															●	●		●	.250	.094	.0156	.015	.110
		3NU-TPGA21.51LS*	3NU-TPGW110204LS																		●	.250	.094	.0156	.015	.110
		3NU-TPGA21.51LE*	3NU-TPGW110204LE																		●	.250	.094	.0156	.015	.110
		3NU-TPGA21.51LF*	3NU-TPGW110204LF																		●	.250	.094	.0156	.015	.110
		3NU-TPGA21.52	3NU-TPGW110208															●	●		●	.250	.094	.0313	.015	.110
		3NU-TPGA220.5	3NU-TPGW110302															●	●		●	.250	.125	.0078	.015	.130
		3NU-TPGA220.5LF*	3NU-TPGW110302LF																			.250	.125	.0078	.015	.130
		3NU-TPGA221	3NU-TPGW110304															●	●		●	.250	.125	.0156	.015	.130
		3NU-TPGA221LS*	3NU-TPGW110304LS																		●	.250	.125	.0156	.015	.130
		3NU-TPGA221LE*	3NU-TPGW110304LE																		●	.250	.125	.0156	.015	.130
		3NU-TPGA221LF*	3NU-TPGW110304LF																		●	.250	.125	.0156	.015	.130
		3NU-TPGA222	3NU-TPGW110308															●	●		●	.250	.125	.0313	.015	.130
		3NU-TPGA222LF*	3NU-TPGW110308LF																		●	.250	.125	.0313	.015	.130
		3NU-TPGA331	3NU-TPGW160404												●		●	●	●			.375	.1875	.0156	.015	.1693
		3NU-TPGA332	3NU-TPGW160408												●		●	●	●			.375	.1875	.0313	.015	.1693
Mini-Tip		NU-TPGX21.50.5	NU-TPGW110202													●						.250	.094	.0078	.015	.110
		NU-TPGX21.51	NU-TPGW110204								▲					●						.250	.094	.0156	.015	.110
		NU-TPGX21.51S	NU-TPGW110204S													●						.250	.094	.0156	.015	.110
		NU-TPGD630.5	NU-TPGW080202												●	●		●	●			.1875	.094	.0078	.015	.090
		NU-TPGD630.5HS*	NU-TPGW080202HS												●							.1875	.094	.0078	.015	.090
		NU-TPGD630.5LT*	NU-TPGW080202LT												●							.1875	.094	.0078	.015	.090
		NU-TPGD630.5S	NU-TPGW080202S													●						.1875	.094	.0078	.015	.090
		NU-TPGD631	NU-TPGW080204								▲			●	●	●		●	●			.1875	.094	.0156	.015	.090
		NU-TPGD631HS*	NU-TPGW080204HS												●							.1875	.094	.0156	.015	.090
		NU-TPGD631LT*	NU-TPGW080204LT												●							.1875	.094	.0156	.015	.090
		NU-TPGD631S	NU-TPGW080204S													★						.1875	.094	.0156	.015	.090
		NU-TPGD632	NU-TPGW080208												●							.1875	.094	.0313	.015	.090

S = Edge preparation for hardened steel boring

TP

60° Triangle Type

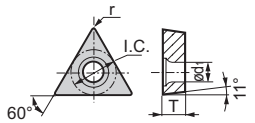
11° Relief

K Cast Iron
S Exotic Materials
H Hardened Steel
S/M Sintered Materials

● USA Stocked Item
★ Worldwide Warehouse Item
▲ USA Limited Availability Item
○ Available 2nd Quarter 2015

***EDGE PREPARATIONS:**
Please see page 246 for descriptions and performance ranges of CBN edge treatments.

TPGA TPGD TPGX *(cont.)*



Mini-Tip

Catalog No.	ISO Cat. No.	Coated H BNC2010	Coated H BNC2010	Coated H BNC100	Coated H BNC160	Coated H BNC200	Coated H BNC300	Coated K BNC500	Uncoated H BNX10	Uncoated H BNX20	Uncoated H BNX25	Uncoated H BN1000	Uncoated H BN2000	Uncoated K BN250	Uncoated K BN350	Uncoated S BN7000	Uncoated S BN700	Uncoated S BNS800	Uncoated S/M BN7500	Inscribed Circle	Thickness	Nose Radius	Max. D. O. C.	Hole Diameter
NU-TPGD632HS*	NU-TPGW080208HS												●							.1875	.094	.0313	.015	.090
NU-TPGA1.81.50.5	NU-TPGW090202												●	●						.219	.094	.0078	.015	.102
NU-TPGA1.81.50.5HS*	NU-TPGW090202HS												●							.219	.094	.0078	.015	.102
NU-TPGA1.81.50.5LT*	NU-TPGW090202LT												●							.219	.094	.0078	.015	.102
NU-TPGA1.81.51	NU-TPGW090204												●	●						.219	.094	.0156	.015	.102
NU-TPGA1.81.51HS*	NU-TPGW090204HS												●							.219	.094	.0156	.015	.102
NU-TPGA1.81.51LT*	NU-TPGW090204LT												●							.219	.094	.0156	.015	.102
NU-TPGA1.81.52	NU-TPGW090208												●							.219	.094	.0313	.015	.102
NU-TPGA21.50.5	NU-TPGW110202												●							.250	.094	.0078	.015	.130
NU-TPGA21.50.5LT*	NU-TPGW110202LT												●							.250	.094	.0078	.015	.130
NU-TPGA21.51	NU-TPGW110204												●							.250	.094	.0156	.015	.130
NU-TPGA21.51HS*	NU-TPGW110204HS												●							.250	.094	.0156	.015	.130
NU-TPGA21.51LT*	NU-TPGW110204LT												●							.250	.094	.0156	.015	.130
NU-TPGA220.5	NU-TPGW110302											●	●	●						.250	.125	.0078	.015	.130
NU-TPGA220.5HS*	NU-TPGW110302HS												●							.250	.125	.0078	.015	.130
NU-TPGA220.5LT*	NU-TPGW110302LT												●							.250	.125	.0078	.015	.130
NU-TPGA221	NU-TPGW110304								▲	▲		●	●	●	●					.250	.125	.0156	.015	.130
NU-TPGA221HS*	NU-TPGW110304HS												●							.250	.125	.0156	.015	.130
NU-TPGA221LT*	NU-TPGW110304LT												●							.250	.125	.0156	.015	.130
NU-TPGA221S	NU-TPGW110304LT									▲				★						.250	.125	.0156	.015	.130
NU-TPGA222	NU-TPGW110308								▲	▲		●	●	●	●					.250	.125	.0313	.015	.130
NU-TPGA222HS*	NU-TPGW110308HS												●							.250	.125	.0313	.015	.130
NU-TPGA222LT*	NU-TPGW110308LT												●							.250	.125	.0313	.015	.130
NU-TPGA222S	NU-TPGW110308S									▲				★						.250	.125	.0313	.015	.130
NU-TPGA320.5	NU-TPGW160302												●							.375	.125	.0078	.015	.1693
NU-TPGA321	NU-TPGW160304											●	●	●	●					.375	.125	.0156	.015	.1693
NU-TPGA322	NU-TPGW160308											●	●	●	●					.375	.125	.0313	.015	.1693
NU-TPGA331	NU-TPGW160404								▲	▲		●	●	●	●					.375	.1875	.0156	.015	.1693
NU-TPGA331HS*	NU-TPGW160404HS												●							.375	.1875	.0156	.015	.1693
NU-TPGA331LT*	NU-TPGW160404LT												●							.375	.1875	.0156	.015	.1693
NU-TPGA331S	NU-TPGW160404S									▲				★						.375	.1875	.0156	.015	.1693
NU-TPGA332	NU-TPGW160408								▲	▲		●	●	●	●					.375	.1875	.0313	.015	.1693
NU-TPGA332HS*	NU-TPGW160408HS												●							.375	.1875	.0313	.015	.1693
NU-TPGA332LT*	NU-TPGW160408LT												●							.375	.1875	.0313	.015	.1693
NU-TPGA332S	NU-TPGW160408S									▲				★						.375	.1875	.0313	.015	.1693

S = Edge preparation for hardened steel boring

Cubic Boron Nitride (PCBN) Inserts

See pages 244 - 245 for running parameters.

VB

35° Diamond Type

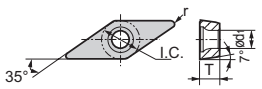
5° Relief

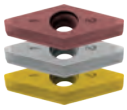
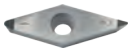
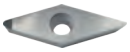
- K Cast Iron
- S Exotic Materials
- H Hardened Steel
- S/M Sintered Materials

- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

***EDGE PREPARATIONS:**
Please see page 246 for descriptions and performance ranges of CBN edge treatments.

VBGA



		Catalog No.	ISO Cat. No.	Coated H BNC2010	Coated H BNC2020	Coated H BNC100	Coated H BNC160	Coated H BNC200	Coated H BNC300	Coated K BNC500	Uncoated H BNX10	Uncoated H BNX20	Uncoated H BNX25	Uncoated H BN1000	Uncoated H BN2000	Uncoated H BN250	Uncoated H BN350	Uncoated K/S BN7000	Uncoated K/S BN700	Uncoated K/S BNS800	Uncoated S/M BN7500	Inscribed Circle	Thickness	Nose Radius	Max. D.O.C.	Hole Diameter
Coated Mini-Tip		2NC-VBGA221	2NC-VBGW110304	●	●	●	●	●		★												.250	.125	.0156	.015	.134
		2NC-VBGA221LS*	2NC-VBGW110304LS			●																.250	.125	.0156	.015	.134
		2NC-VBGA222	2NC-VBGW110308		●			●		★												.250	.125	.0313	.015	.134
		2NC-VBGA331	2NC-VBGW160404		●			●		★												.375	.1875	.0156	.015	.1732
		2NC-VBGA332	2NC-VBGW160408		●			●		●												.375	.1875	.0313	.015	.1732
Multi-Mini Tip		2NU-VBGA221	2NU-VBGW110304															●	●			.250	.125	.0156	.015	.134
		2NU-VBGA222	2NU-VBGW110308															●	●			.250	.125	.0313	.015	.134
		2NU-VBGA331	2NU-VBGW160404															●				.375	.1875	.0156	.015	.1732
		2NU-VBGA332	2NU-VBGW160408															●				.375	.1875	.0313	.015	.1732
Mini-Tip		NU-VBGA220.5	NU-VBGA110302												●							.250	.125	.0078	.015	.134
		NU-VBGA220.5HS*	NU-VBGA110302HS												●							.250	.125	.0078	.015	.134
		NU-VBGA220.5LT*	NU-VBGA110302LT												●							.250	.125	.0078	.015	.134
		NU-VBGA221	NU-VBGA110304												●							.250	.125	.0156	.015	.134
		NU-VBGA221HS*	NU-VBGA110304HS												●							.250	.125	.0156	.015	.134
		NU-VBGA221LT*	NU-VBGA110304LT												●							.250	.125	.0156	.015	.134
		NU-VBGA222	NU-VBGA110308												●							.250	.125	.0313	.015	.134
		NU-VBGA222HS*	NU-VBGA110308HS												●							.250	.125	.0313	.015	.134
		NU-VBGA222LT*	NU-VBGA110308LT												●							.250	.125	.0313	.015	.134
		NU-VBGA330.5	NU-VBGA160402												●							.375	.1875	.0078	.015	.1732
		NU-VBGA330.5LT*	NU-VBGA160402LT												●							.375	.1875	.0078	.015	.1732
		NU-VBGA331	NU-VBGA160404												●							.375	.1875	.0156	.015	.1732
		NU-VBGA331HS*	NU-VBGA160404HS												●							.375	.1875	.0156	.015	.1732
		NU-VBGA331LT*	NU-VBGA160404LT												●							.375	.1875	.0156	.015	.1732
		NU-VBGA332	NU-VBGA160408												●							.375	.1875	.0313	.015	.1732
		NU-VBGA332HS*	NU-VBGA160408HS												●							.375	.1875	.0313	.015	.1732
		NU-VBGA332LT*	NU-VBGA160408LT												●							.375	.1875	.0313	.015	.1732

Note: Maximum depth of cut is based on hardened steel applications. Other materials may allow for increased maximum depths of cut.

VC

35° Diamond Type

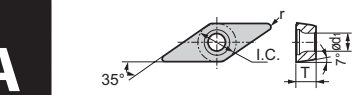
7° Relief

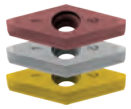
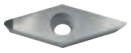
K Cast Iron
S Exotic Materials
H Hardened Steel
S/M Sintered Materials

● USA Stocked Item
★ Worldwide Warehouse Item
▲ USA Limited Availability Item
○ Available 2nd Quarter 2015

***EDGE PREPARATIONS:**
Please see page 249 for descriptions and performance ranges of CBN edge treatments.

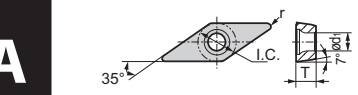
VCGA

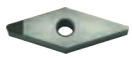


		Catalog No.	ISO Cat. No.	Coated H BNC2010	Coated H BNC2020	Coated H BNC100	Coated H BNC160	Coated H BNC200	Coated H BNC300	Coated K BNC500	Uncoated H BNX10	Uncoated H BNX20	Uncoated H BNX25	Uncoated H BN1000	Uncoated H BN2000	Uncoated H BN250	Uncoated H BN350	Uncoated K BN7000	Uncoated K BN700	Uncoated S BNS800	Uncoated S/M BN7500	Inscribed Circle	Thickness	Nose Radius	Max. D. O. C.	Hole Diameter
Coated Mini Tip		2NC-VCGA331	2NC-VCGW160404	●	●	●	●	●														.375	.1875	.0156	.015	.1732
		2NC-VCGA331LS*	2NC-VCGW160404LS		●	★		★														.375	.1875	.0156	.015	.1732
		2NC-VCGA331HS*	2NC-VCGW160404HS		●			★														.375	.1875	.0156	.015	.1732
		2NC-VCGA332	2NC-VCGW160408	●	●	●	●	●														.375	.1875	.0313	.015	.1732
		2NC-VCGA332LS*	2NC-VCGW160408LS		●	★		★														.375	.1875	.0313	.015	.1732
		2NC-VCGA332HS*	2NC-VCGW160408HS		●			★														.375	.1875	.0313	.015	.1732
Mini Tip		NU-VCGA1.51.50.5	NU-VCGW080202												★							.1874	.094	.0078	.015	.091
		NU-VCGA1.51.50.5LT*	NU-VCGW080202LT												★							.1874	.094	.0078	.015	.091
		NU-VCGA1.51.51	NU-VCGW080204												★							.1874	.094	.0156	.015	.091
		NU-VCGA1.51.51HS*	NU-VCGW080204HS												★							.1874	.094	.0156	.015	.091
		NU-VCGA1.51.51LT*	NU-VCGW080204LT												★							.1874	.094	.0156	.015	.091
		NU-VCGA1.51.52	NU-VCGW080208												★							.1874	.094	.0313	.015	.091
		NU-VCGA1.51.52HS*	NU-VCGW080208HS												★							.1874	.094	.0313	.015	.091
		NU-VCGA1.51.52LT*	NU-VCGW080208LT												★							.1874	.094	.0313	.015	.091
		NU-VCGA220.5	NU-VCGW110302												●	●						.250	.125	.0078	.015	.134
		NU-VCGA220.5HS*	NU-VCGW110302HS												●							.250	.125	.0078	.015	.134
		NU-VCGA221	NU-VCGW110304												●	★						.250	.125	.0156	.015	.134
		NU-VCGA221HS*	NU-VCGW110304												●							.250	.125	.0156	.015	.134

Note: Maximum depth of cut is based on hardened steel applications. Other materials may allow for increased maximum depths of cut.

VCMA



		Catalog No.	ISO Cat. No.	Coated H BNC2010	Coated H BNC2020	Coated H BNC1500	Coated H BNC160	Coated H BNC200	Coated H BNC300	Coated K BNC500	Uncoated H BNX10	Uncoated H BNX20	Uncoated H BNX25	Uncoated H BN1000	Uncoated H BN2000	Uncoated H BN250	Uncoated H BN350	Uncoated K BN7000	Uncoated K BN700	Uncoated S BNS800	Uncoated S/M BN7500	Inscribed Circle	Thickness	Nose Radius	Max. D. O. C.	Hole Diameter
Full Tip		VCMA331	VCMW160404									★										.375	.1875	.0156	.020	.1732
		VCMA332	VCMW160404									★										.375	.1875	.0313	.020	.1732

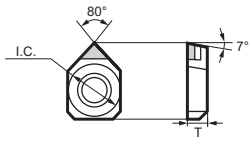
Note: Maximum depth of cut is based on hardened steel applications. Other materials may allow for increased maximum depths of cut.

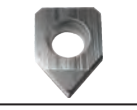
ZN

80° Special Shape

7° Relief

ZNEX



		Catalog No.	ISO Cat. No.	Coated H BNC2010	Coated H BNC2020	Coated H BNC100	Coated H BNC160	Coated H BNC200	Coated H BNC300	Coated K BNC500	Uncoated H BNX10	Uncoated H BNX20	Uncoated H BNX25	Uncoated H BN1000	Uncoated H BN2000	Uncoated H BN250	Uncoated H BN350	Uncoated K BN7000	Uncoated K BN700	Uncoated S BNS800	Uncoated S/M BN7500	Inscribed Circle	Thickness	Nose Radius	Max. D. O. C.	Hole Diameter
Full Tip		NC-ZNEX620.5	NC-ZNEX040102		●			●														.1875	.0625	.0078	.015	.090
		NC-ZNEX621	NC-ZNEX040104		●			●														.1875	.0625	.0156	.015	.090
		NU-ZNEX620.5	NU-ZNEX040102												●	●			●			.1875	.0625	.0078	.015	.090
		NU-ZNEX621	NU-ZNEX040104												●	●		●	●			.1875	.0625	.0156	.015	.090

Note: Maximum depth of cut is based on hardened steel applications. Other materials may allow for increased maximum depths of cut.

Polycrystalline Diamond (PCD) Inserts

See page 247 for running parameters.

CC

80° Diamond Type

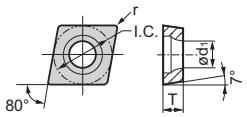
7° Relief

EDGE PREPARATIONS:

S Standard
H Honed
K Reinforced
AW Chipbreaker Stud
WF High Luster "Mirror-Like" Finish

● USA Stocked Item
★ Worldwide Warehouse Item
▲ USA Limited Availability Item
○ Available 2nd Quarter 2015

CCMT



Catalog No.	ISO Cat. No.	Stock N DA90	DA150	DA200	DA1000	DA2200	Inscribed Circle	Thickness	Nose Radius	Hole Diameter	Edge Preparation	Rake Angle
NF-CCMT21.50.5GD	NF-CCMT060202N-GD				○		.250	.094	.0078	.107	S	0°
NF-CCMT21.50.5LD	NF-CCMT060202N-LD				○		.250	.094	.0078	.107	S	0°
NF-CCMT21.51GD	NF-CCMT060204N-GD				○		.250	.094	.0156	.107	S	0°
NF-CCMT21.51LD	NF-CCMT060204N-LD				○		.250	.094	.0156	.107	S	0°
NF-CCMT32.50.5GD	NF-CCMT09T302N-GD				○		.375	.156	.0078	.1732	S	0°
NF-CCMT32.50.5LD	NF-CCMT09T302N-LD				○		.375	.156	.0078	.1732	S	0°
NF-CCMT32.51GD	NF-CCMT09T304N-GD				○		.375	.156	.0156	.1732	S	0°
NF-CCMT32.51LD	NF-CCMT09T304N-LD				○		.375	.156	.0156	.1732	S	0°
NF-CCMT32.52GD	NF-CCMT09T308N-GD				○		.375	.156	.0312	.1732	S	0°
NF-CCMT32.52LD	NF-CCMT09T308N-LD				○		.375	.156	.0312	.1732	S	0°

CC

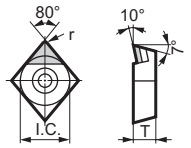
80° Diamond Type

7° Relief

EDGE PREPARATIONS:
- S Standard
- H Honed
- K Reinforced
- AW Chipbreaker Stud
- WF High Luster "Mirror-Like" Finish

- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ Available 2nd Quarter 2015

CCMX



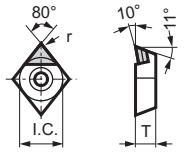
	Catalog No.	ISO Cat. No.	Stock N DA90	DA150	DA1000	DA2200	Dimensions Inscribed Circle	Thickness	Nose Radius	Hole Diameter	Edge Preparation	Rake Angle
NF Tip	NF-CCMX21.50	NF-CCMT060201			●	●	.250	.094	.0039	.110	S	10°
	NF-CCMX21.50.5	NF-CCMT060202			●	●	.250	.094	.0078	.110	S	10°
	NF-CCMX21.51	NF-CCMT060204			●	●	.250	.094	.0156	.110	S	10°
	NF-CCMX32.50.5	NF-CCMT09T302			●	●	.375	.156	.0078	.1732	S	10°
	NF-CCMX32.51	NF-CCMT09T304			●	●	.375	.156	.0156	.1732	S	10°
	NF-CCMX32.52	NF-CCMT09T308			●	●	.375	.156	.0313	.1732	S	10°

CP

80° Diamond Type

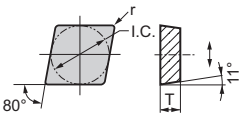
11° Relief

CPMX



	Catalog No.	ISO Cat. No.	Stock N DA90	DA150	DA1000	DA2200	Dimensions Inscribed Circle	Thickness	Nose Radius	Hole Diameter	Edge Preparation	Rake Angle
Standard Tip	CPMX2.51.50.5	CPMT080202				●	.3125	.094	.0078	.134	S	10°
	CPMX2.51.51	CPMT080204				●	.3125	.094	.0156	.134	S	10°
	CPMX2.51.52	CPMT080208				●	.3125	.094	.0313	.134	S	10°
	CPMX320.5	CPMT090302				●	.375	.125	.0078	.1732	S	10°
	CPMX321	CPMT090304				●	.375	.125	.0156	.1732	S	10°
	CPMX322	CPMT090308				●	.375	.125	.0313	.1732	S	10°
NF Tip	NF-CPMX21.51	NF-CPMT060204			●	●	.250	.094	.0156	.110	S	10°
	NF-CPMX21.52	NF-CPMT060208			●	●	.250	.094	.0313	.110	S	10°
	NF-CPMX32.51	NF-CPMT09T304			●	●	.375	.156	.0156	.1732	S	10°
	NF-CPMX32.52	NF-CPMT09T308			●	●	.375	.156	.0313	.1732	S	10°
	NF-CPMX320.5	NF-CPMT090302			●	●	.375	.125	.0078	.1732	S	10°
	NF-CPMX321	NF-CPMT090304			●	●	.375	.125	.0156	.1732	S	10°
	NF-CPMX322	NF-CPMT090308			●	●	.375	.125	.0313	.1732	S	10°

CPG



	Catalog No.	ISO Cat. No.	Stock N DA90	DA150	DA1000	DA2200	Dimensions Inscribed Circle	Thickness	Nose Radius	Hole Diameter	Edge Preparation	Rake Angle
Standard Tip	CPG422	CPGN120308				●	.500	.125	.0313	-	S	0°

Polycrystalline Diamond (PCD) Inserts

See page 247 for running parameters.

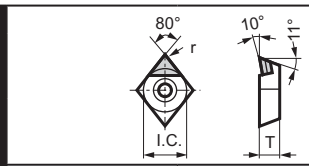
CP — 80° Diamond Type, 11° Relief

EDGE PREPARATIONS:

S Standard
H Honed
K Reinforced
AW Chipbreaker Stud
WF High Luster "Mirror-Like" Finish

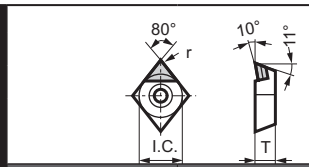
● USA Stocked Item
★ Worldwide Warehouse Item
▲ USA Limited Availability Item
○ Available 2nd Quarter 2015

CPGA



	Catalog No.	ISO Cat. No.	Stock N DA90	DA150	DA1000	DA2200	Inscribed Circle	Thickness	Nose Radius	Hole Diameter	Edge Preparation	Rake Angle
NF Tip	NF-CPGA321	NF-CPGW090304			●		.375	.125	.0156	.1732	S	10°
	NF-CPGA322	NF-CPGW090308			●		.375	.125	.0313	.1732	S	10°

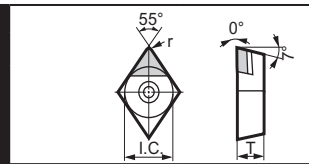
CPEW



	Catalog No.	ISO Cat. No.	Stock N DA90	DA150	DA1000	DA2200	Inscribed Circle	Thickness	Nose Radius	Hole Diameter	Edge Preparation	Rake Angle
Standard Tip	CPEW32.52	CPEW09T308				●	.375	.156	.0313	.1732	S	10°

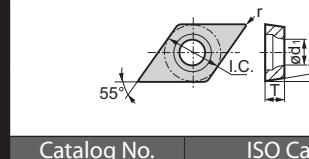
DC — 55° Diamond Type, 7° Relief

DCGA



	Catalog No.	ISO Cat. No.	Stock N DA90	DA150	DA1000	DA2200	Inscribed Circle	Thickness	Nose Radius	Hole Diameter	Edge Preparation	Rake Angle
NF Tip	NF-DCGA32.50.5	NF-DCGT11T302			●		.375	.156	.0078	.1732	S	0°
	NF-DCGA32.51	NF-DCGT11T304			●		.375	.156	.0156	.1732	S	0°
	NF-DCGA32.552	NF-DCGT11T308			●		.375	.156	.0156	.1732	S	0°

DCMT



	Catalog No.	ISO Cat. No.	Stock N DA90	DA150	DA200	DA1000	DA2200	Inscribed Circle	Thickness	Nose Radius	Hole Diameter	Edge Preparation	Rake Angle
	NF-DCMT21.50.5GD	NF-DCMT070202N-GD				○		.250	.094	.0078	.107	S	0°
	NF-DCMT21.50.5LD	NF-DCMT070202N-LD				○		.250	.094	.0078	.107	S	0°
	NF-DCMT21.51GD	NF-DCMT070204N-GD				○		.250	.094	.0156	.107	S	0°
	NF-DCMT21.51LD	NF-DCMT070204N-LD				○		.250	.094	.0156	.107	S	0°
	NF-DCMT32.50.5GD	NF-DCMT11T302N-GD				○		.375	.156	.0078	.1732	S	0°
	NF-DCMT32.50.5LD	NF-DCMT11T302N-LD				○		.375	.156	.0078	.1732	S	0°
	NF-DCMT32.51GD	NF-DCMT11T304N-GD				○		.375	.156	.0156	.1732	S	0°
	NF-DCMT32.51LD	NF-DCMT11T304N-LD				○		.375	.156	.0156	.1732	S	0°
	NF-DCMT32.52GD	NF-DCMT11T308N-GD				○		.375	.156	.0312	.1732	S	0°
	NF-DCMT32.52LD	NF-DCMT11T308N-LD				○		.375	.156	.0312	.1732	S	0°

DC

55° Diamond Type

7° Relief

EDGE PREPARATIONS:

S Standard
H Honed
K Reinforced
AW Chipbreaker Stud
WF High Luster "Mirror-Like" Finish

● USA Stocked Item
★ Worldwide Warehouse Item
▲ USA Limited Availability Item
○ Available 2nd Quarter 2015

DCMX

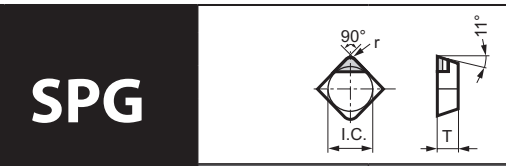
	Catalog No.	ISO Cat. No.	Stock N DA90	DA150	DA1000	DA2200	Inscribed Circle	Thickness	Nose Radius	Hole Diameter	Edge Preparation	Rake Angle
Standard Tip	DCMX21.50	DCMT070201				●	.250	.094	.0039	.110	S	10°
	DCMX21.50.5	DCMT070202				●	.250	.094	.0078	.110	S	10°
	DCMX21.51	DCMT070204				●	.250	.094	.0156	.110	S	10°
	DCMX32.50	DCMT11T301				●	.375	.156	.0039	.1732	S	10°
	DCMX32.50.5	DCMT11T302				●	.375	.156	.0078	.1732	S	10°
	DCMX32.51	DCMT11T304				●	.375	.156	.0156	.1732	S	10°
NF Tip	NF-DCMX21.50	NF-DCMT070201			●	●	.250	.094	.0039	.110	S	10°
	NF-DCMX21.50.5	NF-DCMT070202			●	●	.250	.094	.0078	.110	S	10°
	NF-DCMX21.51	NF-DCMT070204			●	●	.250	.094	.0156	.110	S	10°
	NF-DCMX32.50	NF-DCMT11T301			●	●	.375	.156	.0039	.1732	S	10°
	NF-DCMX32.50.5	NF-DCMT11T302			●	●	.375	.156	.0078	.1732	S	10°
	NF-DCMX32.51	NF-DCMT11T304			●	●	.375	.156	.0156	.1732	S	10°
	NF-DCMX32.52	NF-DCMT11T308			●	●	.375	.156	.0313	.1732	S	10°

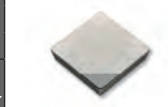
SP

Square Type

11° Relief

SPG





	Catalog No.	ISO Cat. No.	Stock N DA90	DA150	DA1000	DA2200	Inscribed Circle	Thickness	Nose Radius	Hole Diameter	Edge Preparation	Rake Angle
Standard Tip	SPG321	SPGN090304		▲			.375	.125	.0156	-	S	0°
	SPG322	SPGN090308		●			.375	.125	.0313	-	S	0°
	SPG421	SPGN120304		●		●	.500	.125	.0156	-	S	0°
	SPG422	SPGN120308		●		●	.500	.125	.0313	-	S	0°
NF Tip	NF-SPG321	NF-SPGN090304			★	●	.375	.125	.0156	-	S	0°
	NF-SPG322	NF-SPGN090308			★	★	.375	.125	.0313	-	S	0°
	NF-SPG421	NF-SPGN120304			★	●	.500	.125	.0156	-	S	0°
	NF-SPG422	NF-SPGN120308			★	●	.500	.125	.0313	-	S	0°

Polycrystalline Diamond (PCD) Inserts

See page 247 for running parameters.

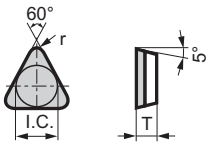
TB — 60° Triangle Type — 5° Relief

EDGE PREPARATIONS:

S Standard
H Honed
K Reinforced
AW Chipbreaker Stud
WF High Luster "Mirror-Like" Finish

● USA Stocked Item
★ Worldwide Warehouse Item
▲ USA Limited Availability Item
○ Available 2nd Quarter 2015

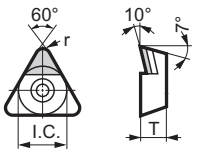
TBGE



	Catalog No.	ISO Cat. No.	Stock N DA90	DA150	DA1000	DA2200	Inscribed Circle	Thickness	Nose Radius	Hole Diameter	Edge Preparation	Rake Angle
Full Top	TBGE520.5B	TBGE060102BSN		●		●	.156	.0625	.0078	-	S	0°
	TBGE521B	TBGE060104BSN		●		●	.156	.0625	.0156	-	S	0°
	TBGE522B	TBGE060108BSN				●	.156	.0625	.0313	-	S	0°
NF Tip	NF-TBGE520.5	NF-TBGN060102			●	●	.156	.0625	.0078	-	S	0°
	NF-TBGE521	NF-TBGN060104			★	★	.156	.0625	.0156	-	S	0°

TC — 60° Triangle Type — 7° Relief

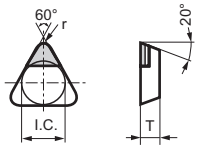
TCMX



	Catalog No.	ISO Cat. No.	Stock N DA90	DA150	DA1000	DA2200	Inscribed Circle	Thickness	Nose Radius	Hole Diameter	Edge Preparation	Rake Angle
Standard Tip	TCMX1.81.50	TCMT090201				▲	.219	.094	.0039	.110	S	10°
	TCMX1.81.50.5	TCMT090202				●	.219	.094	.0078	.110	S	10°
	TCMX1.81.51	TCMT090204				●	.219	.094	.0156	.110	S	10°
	TCMX21.50	TCMT110201				●	.250	.094	.0039	.110	S	10°
	TCMX21.50.5	TCMT110202				▲	.250	.094	.0078	.110	S	10°
	TCMX21.51	TCMT110204				●	.250	.094	.0156	.110	S	10°
NF Tip	NF-TCMX1.81.50.5	NF-TCMT090202			●	▲	.219	.094	.0078	.098	S	10°
	NF-TCMX1.81.51	NF-TCMT090204			●	●	.219	.094	.0156	.098	S	10°
	NF-TCMX21.50	NF-TCMT110201			●	▲	.250	.094	.0039	.110	S	10°
	NF-TCMX21.50.5	NF-TCMT110202			●	●	.250	.094	.0078	.110	S	10°
	NF-TCMX21.51	NF-TCMT110204			●	●	.250	.094	.0156	.110	S	10°

TE — 60° Triangle Type — 20° Relief

TEGN



	Catalog No.	ISO Cat. No.	Stock N DA90	DA150	DA1000	DA2200	Inscribed Circle	Thickness	Nose Radius	Hole Diameter	Edge Preparation	Rake Angle
Standard Tip	TEGN321	TEGN160304				★	.375	.125	.0156	-	S	0°

TP

60° Triangle Type

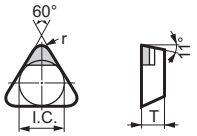
11° Relief

EDGE PREPARATIONS:

S Standard
H Honed
K Reinforced
AW Chipbreaker Stud
WF High Luster "Mirror-Like" Finish

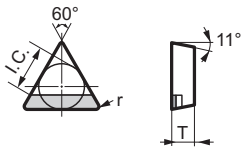
● USA Stocked Item
★ Worldwide Warehouse Item
▲ USA Limited Availability Item
○ Available 2nd Quarter 2015

TPG



	Catalog No.	ISO Cat. No.	Stock N DA90	DA150	DA1000	DA2200	Inscribed Circle	Thickness	Nose Radius	Hole Diameter	Edge Preparation	Rake Angle
Standard Tip	TPG221	TPGN110304		●		●	.250	.125	.0156	-	S	0°
	TPG222	TPGN110308		●		●	.250	.125	.0313	-	S	0°
	TPG321	TPGN160304		●		●	.375	.125	.0156	-	S	0°
	TPG322	TPGN160308		●		●	.375	.125	.0313	-	S	0°
	TPG323	TPGN160312	●			●	.375	.125	.0469	-	S	0°
	TPG431	TPGN220404				●	.500	.1875	.0156	-	S	0°
	TPG432	TPGN220408				●	.500	.1875	.0313	-	S	0°
NF Tip	NF-TPG1.81.51	NF-TPGN090204				●	.219	.094	.0156	-	S	0°
	NF-TPG220.5	NF-TPGN110302			●	●	.250	.125	.0078	-	S	0°
	NF-TPG221	NF-TPGN110304			●	●	.250	.125	.0156	-	S	0°
	NF-TPG222	NF-TPGN110308			●	●	.250	.125	.0313	-	S	0°
	NF-TPG320.5	NF-TPGN160302			●	●	.375	.125	.0078	-	S	0°
	NF-TPG321	NF-TPGN160304			●	●	.375	.125	.0156	-	S	0°
	NF-TPG322	NF-TPGN160308			●	●	.375	.125	.0313	-	S	0°

TPG-P



	Catalog No.	ISO Cat. No.	Stock N DA90	DA150	DA1000	DA2200	Inscribed Circle	Thickness	Nose Radius	Hole Diameter	Edge Preparation	Rake Angle
NF Tip	NF-TPG221P	NF-TPGN110304P			★	★	.250	.125	.0156	-	S	0°
	NF-TPG222P	NF-TPGN110308P			★	★	.250	.125	.0313	-	S	0°
	NF-TPG321P	NF-TPGN160304P			★	★	.375	.125	.0156	-	S	0°

Polycrystalline Diamond (PCD) Inserts

See page 247 for running parameters.

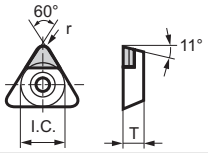
TP — 60° Triangle Type — 11° Relief

EDGE PREPARATIONS:

S Standard
H Honed
K Reinforced
AW Chipbreaker Stud
WF High Luster "Mirror-Like" Finish

● USA Stocked Item
★ Worldwide Warehouse Item
▲ USA Limited Availability Item
○ Available 2nd Quarter 2015

TPGA TPGD



Catalog No.	ISO Cat. No.	Stock N DA90	DA150	DA1000	DA2200	Inscribed Circle	Thickness	Nose Radius	Hole Diameter	Edge Preparation	Rake Angle
Standard Tip											
TPGA220	TPGW110301				●	.250	.125	.0039	.130	S	0°
TPGA220.5	TPGW110302		▲		●	.250	.125	.0078	.130	S	0°
TPGA221	TPGW110304		●		●	.250	.125	.0156	.130	S	0°
TPGA222	TPGW110308		▲		●	.250	.125	.0313	.130	S	0°
TPGA331	TPGW160404		●		●	.375	.1875	.0156	.1693	S	0°
TPGA332	TPGW160408		●		●	.375	.1875	.0313	.1693	S	0°
TPGA333	TPGW160412				●	.375	.1875	.0469	.1693	S	0°
NF Tip											
NF-TPGD630	NF-TPGW080201			★	★	.1875	.094	.0039	.090	S	0°
NF-TPGD630.5	NF-TPGW080202			●	●	.1875	.094	.0078	.090	S	0°
NF-TPGD631	NF-TPGW080204			●	●	.1875	.094	.0156	.090	S	0°
NF-TPGA1.81.50.5	NF-TPGW090202			●	●	.219	.094	.0078	.102	S	0°
NF-TPGA1.81.51	NF-TPGW090204			●	●	.219	.094	.0156	.102	S	0°
NF-TPGA21.50	NF-TPGW110201			●	●	.250	.094	.0039	.107	S	0°
NF-TPGA21.50.5	NF-TPGW110202			●	●	.250	.094	.0078	.107	S	0°
NF-TPGA21.51	NF-TPGW110204			●	●	.250	.094	.0156	.107	S	0°
NF-TPGA220.5	NF-TPGW110302			●	●	.250	.125	.0078	.130	S	0°
NF-TPGA221	NF-TPGW110304			●	●	.250	.125	.0156	.130	S	0°
NF-TPGA222	NF-TPGW110308			●	●	.250	.125	.0313	.130	S	0°
NF-TPGA320.5	NF-TPGW160302			●	●	.375	.125	.0078	.1693	S	0°
NF-TPGA321	NF-TPGW160304			●	●	.375	.125	.0156	.1693	S	0°
NF-TPGA322	NF-TPGW160308			●	●	.375	.125	.0313	.1693	S	0°
NF-TPGA330	NF-TPGW160401			★	●	.375	.1875	.0039	.1693	S	0°
NF-TPGA330.5	NF-TPGW160402			●	●	.375	.1875	.0078	.1693	S	0°
NF-TPGA331	NF-TPGW160404			●	●	.375	.1875	.0156	.1693	S	0°
NF-TPGA332	NF-TPGW160408			●	●	.375	.1875	.0313	.1693	S	0°

TP

60° Triangle Type

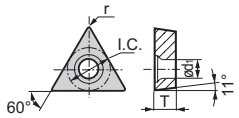
11° Relief

EDGE PREPARATIONS:

S Standard
H Honed
K Reinforced
AW Chipbreaker Stud
WF High Luster "Mirror-Like" Finish

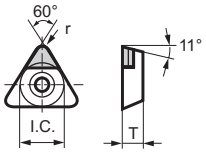
● USA Stocked Item
★ Worldwide Warehouse Item
▲ USA Limited Availability Item
○ Available 2nd Quarter 2015

TPMT



Catalog No.	ISO Cat. No.	Stock N DA90	DA150	DA200	DA1000	DA2200	Inscribed Circle	Thickness	Nose Radius	Hole Diameter	Edge Preparation	Rake Angle
NF-TPMT630.5GD	NF-TPMT080202N-GD				○		.1875	.094	.0078	.090	S	0°
NF-TPMT630.5LD	NF-TPMT080202N-LD				○		.1875	.094	.0078	.090	S	0°
NF-TPMT631GD	NF-TPMT080204N-GD				○		.1875	.094	.0156	.090	S	0°
NF-TPMT631LD	NF-TPMT080204N-LD				○		.1875	.094	.0156	.090	S	0°
NF-TPMT1.81.50.5GD	NF-TPMT090202N-GD				○		.219	.094	.0078	.102	S	0°
NF-TPMT1.81.50.5LD	NF-TPMT090202N-LD				○		.219	.094	.0078	.102	S	0°
NF-TPMT1.81.51GD	NF-TPMT090204N-GD				○		.219	.094	.0156	.102	S	0°
NF-TPMT1.81.51LD	NF-TPMT090204N-LD				○		.219	.094	.0156	.102	S	0°
NF-TPMT21.50.5GD	NF-TPMT110202N-GD				○		.250	.094	.0078	.107	S	0°
NF-TPMT21.50.5LD	NF-TPMT110202N-LD				○		.250	.094	.0078	.107	S	0°
NF-TPMT21.51GD	NF-TPMT110204N-GD				○		.250	.094	.0156	.107	S	0°
NF-TPMT21.51LD	NF-TPMT110204N-LD				○		.250	.094	.0156	.107	S	0°
NF-TPMT220.5GD	NF-TPMT110302N-GD				○		.250	.125	.0078	.130	S	0°
NF-TPMT220.5LD	NF-TPMT110302N-LD				○		.250	.125	.0078	.130	S	0°
NF-TPMT221GD	NF-TPMT110304N-GD				○		.250	.125	.0156	.130	S	0°
NF-TPMT221LD	NF-TPMT110304N-LD				○		.250	.125	.0156	.130	S	0°
NF-TPMT222GD	NF-TPMT110308N-GD				○		.250	.125	.0312	.130	S	0°
NF-TPMT222LD	NF-TPMT110308N-LD				○		.250	.125	.0312	.130	S	0°
NF-TPMT330.5GD	NF-TPMT160402N-GD				○		.375	.1875	.0078	.1693	S	0°
NF-TPMT330.5LD	NF-TPMT160402N-LD				○		.375	.1875	.0078	.1693	S	0°
NF-TPMT331GD	NF-TPMT160404N-GD				○		.375	.1875	.0156	.1693	S	0°
NF-TPMT331LD	NF-TPMT160404N-LD				○		.375	.1875	.0156	.1693	S	0°
NF-TPMT332GD	NF-TPMT160408N-GD				○		.375	.1875	.0312	.1693	S	0°
NF-TPMT332LD	NF-TPMT160408N-LD				○		.375	.1875	.0312	.1693	S	0°

TPMX



	Catalog No.	ISO Cat. No.	Stock N DA90	DA150	DA1000	DA2200	Inscribed Circle	Thickness	Nose Radius	Hole Diameter	Edge Preparation	Rake Angle
Standard Tip	TPMX22V	TPMT110300				●	.250	.125	.0012	.130	S	0°
	TPMX220.5	TPMT110302				●	.250	.125	.0078	.130	S	0°
	TPMX221	TPMT110304				●	.250	.125	.0156	.130	S	0°
	TPMX222	TPMT110308				●	.250	.125	.0313	.130	S	0°
NF Tip	NF-TPMX220	NF-TPMT110301			●	●	.250	.125	.0039	.130	S	0°
	NF-TPMX220.5	NF-TPMT110302			●	●	.250	.125	.0078	.130	S	0°
	NF-TPMX221	NF-TPMT110304			●	●	.250	.125	.0156	.130	S	0°
	NF-TPMX222	NF-TPMT110308			●	●	.250	.125	.0313	.130	S	0°

Polycrystalline Diamond (PCD) Inserts

See page 247 for running parameters.

VC

35° Diamond Type

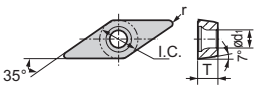
7° Relief

EDGE PREPARATIONS:

S Standard
H Honed
K Reinforced
AW Chipbreaker Stud
WF High Luster "Mirror-Like" Finish

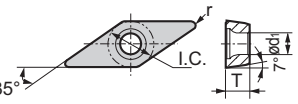
● USA Stocked Item
★ Worldwide Warehouse Item
▲ USA Limited Availability Item
○ Available 2nd Quarter 2015

VCMA

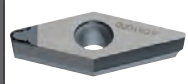


	Catalog No.	ISO Cat. No.	Stock N DA90	DA150	DA1000	DA2200	Inscribed Circle	Thickness	Nose Radius	Hole Diameter	Edge Preparation	Rake Angle
Standard Tip	VCMA333	VCMW160412	●			●	.375	.1875	.0469	.1732	S	0°
	VCMA333WF	VCMW160412WF	●			●	.375	.1875	.0469	.1732	WF	0°
	VCMA220520	VCMW220520				●	.500	.219	.3125	.1732	S	0°
NF Tip	NF-VCMA332	NF-VCMW160408			●	●	.375	.1875	.0313	.1732	S	0°
	NF-VCMA333	NF-VCMW160412			●	●	.375	.1875	.0469	.1732	S	0°
	NF-VCMA333H	NF-VCMW160412H				●	.375	.1875	.0469	.1732	H	0°

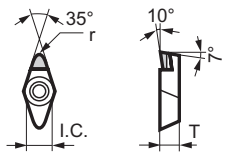
VCMT



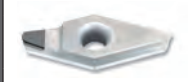
	Catalog No.	ISO Cat. No.	Stock N DA90	DA150	DA200	DA1000	DA2200	Inscribed Circle	Thickness	Nose Radius	Hole Diameter	Edge Preparation	Rake Angle
	NF-VCMT220.5GD	NF-VCMT110302N-GD				○		.250	.125	.0078	.130	S	0°
	NF-VCMT220.5LD	NF-VCMT110302N-LD				○		.250	.125	.0078	.130	S	0°
	NF-VCMT221GD	NF-VCMT110304N-GD				○		.250	.125	.0156	.130	S	0°
	NF-VCMT221LD	NF-VCMT110304N-LD				○		.250	.125	.0156	.130	S	0°
	NF-VCMT331GD	NF-VCMT160404N-GD				○		.375	.1875	.0156	.1693	S	0°
	NF-VCMT331LD	NF-VCMT160404N-LD				○		.375	.1875	.0156	.1693	S	0°
	NF-VCMT332GD	NF-VCMT160408N-GD				○		.375	.1875	.0312	.1693	S	0°
	NF-VCMT332LD	NF-VCMT160408N-LD				○		.375	.1875	.0312	.1693	S	0°
	NF-VCMT333GD	NF-VCMT160412N-GD				○		.375	.1875	.0469	.1693	S	0°
	NF-VCMT333LD	NF-VCMT160412N-LD				○		.375	.1875	.0469	.1693	S	0°



VCMX



	Catalog No.	ISO Cat. No.	Stock N DA90	DA150	DA1000	DA2200	Inscribed Circle	Thickness	Nose Radius	Hole Diameter	Edge Preparation	Rake Angle
Standard Tip	VCMX333	VCMT160412				●	.375	.1875	.0469	.1732	S	10°
	VCMX333WF	VCMT160412WF				●	.375	.1875	.0469	.1732	WF	10°
NF Tip	NF-VCMX220	NF-VCMT110301			●	●	.250	.125	.0039	.134	S	10°
	NF-VCMX220.5	NF-VCMT110302			●	●	.250	.125	.0078	.134	S	10°
	NF-VCMX221	NF-VCMT110304			●	●	.250	.125	.0156	.134	S	10°
	NF-VCMX331	NF-VCMT160404			●	●	.375	.1875	.0156	.1732	S	10°
	NF-VCMX332	NF-VCMT160408			●	●	.375	.1875	.0313	.1732	S	10°
	NF-VCMX333	NF-VCMT160412			●	●	.375	.1875	.0469	.1732	S	10°



VP

35° Diamond Type

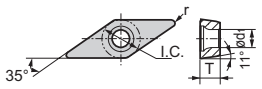
11° Relief

EDGE PREPARATIONS:

S Standard
H Honed
K Reinforced
AW Chipbreaker Stud
WF High Luster "Mirror-Like" Finish

● USA Stocked Item
★ Worldwide Warehouse Item
▲ USA Limited Availability Item
○ Available 2nd Quarter 2015

VPMA



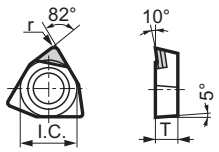
		Catalog No.	ISO Cat. No.	Stock N DA90	DA150	DA1000	DA2200	Inscribed Circle	Thickness	Nose Radius	Hole Diameter	Edge Preparation	Rake Angle
Standard Tip		VPMA443	VPMW220612				●	.500	.250	.0469	.214	S	0°
		VPMA443WF	VPMW220612WF				●	.500	.250	.0469	.214	WF	0°

WB

80° Trigon Type

5° Relief

WBMX



		Catalog No.	ISO Cat. No.	Stock N DA90	DA150	DA1000	DA2200	Inscribed Circle	Thickness	Nose Radius	Hole Diameter	Edge Preparation	Rake Angle
Standard Tip		WBMX520L	WBMT060101L				●	.156	.0625	.0039	.090	S	10°
		WBMX520.5L	WBMT060102L				●	.156	.0625	.0078	.090	S	10°
		WBMX521L	WBMT060104L				●	.156	.0625	.0156	.090	S	10°

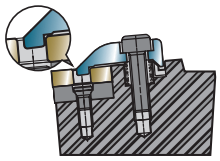
Mini Toolholders

Pages 82 - 105

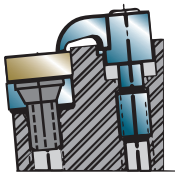
S

Insert Holding

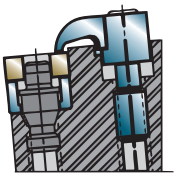
D
Clamp Mechanism



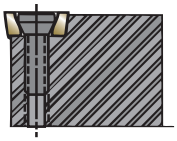
C
Clamp



M
Clamp and Lock Pin



S
Screw Only



C

Insert Shape

C Diamond — 80°

D Diamond — 55°

R Round — 360°

S Square — 90°

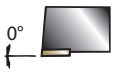
T Triangle — 60°

V Diamond — 35°

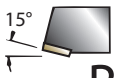
W Trigon — 80°

A

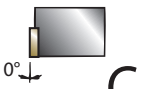
Toolholder Style



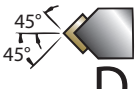
A
0° side cutting straight shank



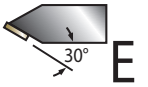
B
15° side cutting straight shank



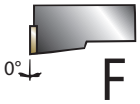
C
0° end cutting straight shank



D
45° side cutting straight shank

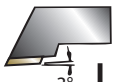


E
30° side cutting straight shank



F
0° end cutting o set shank

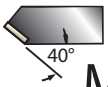
G
0° side cutting o set shank



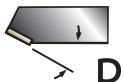
J
-3° side cutting o set shank

K
15° end cutting o set shank

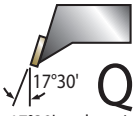
L
5° side & end cutting o set shank



M
40° side cutting straight shank

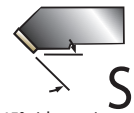


P
27°30' side cutting straight shank



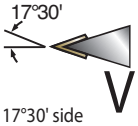
Q
17°30' end cutting straight shank

R
15° side cutting o set shank



S
45° side cutting o set shank

U
-3° end cutting o set shank



V
17°30' side cutting straight shank

All lead angles are ±1°

C

Insert Relief Angle

B — 5°

C — 7°

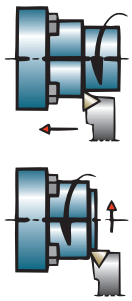
N — 0°

P — 11°

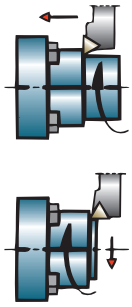
R

Hand

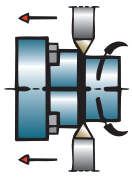
R
Right Hand



L
Left Hand

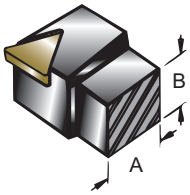


N
Neutral Hand



08

Shank Size



Square Shanks

This indicates the A & B dimensions in sixteenths (1/16).

examples:
12 = 12/16 =3/4 sq.
16 = 16/16 =1.0 sq.
20 = 20/16 =1-1/4 sq.

Rectangle Shanks

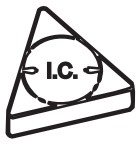
The first digit indicates the "A" dimension in eighths (1/8).

The second digit indicates the "B" dimension in quarters (1/4).

examples:
86 = A x B
1.0 x 1-1/2
85 = A x B
1.0 x 1-1/4

3

Insert Size



For equal sided inserts this indicates the inscribed circle (I.C.) in eighths (1/8)

examples,

6 = 6/8 =
3/4" I.C.

4 = 4/8 =
1/2" I.C.

2.5 = 2.5/8 =
5/16 I.C.

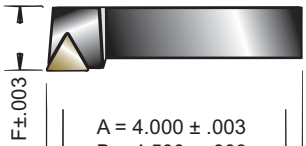
For rectangles and parallelograms two digits are necessary.

1st digit =
number of eighths (1/8) in width.

2nd digit =
number of quarters (1/4) in length.

B

Qualifications



A = 4.000 ± .003
B = 4.500 ± .003
C = 5.000 ± .003
D = 6.000 ± .003
E = 7.000 ± .003
J = 3.500 ± .003*
V = 3.500 ± .003*

*Sumitomo standard only

Master Gage Insert Nose Radius Chart for Qualified Holders

Insert I.C.	Nose Radius
1/4, 5/16	.015
3/8, 1/2	.031
5/8, 3/4	.047
1.0	.062

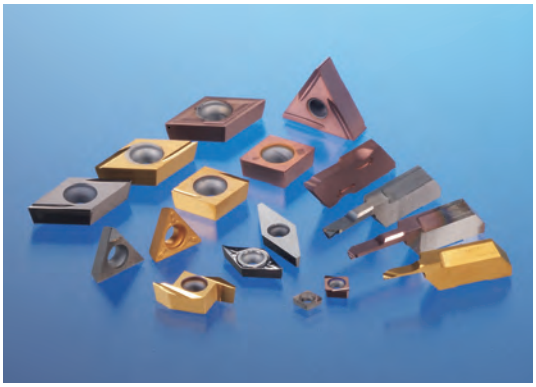
Mini TOOLHOLDERS

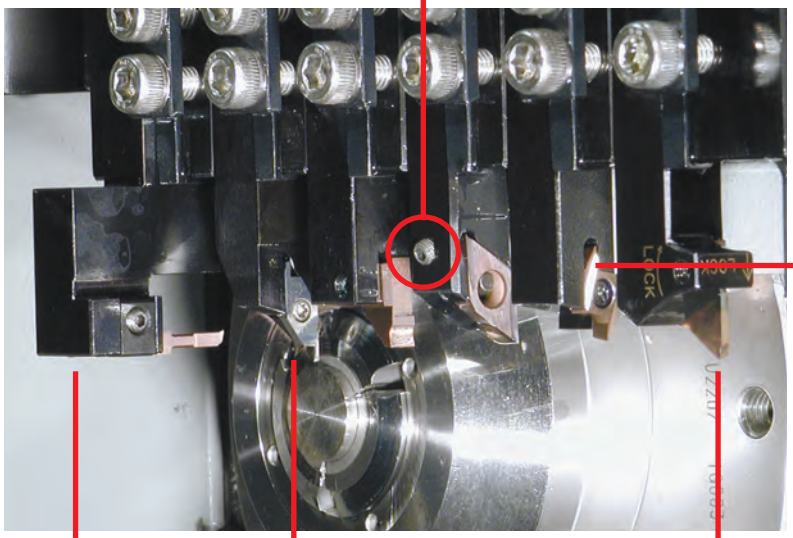
Full support for small product machining with a wide selection of tools !

■ General Features

In 1984, Sumitomo Electric Hardmetal first released the SECMINI Tool Holder series for the machining of small components in small NC autolathes. Through these years of experience, new tool designs which include the side lever lock tool holder were developed to meet the various machining requirements such as Back Turning, Copying, Cut-off, etc; and Sumitomo is continually striving to enhance the series.

■ Full lineup of grades from Carbide to PCD





■ Special tools for autolathe machines to meet various types of machining

● Very Small Dia. Boring Tool Holder CKB Type
Min. dia. ø1 to ø5 mm

☞ 101

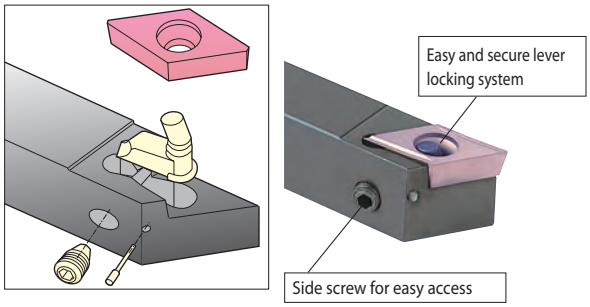
● Very Small Product Turning Tool SPB Type
Best suited for products with a diameter of less than ø10 mm

☞ 100

Mini TOOLHOLDERS

■ A wide selection of easy-to-use holders

● Side Lever Locking (Back Clamp)Tool Holders PD/PC Type



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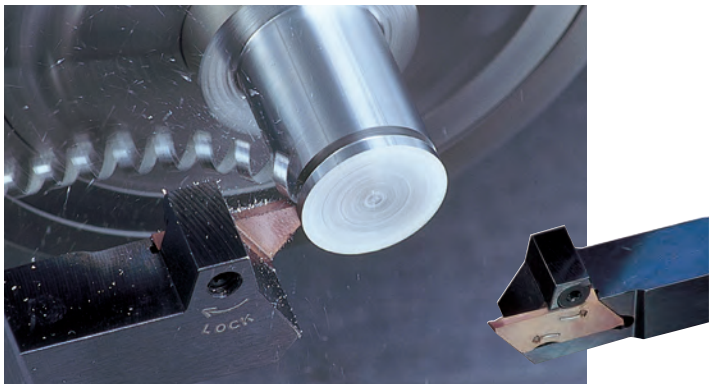
● Back-Turning Tool Holder SBT/PBT Type

Sharp cutting edges with good surface finish
Max. reach of insert 8.0 mm, edge width 2.5 mm

94

● Cut-off Tool Holder SCT Type

Easy insert change by just loosening the screw from the back
Max. cut-off dia. ø5 mm, ø12 mm, ø16 mm



147

● Zero Off-set Holders

Tool compensation not required for small gang-type lathes

From 86

● Twin Head Holders

Multi-functional tools for autolathes
One holder with 2 operations

From 103

● Round Shank Holder RS Type

External turning made possible with holder sleeves

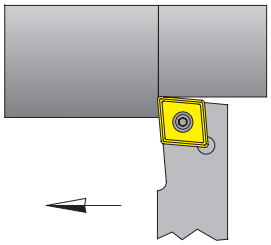
From 97

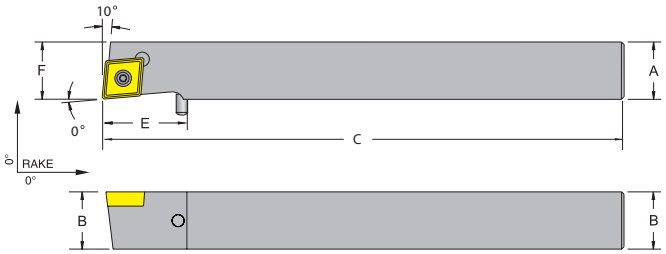
● SEC-Grooving Tools GND Type

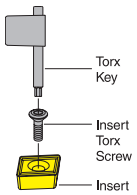
Full range of shanks for small product machining
Can be used for grooving widths of 1.25 mm and greater

From 139

SCAC Series





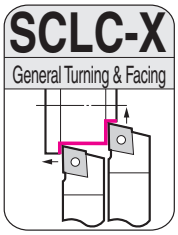


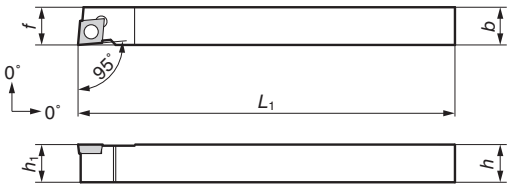
Right Hand Shown, Left Hand Opposite

Catalog Number		A	B	C	E (Tool Stop)	F	Gage Insert	Insert Torx Screw	Torx Key
Right Hand	Left Hand								
SCACR062B	SCACL062B	0.375	0.375	4.500	1.000	0.375	CC__-21.51	TS25.45-6M2	TRX08
SCACR062D	SCACL062D	0.375	0.375	6.000	1.000	0.375			
SCACR083B	SCACL083B	0.500	0.500	4.500	1.000	0.500	CC__-32.52	TS4.7-10M1	TRX15
SCACR083D	SCACL083D	0.500	0.500	6.000	1.000	0.500			
SCACR103B	SCACL103B	0.625	0.625	4.500	1.000	0.625			
SCACR103D	SCACL103D	0.625	0.625	6.000	1.000	0.625			

SCLC-X

General Turning & Facing





■ Holder

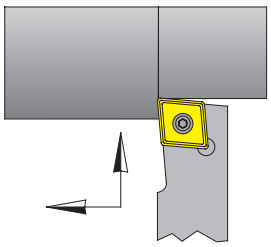
■ Parts

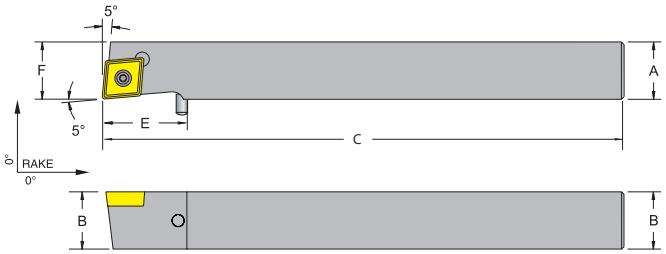
Above figures show right hand tools.

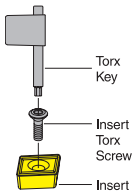
Catalog Number	Stock		Dimensions (mm)					Gage Insert	Screw	Wrench
	R	L	h	b	L_1	f	h_1			
SCLCR/L1010-H06X	★	★	10	10	100	10	10	CC_T21.5	BFTX02506N	TRX08
SCLCR/L1215-K09X	★	★	12	15	125	15	12	CC_T32.5	BFTX0409N	TRX15
SCLCR/L1215-F09X	★	★	12	15	85	15	12	CC_T32.5		

85mm Shank

SCNC Series



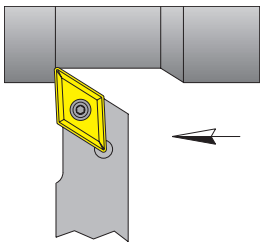


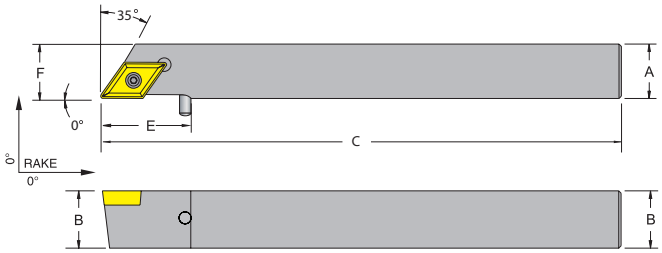


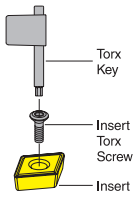
Right Hand Shown, Left Hand Opposite

Catalog Number		A	B	C	E (Tool Stop)	F	Gage Insert	Insert Torx Screw	Torx Key
Right Hand	Left Hand								
SCNCR062B	SCNCL062B	0.375	0.375	4.500	1.000	0.375	CC__21.51	TS25.456M2	TRX08
SCNCR062D	SCNCL062D	0.375	0.375	6.000	1.000	0.375			
SCNCR082B	SCNCL082B	0.500	0.500	4.500	1.000	0.500	CC__32.52	TS4.710M1	TRX15
SCNCR083B	SCNCL083B	0.500	0.500	4.500	1.000	0.500			
SCNCR083D	SCNCL083D	0.500	0.500	6.000	1.000	0.500			
SCNCR103B	SCNCL103B	0.625	0.625	4.500	1.000	0.625			
SCNCR103D	SCNCL103D	0.625	0.625	4.500	1.000	0.625			

SDAC Series





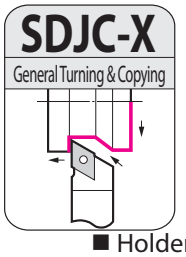


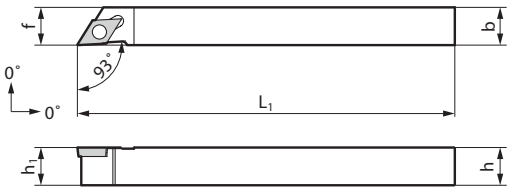
Right Hand Shown, Left Hand Opposite

Catalog Number		A	B	C	E (Tool Stop)	F	Gage Insert	Insert Torx Screw	Torx Key
Right Hand	Left Hand								
SDACR062B	SDACL062B	0.375	0.375	4.500	1.000	0.375	DC__21.51	TS25.456M2	TRX08
SDACR062D	SDACL062D	0.375	0.375	6.000	1.000	0.375			
SDACR082B	SDACL082B	0.500	0.500	4.500	1.000	0.500			
SDACR082D	SDACL082D	0.500	0.500	6.000	1.000	0.500			
SDACR083B	SDACL083B	0.500	0.500	4.500	1.000	0.500	DC__32.52	TS4.710M1	TRX15
SDACR083D	SDACL083D	0.500	0.500	6.000	1.000	0.500			
SDACR103B	SDACL103B	0.625	0.625	4.500	1.000	0.625			
SDACR103D	SDACL103D	0.625	0.625	6.000	1.000	0.625			
SDACR123B	SDACL123B	0.750	0.750	4.500	1.000	0.750			
SDACR1010-H07X*	SDACL1010-H07X*	*10*	*10*	*100*	*10*	*10*	DC__21.51	BFTX02506N	TRX08
SDACR1215-K11X*	SDACL1215-K11X*	*12*	*15*	*125*	*15*	*12*	DC__32.52	BFTX0409N	TRX15
SDACR1215-F11X*	SDACL1215-F11X*	*12*	*15*	*85*	*15*	*12*	DC__32.52		

* = Worldwide Warehouse Stock

SDJC-X





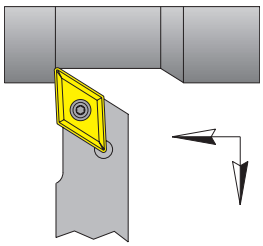
Above figures show right hand tools.

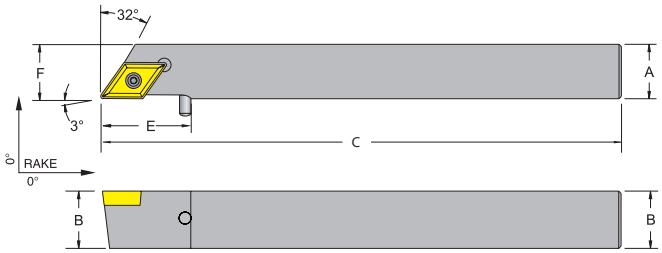
■ Holder

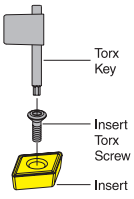
■ Parts

	Catalog Number	Stock		Dimensions (mm)					Gage Insert	Screw	Wrench
		R	L	h	b	L_1	f	h_1			
85mm Shank	SDJC R/L1010-H07X	★	★	10	10	100	10	10	DC_T21.5	BFTX02506N	TRX08
	SDJC R/L1215-K11X	★	★	12	15	125	15	12	DC_T32.5	BFTX0409N	TRX15
	SDJC R/L1215-F11X	★	★	12	15	85	15	12	DC_T32.5		

SDNC Series



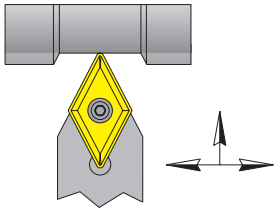


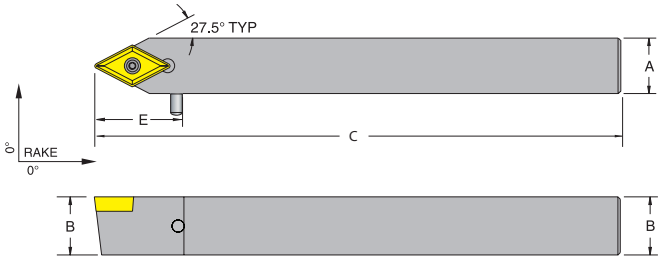


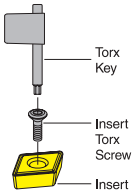
Right Hand Shown, Left Hand Opposite

Catalog Number		A	B	C	E (Tool Stop)	F	Gage Insert	Insert Torx Screw	Torx Key
Right Hand	Left Hand								
SDNCR062B	SDNCL062B	0.375	0.375	4.500	1.000	0.375	DC__21.51	TS25.456M2	TRX08
SDNCR082B	SDNCL082B	0.500	0.500	4.500	1.000	0.500			
SDNCR103B	SDNCL103B	0.625	0.625	4.500	1.000	0.625	DC__32.52	TS4.710M1	TRX15

SDPC Series





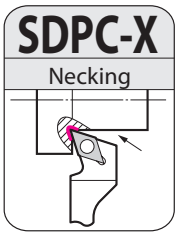


Neutral Hand Shown

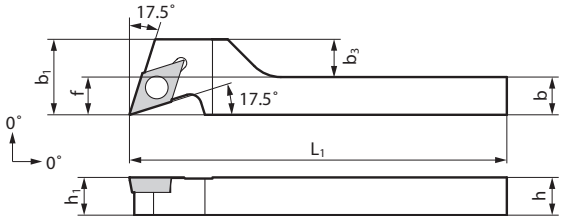
Catalog Number Neutral	A	B	C	E (Tool Stop)	Gage Insert	Insert Torx Screw	Torx Key
SDPCN062B	0.375	0.375	4.500	1.000	DC__21.51	TS25.456M2	TRX08
SDPCN062D	0.375	0.375	6.000	1.000			
SDPCN082B	0.500	0.500	4.500	1.000			
SDPCN083B	0.500	0.500	4.500	1.000	DC__32.52	TS4.710M1	TRX15
SDPCN083D	0.500	0.500	6.000	1.000			
SDPCN103B	0.625	0.625	4.500	1.000			
SDPCN103D	0.625	0.625	6.000	1.000			

SDPC-X

Necking



■ Holder

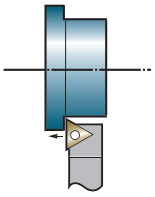


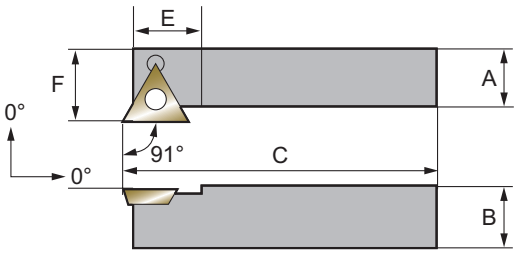
Above figures show right hand tools.

■ Parts

Catalog Number	Stock		Dimensions (mm)							Gage Insert	Screw	Wrench
	R	L	h	b	L_1	f	h_1	b_1	b_3			
SDPCR/L1010-H11X	★	★	10	10	100	10	10	20	10	DC_T32.5	BFTX0409N	TRX15

STAC R/L Series





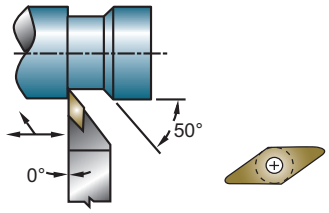
Catalog Number Right Hand	Catalog Number Left Hand	7° Positive Gage Insert	Stock	A	B	C	E	F	Insert Screw	Torque Wrench
STACR062B	STACL062B	TCMT21.51	•	.375	.375	4.500	0.625	0.375	ST-21.5	TRX08
STACR082B	STACL082B	TCMT21.51	•	.500	.500	4.500		.500		
STACR103B	STACL103B	TCMT32.52	•	.625	.625	4.500	0.750	0.625	ST-32.5	TRX15
STACR062D	STACL062D	TCMT21.51	•	.375	.375	6.000	0.625	0.375	ST-21.5	TRX08
STACR082D	STACL082D	TCMT21.51	•	.500	.500	6.000		.500		
STACR103D	STACL103D	TCMT32.52	•	.625	.625	6.000	0.750	0.625	ST-32.5	TRX15

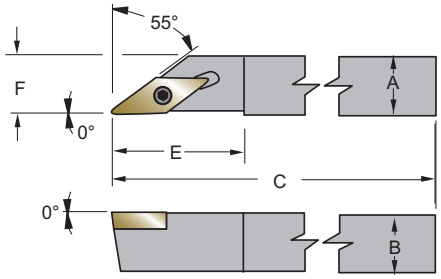
* Not zero offset

• = USA stocked item

★ = Worldwide Warehouse item

SVAB R/L Series

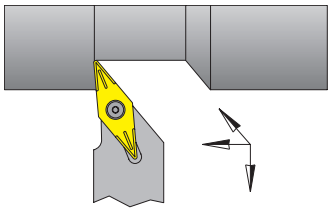


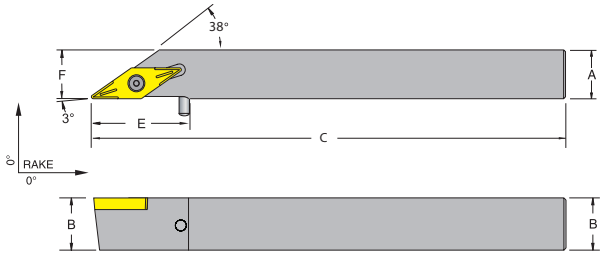


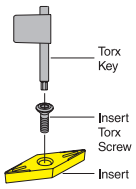
Catalog Number		5° Positive Gage Insert	Stock	A	B	C	E	F	Insert Screw	Torque Wrench
Right Hand	Left Hand									
SVABR103B	SVABL103B	VBMT332	•	.625	.625	6.000	1.375	0.625	ST-32.5	TRX15
SVABR062D	SVABL062D	VBMT221	•	.375	.375	6.000	0.875	0.375	ST-21.5	TRX08
SVABR082D	SVABL082D	VBMT221	•	.500	.500	6.000		.500		
SVABR103D	SVABL103D	VBMT332	•	.625	.625	6.000	1.375	0.625	ST-32.5	TRX15

• = USA stocked item

SVNB Series





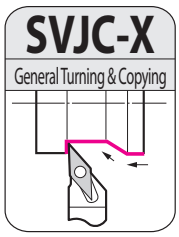


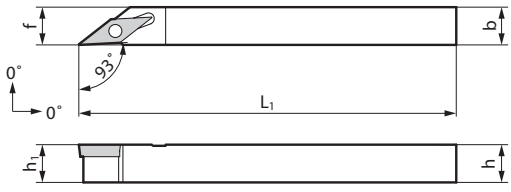
Right Hand Shown, Left Hand Opposite

Catalog Number		A	B	C	E (Tool Stop)	F	Gage Insert	Insert Torx Screw	Torx Key
Right Hand	Left Hand								
SVNBR062B	SVNBL062B	0.375	0.375	4.500	1.000	0.375	VB__21.51	TS25.456M2	TRX08
SVNBR062D	SVNBL062D	0.375	0.375	6.000	1.000	0.375			
SVNBR082B	SVNBL082B	0.500	0.500	4.500	1.000	0.500			
SVNBR082D	SVNBL082D	0.500	0.500	6.000	1.000	0.500			
SVNBR103B	SVNBL103B	0.625	0.625	4.500	1.000	0.625	VB__32.52	TS4.710M1	TRX15
SVNBR103D	SVNBL103D	0.625	0.625	6.000	1.000	0.625			

SVJC-X

General Turning & Copying





Above figures show right hand tools.

■ Holder

Catalog Number	Stock		Dimensions (mm)					Gage Insert
	R	L	h	b	L_1	f	h_1	
SVJCR/L1010-H11X	★	★	10	10	100	10	10	VC_T22
SVJCR/L1212-K11X	★	★	12	12	125	12	12	VC_T22
SVJCR/L1212-F11X	★	★	12	12	85	12	12	VC_T22

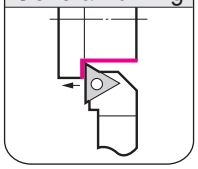
■ Parts

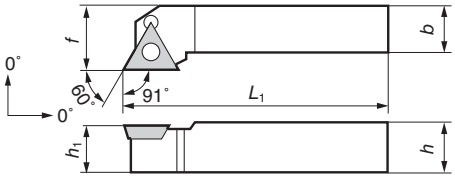
Screw	Wrench
BFTX02506N	TRX08

★ = Worldwide Warehouse item

External Turning

STGC
General Turning





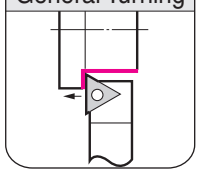
■ **Holder**

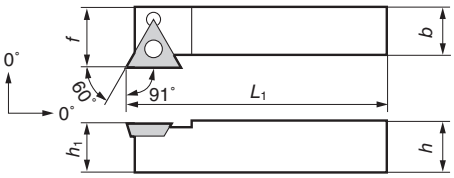
Above figures show right hand tools.

■ **Parts**

Cat. No.	Stock		Dimensions (mm)					Gage Insert	Screw	Recommended Tightening Torque (N•m)	Wrench
	R	L	h	b	L1	f	h1				
STGC R/L0808-09	★		8	8	100	10	8	TC□□1.81.5□	BFTX02205N	0.5	TRX06
STGC R/L1010-09	★	★	10	10	100	12	10				
STGC R/L1212-11	★	★	12	12	100	16	12	TC□□21.5□	BFTX02506N	1.5	TRX08
STGC R/L1616-11	★	★	16	16	100	20	16				
STGC R/L2020-11	★	★	20	20	125	25	20				

STAC
General Turning





■ **Holder**

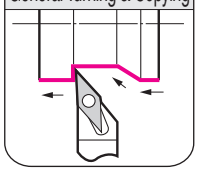
Above figures show right hand tools.

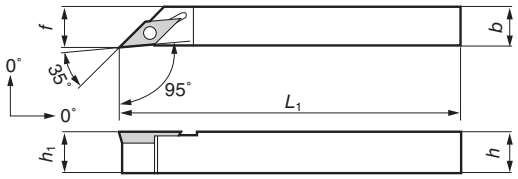
■ **Parts**

Cat. No.	Stock		Dimensions (mm)					Gage Insert	Screw	Recommended Tightening Torque (N•m)	Wrench
	R	L	h	b	L1	f	h1				
STAC R/L0808-09		★	8	8	100	8.5	8	TC□□1.81.5□	BFTX02205N	0.5	TRX06
STAC R/L1010-09	★		10	10	100	10.5	10				
STAC R/L1212-11	★	★	12	12	100	12.5	12	TC□□21.5□	BFTX02506N	1.5	TRX08
STAC R/L1616-11	★	★	16	16	100	16.5	16				
STAC R/L2020-11	★	★	20	20	125	20.5	20				

General Turning and Copying

SVLC
General Turning & Copying





■ **Parts**

For Torx Holes

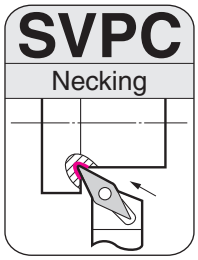
■ **Holder**

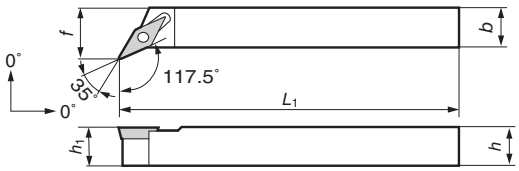
Above figures show right hand tools.

Cat. No.	Stock		Dimensions (mm)					Gage Insert	Screw	Recommended Tightening Torque (N•m)	Wrench
	R	L	h	b	L_1	f	h_1				
SVLC R/L1010-H11	★	★	10	10	100	10.5	10	VC□□22□	BFTX02508NV	1.5	TRX08
SVLC R/L1212-H11	★	★	12	12	100	12.5	12				
SVLC R/L1616-H11	★	★	16	16	100	16.5	16				
SVLC R/L2020-K11*	★	★	20	20	125	20.5	20				

* Previous Cat. No SVLCR/L2020-H11

SVPC
Necking





■ **Parts**

For Torx Holes

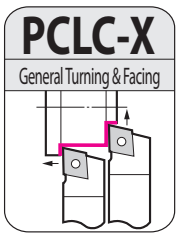
■ **Holder**

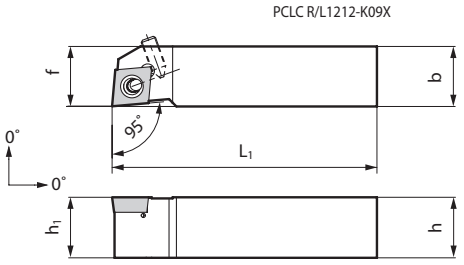
Above figures show right hand tools.

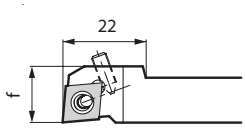
Cat. No.	Stock		Dimensions (mm)					Gage Insert	Screw	Recommended Tightening Torque (N•m)	Wrench
	R	L	h	b	L_1	f	h_1				
SVPC R/L1010-H11	★	★	10	10	100	14.5	10	VC□□22□	BFTX02508NV	1.5	TRX08
SVPC R/L1212-H11	★	★	12	12	100	16.5	12				
SVPC R/L1616-H11	★	★	16	16	100	20.5	16				
SVPC R/L2020-K11*	★	★	20	20	125	24.5	20				

* Previous Cat. No SVLCR/L2020-H11

PCLC-X
General Turning & Facing





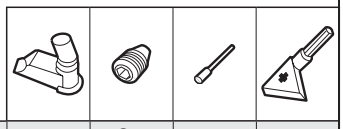


Side lever locking holders

■ Holder

Above figures show right hand tools.

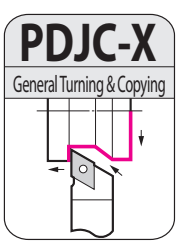
■ Parts

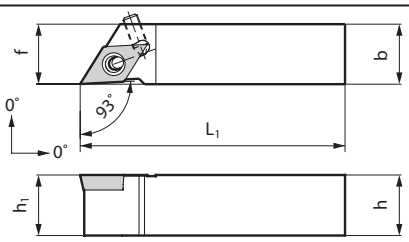


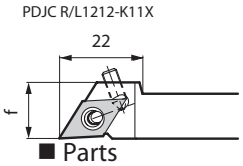
Catalog Number	Stock		Dimensions (mm)					Gage Insert	Lever Pin	Set Screw	Pin	Wrench
	R	L	h	b	L1	f	h1					
PCLC R/L1010-K06X	★		10	10	125	10	10	CC_T21.5	LCL06	BTT0407	LP07	TH020
PCLC R/L1212-K09X	★		12	12	125	15	12	CC_T32.5	LCL09	BTT0411	LP06	
PCLC R/L1616-K09X	★		16	16	125	16	16	CC_T32.5				

★= Worldwide Warehouse item

PDJC-X
General Turning & Copying





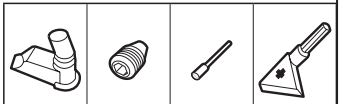


Side lever locking holders

■ Holder

Above figures show right hand tools.

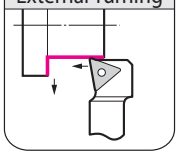
■ Parts

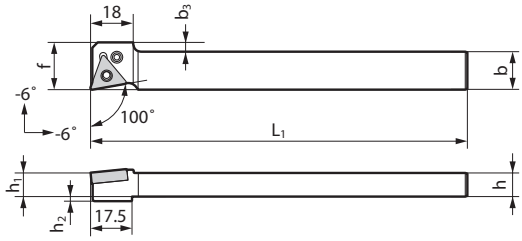


Catalog Number	Stock		Dimensions (mm)					Gage Insert	Lever Pin	Set Screw	Pin	Wrench
	R	L	h	b	L1	f	h1					
PDJC R/L1010-K07X	★		10	10	125	10	10	DC_T21.5	LCL06	BTT0407	LP04	TH020
PDJC R/L1212-K11X	★		12	12	125	15	12	DC_T32.5	LCL09	BTT0411	LP07	
PDJC R/L1616-K11X	★		16	16	125	16	16	DC_T32.5				

★= Worldwide Warehouse item

PTXN-X
External Turning

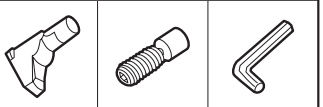




Side lever locking holders

■ Holder

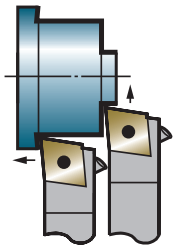
■ Parts



Catalog Number	Stock	Dimensions (mm)							Gage Insert	Lever Pin	Screw	Wrench
		h	b	L1	f	h1	h2	b3				
PTXN R1016-X16X	★	10	16	120	20	10	2	4	TN□□33	LCL33NT	LCS33NT	LH020NT
PTXN R1216-X16X	★	12	16	120	20	12	0	4	TN□□33			
PTXN R1616-X16X	★	16	16	120	20	16	0	4	TN□□33			
PTXN R2020-X16X	★	20	20	120	20	20	0	0	TN□□33			

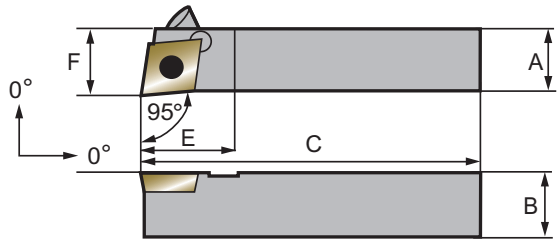
★= Worldwide Warehouse item

PCLC R/LSeries



Side lever locking holders

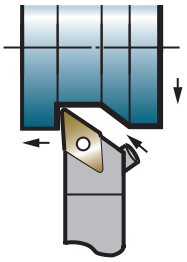
Side lever locking holders



Sumitomo Cat. No.			Dimensions (inch/*mm*)									
Right Hand	Left Hand	7° Positive Gage Insert	Stock	A	B	C	E	F	Lever Pin	Clamp Bolt	Pin	Wrench
PCLCR062D	PCLCL062D	CCMT21.51	●	.375	.375	6.000	.472	.395	LCL06	BTT0407	LP07	TH020
PCLCR083D	PCLCL083D	CCMT32.52	●	.500	.500	6.000	.591	.520	LCL09	BTT0407	LP06	TH020
PCLCR103D	PCLCL103D	CCMT32.52	●	.625	.625	6.000	.630	.645	LCL09	BTT0411	LP06	TH020
PCLCR1010-K06	*PCLCL1010-K06*	CCMT21.51	★	*10.0*	*10.0*	*125.0*	*12.0*	*10.5*	LCL06	BTT0407	LP07	TH020
PCLCR1212-K09	*PCLCL1212-K09*	CCMT32.52	★	*12.0*	*12.0*	*150.0*	*16.0*	*12.5*	LCL09	BTT0407	LP06	TH020
PCLCR1616-M09	*PCLCL1616-M09*	CCMT32.52	★	*16.0*	*16.0*	*150.0*	*16.0*	*16.5*	LCL09	BTT0411	LP06	TH020

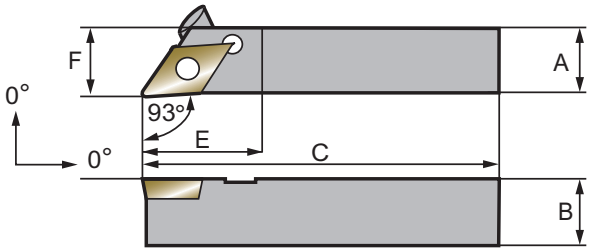
● = USA stocked item ★ = Worldwide Warehouse item

PDJC R/LSeries



Side lever locking holders

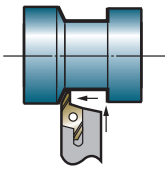
Side lever locking holders



Sumitomo Cat. No.			Dimensions (Inch/*mm*)									
Right Hand	Left Hand	7° Positive Gage Insert	Stock	A	B	C	E	F	Lever Pin	Clamp Bolt	Pin	Wrench
PDJCR062D	PDJCL062D	DCMT21.51	●	.375	.375	6.000	.472	.395	LCL06	BTT0407	LP04	TH020
PDJCR083D	PDJCL083D	DCMT32.52	●	.500	.500	6.000	.787	.520	LCL09	BTT0407	LP07	TH020
PDJCR103D	PDJCL103D	DCMT32.52	●	.625	.625	6.000	.787	.645	LCL09	BTT0411	LP07	TH020
PDJCR1010-K07	*PDJCL1010-K07*	DCMT21.51	★	*10.0*	*10.0*	*125.0*	*15.0*	*10.5*	LCL06	BTT0407	LP04	TH020
PDJCR1212-M11	*PDJCL1212-M11*	DCMT32.52	★	*12.0*	*12.0*	*150.0*	*20.0*	*12.5*	LCL09	BTT0407	LP07	TH020
PDJCR1616-M11	*PDJCL1616-M11*	DCMT32.52	★	*16.0*	*16.0*	*150.0*	*20.0*	*16.5*	LCL09	BTT0411	LP07	TH020

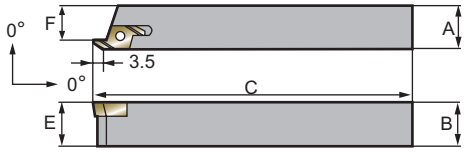
● = USA stocked item ★ = Worldwide Warehouse item

SBT R Series



Back Turning Holders

See page for inserts



Sumitomo Cat. No.			Dimensions (Inch*mm*)							
Right Hand	Left Hand	Gage Insert	Stock	A	B	C	E	F	Insert Screw	Torx Wrench
SBTR3508		BTR35	•	.500	.500	6.000	.500	.402	BFTX0307N	TRX10
SBTR3510		BTR35	•	.625	.625	6.000	.625	.527	BFTX0307N	TRX10
SBTR351212		BTR35	★	*12.0*	*12.0*	*150.0*	*12.0*	*.402*	BFTX0307N	TRX10
SBTR351616		BTR35	★	*16.0*	*16.0*	*150.0*	*16.0*	*.527*	BFTX0307N	TRX10

• = USA stocked item ★ = Worldwide Warehouse item

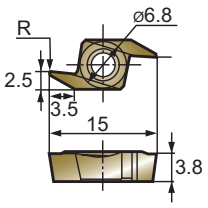
Swiss Tooling Inserts

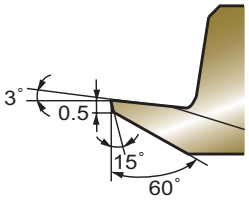
for precision turning applications:
- *Cut-off*
- *Back Turn*
- *BoringRoughing*
- *Boring Finishing*

P Steel
M Stainless Steel
K Cast Iron
N Non-ferrous
S Exotic Materials
H Hardened Steel

● USA Stocked Item
★ Worldwide Warehouse Item
▲ USALimited Availability Item
○ New Product Arriving 2nd Quarter 2015

BTR
for SBT Type Holder





Sumitomo Catalog #	ISO Catalog #	I.C.	T	r	Coated: AC530U	Cermet: T1500A	Cermet: T1200A
BTR3505	BTR3505	6.8	3.8	0.05	●	★	★
BTR3515	BTR3515			0.15	●	★	★
BTR5505	BTR5505			0.05	★		
BTR5515	BTR5515			0.15	★		
BTR8005	BTR8005			0.05	★		
BTR8015	BTR8015			0.15	★		

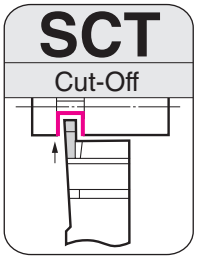


Fig.1

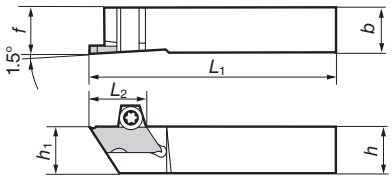
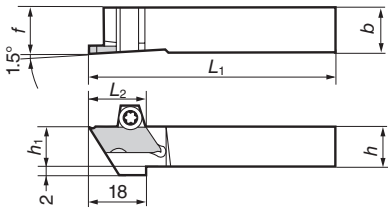
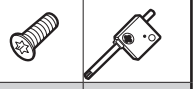


Fig.2



Above figures show right hand tools.

■ Spare Parts



■ **Holders (Right Hand)**

Cat. No.	Stock	Dimensions (in/mm)						Gage Insert	Fig.	Screw	Spanner
		h	*b*	*L1*	*f*	*h1*	*L2*				
SCTR08	●	.500	.500	6.00	.500	.500	.591	CT R12○○○○(-NB)	1	BFTX0410T8L	TRX08
SCTR10	●	.625	.625	6.00	.625	.625	.591				
SCTR12	●	.750	.750	6.00	.750	.750	.591				
SCT R1010	★	*10*	*10*	*120*	*10*	*10*	*15*	CT R05○○○○(-NB) CT R12○○○○(-NB)			
SCT R1212	★	*12*	*12*	*120*	*12*	*12*	*15*				
SCT R1616	★	*16*	*16*	*120*	*16*	*16*	*15*				
SCT R1010-16	★	*10*	*10*	*120*	*10*	*10*	*18*	CT R16○○○○(-NB)	2		
SCT R1212-16	★	*12*	*12*	*120*	*12*	*12*	*18*		1		
SCT R1616-16	★	*16*	*16*	*120*	*16*	*16*	*18*				

■ **Holders (Left Hand)**

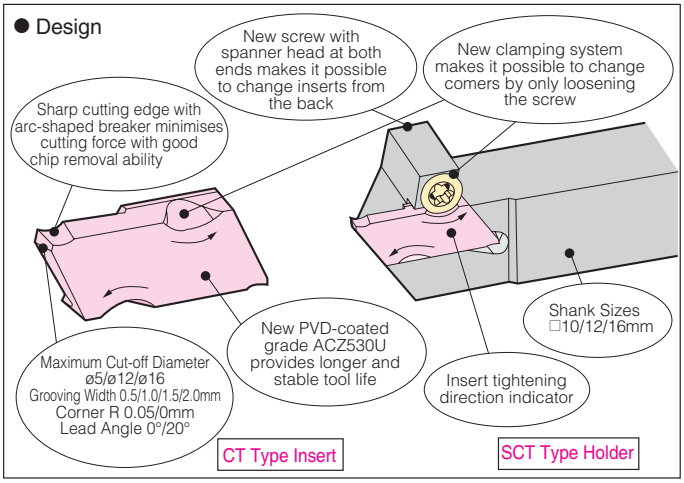
SCTL08	●	.500	.500	6.00	.500	.500	.591	CT R12○○○○(-NB)	1	BFTX0410T8R	TRX08
SCTL10	●	.625	.625	6.00	.625	.625	.591				
SCTL12	●	.750	.750	6.00	.750	.750	.591				
SCT L1010	★	*10*	*10*	*120*	*10*	*10*	*15*	CT L05○○○○(-NB) CT L12○○○○(-NB)			
SCT L1212	★	*12*	*12*	*120*	*12*	*12*	*15*				
SCT L1616	★	*16*	*16*	*120*	*16*	*16*	*15*				
SCT L1010-16	★	*10*	*10*	*120*	*10*	*10*	*18*	CT L16○○○○(-NB)	2		
SCT L1212-16	★	*12*	*12*	*120*	*12*	*12*	*18*		1		
SCT L1616-16	★	*16*	*16*	*120*	*16*	*16*	*18*				

For list of inserts please see page 148

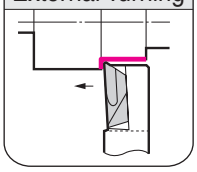
■ **Characteristics**

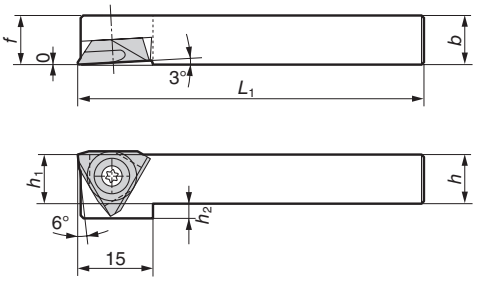
- New clamping system
  New clamping system makes it possible to change corners by only loosening the screw from the back.
- High quality surface finish
  Excellent chip removal with good surface finish even at the centre of the end face.
- Stable and long tool life
  PVD-coated grade AC530U provides stability and longer tool life.

● Design



SFT
External Turning





■ **Parts**

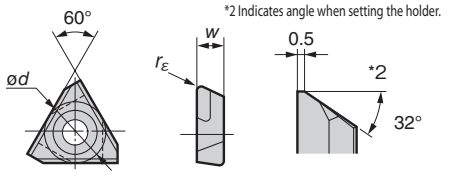
(For Torx Holes)

■ **Holder**

Cat. No.	Stock	Dimensions (mm)						Gage Insert	Screw	Wrench
		h	b	L_1	f	h_1	h_2			
SFT R1010	★	10	10	120	10	10	3	TFR33○○	BFTX0410NSW	RT08
SFT R1212	★	12	12	120	12	12	1			
SFT R1616	★	16	16	120	16	16	Q			
SFT R2020	★	20	20	120	20	20	Q			

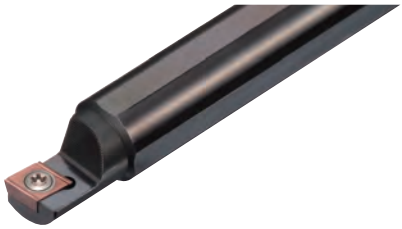
■ **Insert**

Cat. No.	Stock	Dimensions (mm)			Holder
	ACZ150	ød	w	r_ε	
TF R3300	★	9.525	4.76	-	SFT R○○○○
TF R3305	★	9.525	4.76	0.05	
TF R3315	★	9.525	4.76	0.15	
TF R3320	★	9.525	4.76	0.20	

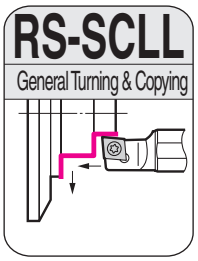


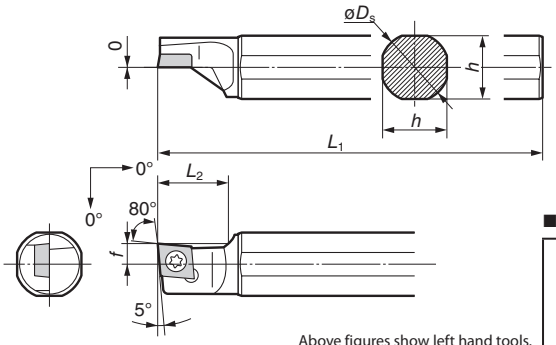
■ Characteristics

- Shank diameters from ø14mm to ø25.4mm are stocked. Holders can be fitted on machines of different makes.
- Bars can be mounted from the rear of the sleeve to increase the tooling range.



General Turning

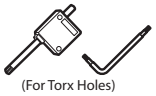




Above figures show left hand tools.

■ Holder

■ Parts



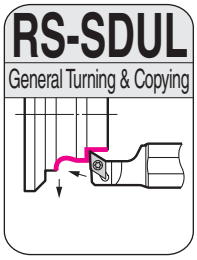
(For Torx Holes)

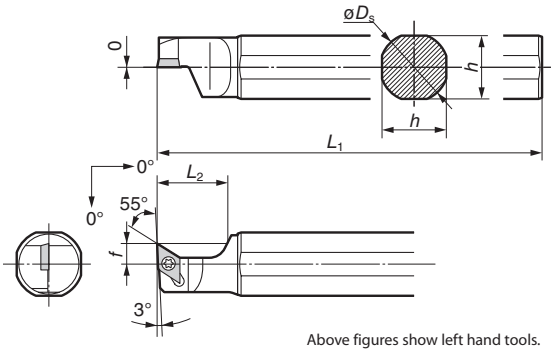
Cat. No.	Stock	Dimensions (mm)					Gage Insert	Screw	Wrench
		øDs	h	L1	f	L2			
RS15H-SCLL06	★	15.875	15	100	6.0	20	CC□□21.5□	BFTX02507NT	RT08
RS19X-SCLL06	★	19.05	18	120	6.0	20			
RS20X-SCLL06X	★	20	19	95	6.0	20			
RS20X-SCLL06	★	20	19	120	6.0	20			
RS22X-SCLL06	★	22	21	120	6.0	20			
RS25X-SCLL06	★	25	24	120	6.0	20			
RS25M-SCLL06	★	25.4	24	150	6.0	20			
RS15H-SCLL09	★	15.875	15	100	6.0	20	CC□□32.5□	BFTX0408NT	LT25NT
RS19X-SCLL09	★	19.05	18	120	6.0	20			
RS20X-SCLL09S	★	20	19	95	6.0	20			
RS20X-SCLL09	★	20	19	120	6.0	20			
RS22X-SCLL09	★	22	21	120	6.0	20			
RS25X-SCLL09	★	25	24	120	6.0	20			
RS25M-SCLL09	★	25.4	24	150	6.0	20			

* Right handed or neutral handed inserts are applicable.

General Turning

RS-SDUL
General Turning & Copying





Above figures show left hand tools.

■ Parts

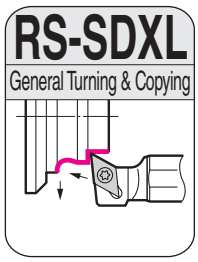
(For Torx Holes)

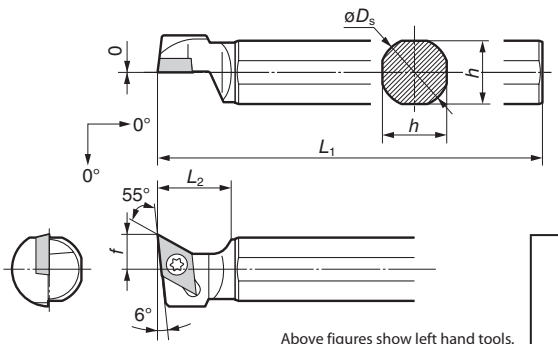
■ Holder

Cat. No.	Stock	Dimensions (mm)					Gage Insert	Screw	Wrench
		øDs	h	L1	f	L2			
RS14F-SDUL07	★	14	13	80	6.0	20	DC□□21.5□	BFTX02507NT	RT08
RS15H-SDUL07	★	15.875	15	100	6.0	20			
RS16F-SDUL07	★	16	15	80	6.0	20			
RS16X-SDUL07	★	16	15	120	6.0	20			
RS19X-SDUL07	★	19.05	18	120	6.0	20			
RS20X-SDUL07S	★	20	19	95	6.0	20			
RS20X-SDUL07	★	20	19	120	6.0	20			
RS22X-SDUL07	★	22	21	120	6.0	20			
RS19X-SDUL11	★	19.05	18	120	10.0	20	DC□□32.5□	BFTX0410NT	LT25NT
RS20X-SDUL11S	★	20	19	95	10.0	20			
RS20X-SDUL11	★	20	19	120	10.0	20			
RS22X-SDUL11	★	22	21	120	10.0	20			
RS25X-SDUL11	★	25	24	120	10.0	20			
RS25M-SDUL11	★	25.4	24	150	10.0	20			

* Right handed or neutral handed inserts are applicable.

RS-SDXL
General Turning & Copying





Above figures show left hand tools.

■ Parts

(For Torx Holes)

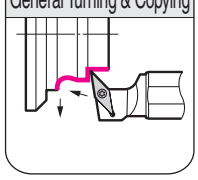
■ Holder

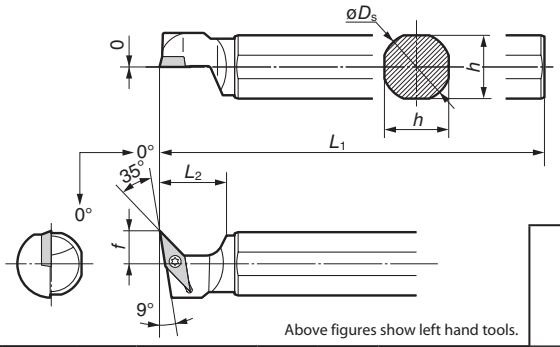
Cat. No.	Stock	Dimensions (mm)					Gage Insert	Screw	Wrench
		øDs	h	L1	f	L2			
RS19X-SDXL11	★	19.05	18	120	10.0	20	DC□□32.5□	BFTX0410NT	LT25NT
RS20X-SDXL11S	★	20	19	95	10.0	20			
RS20X-SDXL11	★	20	19	120	10.0	20			
RS25X-SDXL11	★	25	24	120	10.0	20			

* Right handed or neutral handed inserts are applicable.

General Turning

RS-SVXL
General Turning & Copying





■ Holder

Above figures show left hand tools.

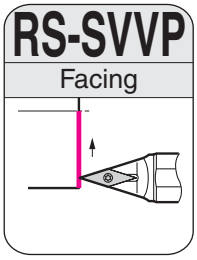
■ Parts

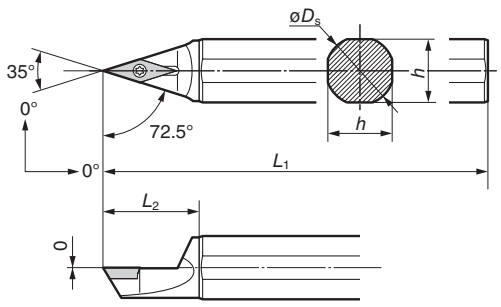
(For Torx Holes)

Cat. No.	Stock	Dimensions (mm)					Gage Insert	Screw	Wrench
		øDs	h	L1	f	L2			
RS15H-SVXL11	★	15.875	15	100	10.0	20	VC□□22□	BFTX02507NT	RT08
RS19X-SVXL11	★	19.05	18	120	10.0	20			
RS20X-SVXL11S	★	20	19	95	10.0	20			
RS20X-SVXL11	★	20	19	120	10.0	20			
RS22X-SVXL11	★	22	21	120	10.0	20			
RS25X-SVXL11	★	25.4	24	150	10.0	20			

* Right handed or neutral handed inserts are applicable.

RS-SVVP
Facing





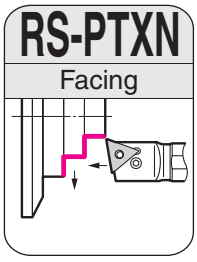
■ Holder

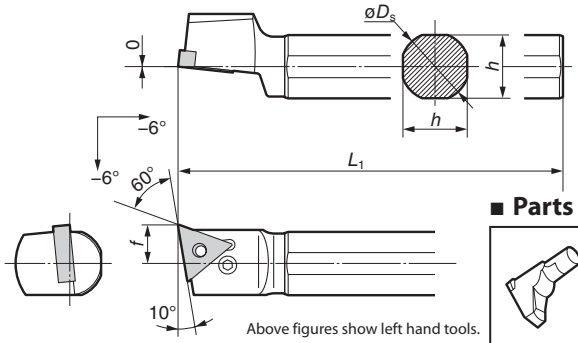
■ Parts

(For Torx Holes)

Cat. No.	Stock	Dimensions (mm)					Gage Insert	Screw	Wrench
		øDs	h	L1	f	L2			
RS19X-SVVPN11	★	19.05	18	120	9.0	27	VP□□22□	BFTX02507NT	RT08
RS22X-SVVPN11	★	22	21	120	10.5	27			

RS-PTXN
Facing





■ Holder

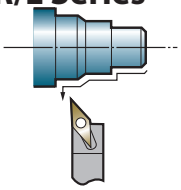
Above figures show left hand tools.

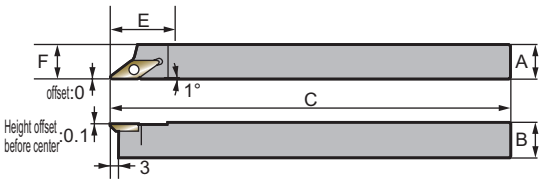
■ Parts

(For Hexagonal Holes)

Cat. No.	Stock	Dimensions (mm)				Gage Insert	Lever Pin	Screw	Wrench
		øDs	h	L1	f				
RS19X-PTXNL16	★	19.05	18	120	11.0	TN□□33	LCL33NT	LCS33NT	LH020NT
RS20X-PTXNL16	★	20	19	120	11.0				
RS25M-PTXNL16	★	25.4	24	150	13.0				

SPB R/L Series





Sumitomo Cat. No.			Dimensions (Inch/*mm*)							
Right Hand	Left Hand	Gage Insert	Stock	A	B	C	E	F	Insert Screw	Torx Wrench
SPBR063D	SPBL063D	PBV1102	•	.375	.375	6.000	.669	.375	BFTX02505N	LT08-06
SPBR083D	SPBL083D	PBV1102	•	.500	.500	6.000	.669	.500	BFTX02505N	LT08-06
SPBR1010-60	*SPBL1010-60*	PBV1102	★	*10.0*	*10.0*	*150.0*	*17.0*	*10.5*	BFTX02505N	LT08-06
SPBR1212-60	*SPBL1212-60*	PBV1102	★	*12.0*	*12.0*	*150.0*	*17.0*	*12.5*	BFTX02505N	LT08-06

• = USA stocked item ★ = Worldwide Warehouse item

Swiss Tooling Inserts

for precision turning applications:
- *Cut-off*
- *Back Turn*
- *BoringRoughing*
- *Boring Finishing*

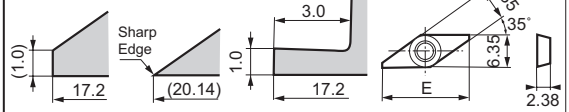
P Steel
M Stainless Steel
K Cast Iron
N Non-ferrous
S Exotic Materials
H Hardened Steel

● USA Stocked Item
★ Worldwide Warehouse Item
▲ USALimited Availability Item
○ New Product Arriving 2nd Quarter 2015

Blank Inserts *for SPB Type holder*

Uncoated

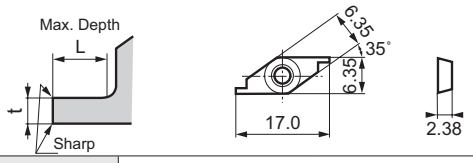
Fig. 1 Fig. 2 Fig. 3



Sumitomo Catalog #	Dim. E (mm)	Application	Fig.	BL130
PBVX1102R-NB	17.20	General	1	●
PBVX1102R-SB	20.14	Sharp Edge	2	●
PBVX1102R-BB	14.20	Special	3	●

Grooving Inserts *for SPB Type holder*

Uncoated

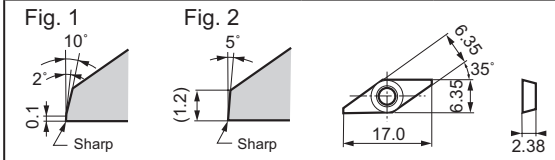


Sumitomo Catalog #	Dimensions (mm)		BL130
	Groove Depth	t	
PBVG1102R-030	0.5	0.3	●
PBVG1102R-050	1.0	0.5	●
PBVG1102R-100	2.0	1.0	●

Turning Inserts *for SPB Type holder*

Uncoated

Fig. 1 Fig. 2

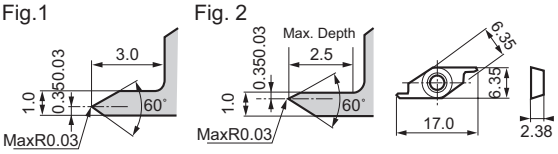


Sumitomo Catalog #	Dim. Cutter Edge (mm)	Wiper Edge	Fig.	BL130
PBVFW1102R	1.0	Yes	1	●
PBVFN1102R	1.0	No	2	●

Threading Inserts *for SPB Type holder*

Uncoated

Fig.1 Fig. 2

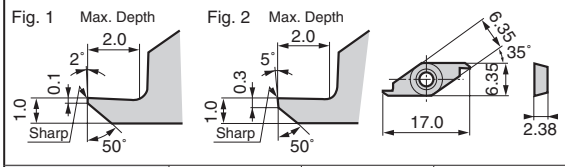


Sumitomo Catalog #	Dimension Pitch (mm)	Fig.	BL130
PBVTF1102R	0.2 ~ 0.5	1	●
PBVTB1102R	0.2 ~ 0.5	2	●

Turning Inserts *for SPB Type holder*

Uncoated

Fig. 1 Max. Depth Fig. 2 Max. Depth

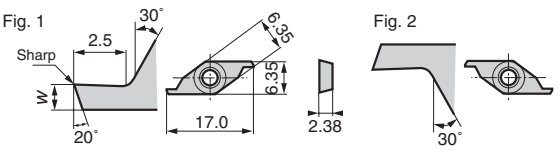


Sumitomo Catalog #	Dim. Cutter Edge (mm)	Wiper Edge	Fig.	BL130
PBVBN1102R	1.0	Yes	1	★
PBVBW1102R	1.0	No	2	★

Turning Inserts *for SPB Type holder*

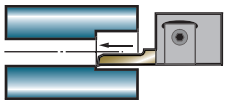
Uncoated

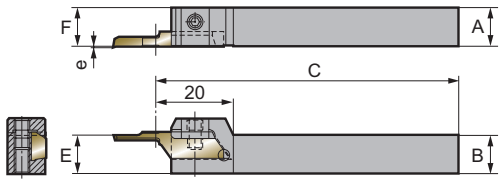
Fig. 1 Fig. 2



Sumitomo Catalog #	Dim. Cutter Edge (mm)	Wiper Edge	Fig.	BL130
PBVC1102L-50	1.0	Yes	1	★
PBVC1102R-50	1.0	No	2	★

CKBR Series



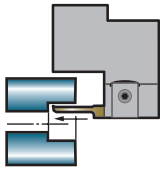


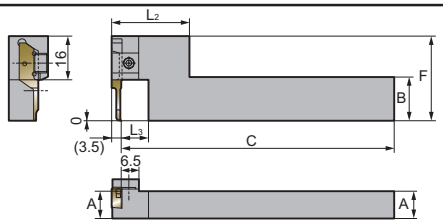
Sumitomo Cat. No.		Gage Insert	Stock	Dimensions (Inch/*mm*) A	B	C	E	F	Clamp	Clamp Screw	Wrench
CKBR062D		KBMXR	•	.375	.375	6.000	.375	.375	CKBW16	WB4-8	LH020
CKBR082D		KBMXR	•	.500	.500	6.000	.500	.500	CKBW16	WB4-8	LH020
CKBR102D		KBMXR	•	.625	.625	6.000	.625	.625	CKBW16	WB4-8	LH020
CKBR1010-16		KBMXR	★	*10.0*	*10.0*	*150.0*	*10.0*	*10.0*	CKBW16	WB4-8	LH020
CKBR1212-16		KBMXR	★	*12.0*	*12.0*	*150.0*	*12.0*	*12.0*	CKBW16	WB4-8	LH020
CKBR1616-16		KBMXR	★	*16.0*	*16.0*	*150.0*	*16.0*	*16.0*	CKBW16	WB4-8	LH020

• = USA stocked item ★ = Worldwide Warehouse item

KB Turning Insert pg. 105

CKBSR Series

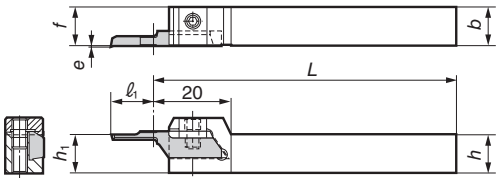




Sumitomo Cat. No. Right Hand		Gage Insert	Stock	Dimensions (Inch/*mm*) A	B	C	F	L_2	L_3	Clamp	Clamp Screw	Wrench
CKBSR102D		KBMXL	•	.625	.625	6.000	1.220	1.125	.393	CKBW16	WB4-8	LH020
CKBSR1010-16-11		KBMXL	★	*10.0*	*16.0*	*150.0*	*31.0*	*28.5*	*10.0*	CKBW16	WB4-8	LH020
CKBSR1212-16-11		KBMXL	★	*12.0*	*16 .0*	*150.0*	*31.0*	*28.5*	*10.0*	CKBW16	WB4-8	LH020
CKBSR1616-16-11		KBMXL	★	*16.0*	*16.0*	*150.0*	*31.0*	*28.5*	*16.0*	CKBW16	WB4-8	LH020

KB Turning Insert pg. 105

Square Shank



■ Holder

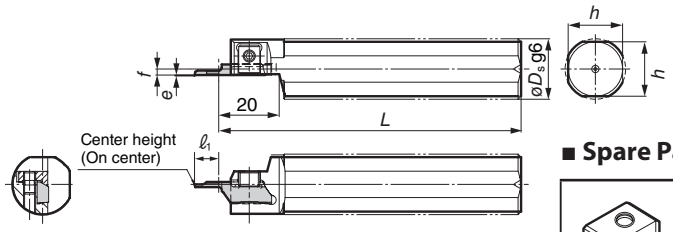
Please refer to facing page 105 for e, ℓ_1 dimensions.

■ Spare Parts

Cat. No.	Stock	Dimensions (mm)					Clamp	Double Screw	Wrench
		h	b	L	f	h_1			
CKB R1010-16	★	10	10	100	10	10	CKBW16	WB4-8	LH020
CKB R1212-16	★	12	12	125	12	12			
CKB R1616-16	★	16	16	125	16	16			
CKB R2020-16	★	20	20	125	20	20			
CKB R2525-16		25	25	150	25	25			

KB Turning Insert pg. 105

Round Shank (Offset Small)



■ Holder

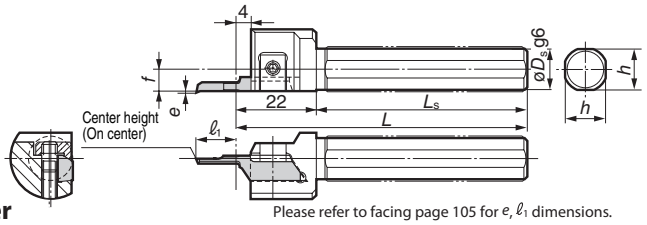
Please refer to facing page 105 for e, ℓ_1 dimensions.

■ Spare Parts

Cat. No.	Stock	Dimensions (mm)				Clamp	Double Screw	Wrench
		$øD_s$	h	L	f			
S1905H-CKB RS-16	★	19.05	17	100	2	CKBW16	WB4-8	LH020
S20H-CKB RS-16	★	20	18	100	2			
S22K-CKB RS-16	★	22	19	125	2			
S25K-CKB RS-16	★	25	23	125	2			
S254K-CKB RS-16	★	25.4	23	125	2			

KB Turning Insert pg. 105

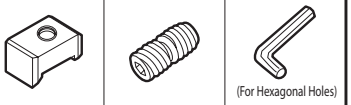
Round Shank



■ Holder

Please refer to facing page 105 for e, ℓ_1 dimensions.

■ Spare Parts



Cat. No.	Stock	Dimensions (mm)					Clamp	Double Screw	Wrench
		$øD_s$	h	L	L_s	f			
S10F-CKB R-16	★	10	9	80	58	5	CKBW16	WB4-8	LH020
S12F-CKB R-16	★	12	11	80	58	6			
S16H-CKB R-16	★	16	15	100	78	8			
S19K-CKB R-16	★	19.05	17	125	103	8			
S20K-CKB R-16	★	20	18	125	103	10			

KB Turning Insert pg. 105

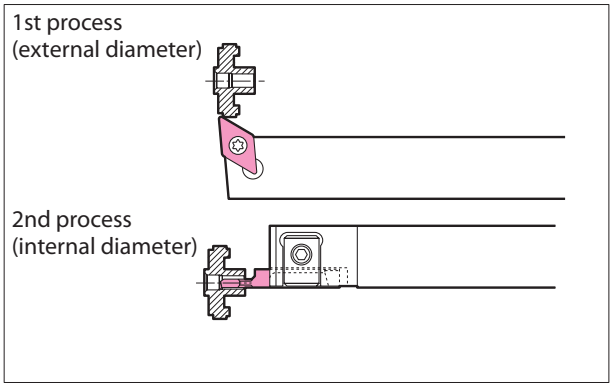
TWIN HEAD

■ Characteristics

- 1 holder that performs 2 operations is equivalent to mounting an additional tool on the machine.
- External turning possible with the aid of a drill sleeve.
- 2 holder configurations, internal+external and internal +internal, are standard stocked items.
- Height difference of the 2 cutting edges is below 40µm which is good for high precision machining.

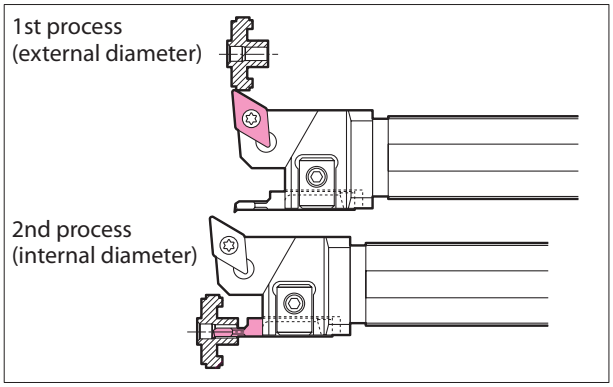
■ Advantage of twin-head holder

- Conventional tool



• 2 different operations requiring 2 separate tools.

- Twin head holder

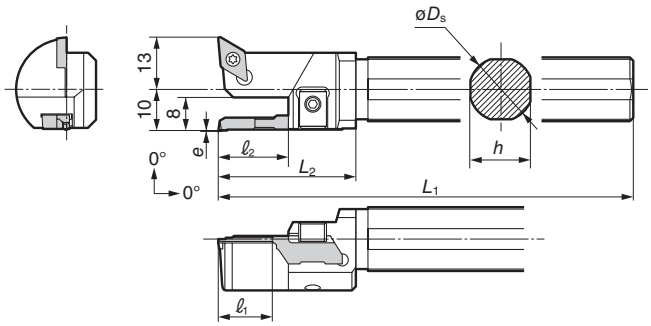


• A single tool performing 2 different operations.

• Cycle time can be reduced.

Boring External Tool Holder

CKBE type



Please refer to page 105 for *e*.

■ **Holder** (ID boring depth 6.0mm type)

Cat. No.	Stock	Dimensions (mm)						*Maximum workpiece diameter	ID Boring Insert	OD Turning Insert
		øDs	h	L1	L2	ℓ1	ℓ2			
S1588X-CKBE-06	★	15.875	15	130	27	6	10	12.0	KBMX R○○06-○○ KBMX R○○06-○○T	DC□□21.5□
S16X-CKBE-06	★	16	15	130	27	6	10	12.0		
S1905X-CKBE-06	★	19.05	17	130	27	6	10	12.0		
S20X-CKBE-06	★	20	18	130	27	6	10	12.0		
S22X-CKBE-06	★	22	20	130	27	6	10	12.0		

* When machining internal diameter

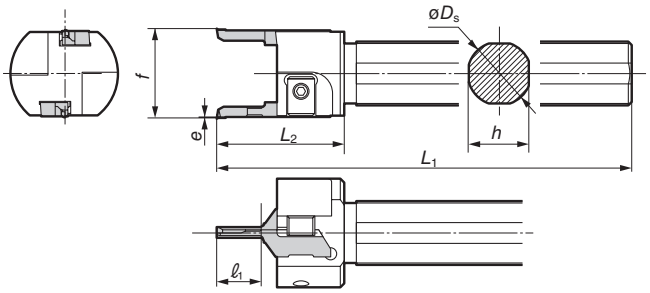
■ **Holder** (ID boring depth 11.0mm type)

Cat. No.	Stock	Dimensions (mm)						*Maximum workpiece diameter	ID Boring Insert	OD Turning Insert
		øDs	h	L1	L2	ℓ1	ℓ2			
S1588X-CKBE-11	★	15.875	15	130	32	11	15	12.0	KBMX R○○11-○○ KBMX R○○11-○○T	DC□□21.5□
S16X-CKBE-11	★	16	15	130	32	11	15	12.0		
S1905X-CKBE-11	★	19.05	17	130	32	11	15	12.0		
S20X-CKBE-11	★	20	18	130	32	11	15	12.0		
S22X-CKBE-11	★	22	20	130	32	11	15	12.0		

* When machining internal diameter

KB Turning Insert pg. 105

Boring + Face Grooving



■ Holder

Please refer to facing page E15 for e, ℓ_1 dimensions.

Cat. No.	Stock	Dimensions (mm)						ID Boring Insert	OD Turning Insert
		øDs	h	L1	L2	f	N		
S1588X-CKBB-F	D	15.875	15	130	32	22.0	11	KBMX R○○○○-○○ KBMX R○○○○-○○T	KBMF R○○○○-05
S16X-CKBB-F	D	16	15	130	32	22.0	11		
S1905X-CKBB-F	D	19.05	17	130	32	22.0	11		
S20X-CKBB-F	D	20	18	130	32	22.0	11		
S22X-CKBB-F	D	22	20	130	32	22.0	11		

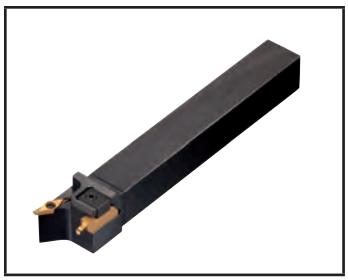
* Reference for L_1, f, and ℓ_1 are taken with KBMXR0311-OO(T) mounted.

KB Turning Insert pg. 105

■ Spare Parts

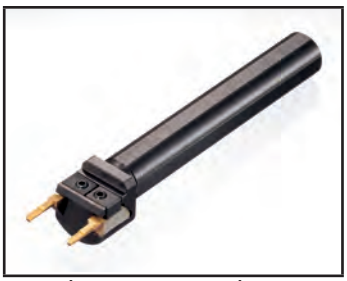
For use with KBM □ R insert			For use with DC □□ insert		
	 (For Hexagonal Holes)			 (For Torx Holes)	
Clamp	**Double Screw**	**Wrench**	**Screw**	**Recommended Tightening Torque (N•m)**	**Wrench**
CKBW16	WB4-8	LH020	BFTX02506N	**1.5**	TRX08

■ Special Holder Configurations



Int. diameter+Ext. diameter
(Square shank holder)

Inner diameter + Center drill



Int. diameter + Int. diameter
(Parallel boring holder)

Holder configurations for different workpieces or various machining requirements, such as guide holes, chamfering and external necking, can be custom-made.

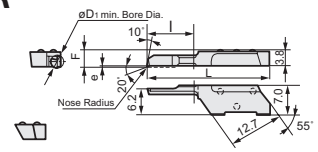
Swiss Tooling Inserts

for precision turning applications:
- *Cut-off*
- *Back Turn*
- *Boring Rough*
- *Boring Finishing*

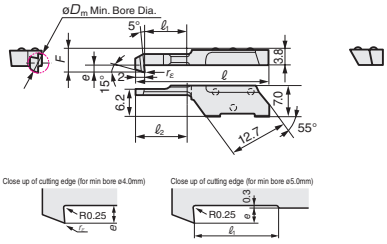
P Steel
M Stainless Steel
K Cast Iron
N Non-ferrous
S Exotic Materials
H Hardened Steel

- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item
- ○ New Product Arriving 2nd Quarter 2015

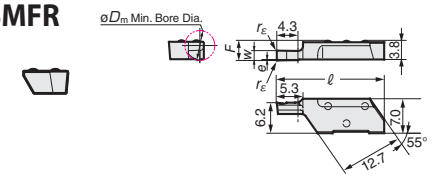
KBMXR



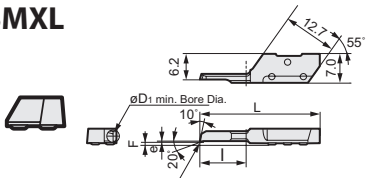
KBMZ



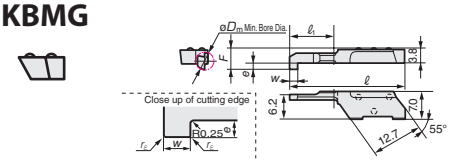
KBMFR



KBMXL



KBMG



Boring Rough Inserts

Sumitomo Catalog #	Dimensions (mm)						ACZ310	DA2200
	Min. Bore Dia.	F	e	Nose Radius	L	ℓ		
KBMXR0103-05	1.0	4.00	0.20	0.05	20.5	3	▲	
KBMXR0103-20	1.0	4.00	0.20	0.20	20.5	3	★	
KBMXR01506-05	1.5	4.05	0.25	0.05	23.5	6	★	
KBMXR01506-20	1.5	4.05	0.25	0.20	23.5	6	★	
KBMXR0206-05	2.0	4.05	0.25	0.05	23.5	6	▲	
KBMXR0206-20	2.0	4.05	0.25	0.20	23.5	6	★	
KBMXR0311-05	3.0	4.10	0.30	0.05	28.5	11	★	
KBMXR0311-10	3.0	4.10	0.30	0.05	28.5	11		★
KBMXR0311-20	3.0	4.10	0.30	0.20	28.5	11	★	
KBMXR0411-05	4.0	4.30	0.50	0.05	28.5	11	▲	
KBMXR0411-10	4.0	4.30	0.50	0.05	28.5	11		★
KBMXR0411-20	4.0	4.30	0.50	0.20	28.5	11	▲	
KBMXR0511-05	5.0	4.50	0.70	0.05	28.5	11	▲	
KBMXR0511-10	5.0	4.50	0.70	0.05	28.5	11		★
KBMXR0511-20	5.0	4.50	0.70	0.20	28.5	11	▲	
KBMXR0520-05	5.0	4.50	0.70	0.05	37.5	20	★	
KBMXR0520-20	5.0	4.50	0.70	0.20	37.5	20	★	

Boring Rough Inserts

Sumitomo Catalog #	Dimensions (mm)						ACZ310
	Min. Bore Dia.	F	e	Nose Radius	L	ℓ	
KBMXL0206-05R	2.0	4.05	0.25	0.05	23.5	6	▲
KBMXL0206-20R	2.0	4.05	0.25	0.05	23.5	6	★
KBMXL0311-05	3.0	4.10	0.30	0.05	28.5	11	★
KBMXL0311-20	3.0	4.10	0.30	0.20	28.5	11	★
KBMXL0411-05R	4.0	4.30	0.50	0.05	28.5	11	▲
KBMXL0411-20R	4.0	4.30	0.50	0.20	28.5	11	▲
KBMXL0511-05	5.0	4.50	0.70	0.05	28.5	11	★
KBMXL0511-20	5.0	4.50	0.70	0.20	28.5	11	★
KBMXL0520-05	5.0	4.50	0.70	0.05	37.5	20	★
KBMXL0520-20	5.0	4.50	0.70	0.20	37.5	20	★

Back Boring

Sumitomo Catalog #	Dimensions (mm)							ACZ310
	Min. Bore Dia.	F	e	Nose Radius	L	ℓ1	ℓ2	
KBMZR0411-05	4.0	5.10	1.10	0.05	28.5	9	11	★
KBMZR0411-20				0.20				★
KBMZR0511-05	5.0	5.10	1.30	0.05	28.5	9	11	★
KBMZR0511-20				0.20				★

Boring Finishing Inserts

Sumitomo Catalog #	Dimensions (mm)						ACZ310	ACZ150
	Min. Bore Dia.	F	e	Nose Radius	L	ℓ		
KBMXR0103-05T	1.0	4.00	0.20	0.05	20.5	3	▲	
KBMXR0103-20T	1.0	4.00	0.20	0.20	20.5	3		★
KBMXR01506-05T	1.5	4.05	0.25	0.05	23.5	6		★
KBMXR01506-20T	1.5	4.05	0.25	0.20	23.5	6		★
KBMXR0206-05T	2.0	4.05	0.25	0.05	23.5	6	▲	
KBMXR0206-20T	2.0	4.05	0.25	0.20	23.5	6		★
KBMXR0311-05T	3.0	4.10	0.30	0.05	28.5	11		★
KBMXR0311-20T	3.0	4.10	0.30	0.20	28.5	11		★
KBMXR0411-05T	4.0	4.30	0.50	0.05	28.5	11	▲	
KBMXR0411-20T	4.0	4.30	0.50	0.20	28.5	11	▲	
KBMXR0511-05T	5.0	4.50	0.70	0.05	28.5	11	▲	
KBMXR0511-20T	5.0	4.50	0.70	0.20	28.5	11	▲	

T = Free cutting

End Grooving

Sumitomo Catalog #	Dimensions (mm)						ACZ150
	Min. Bore Dia.	F	e	Nose Radius	L	Maximum groove depth	
KBMFR0615-05	6.0	4.00	0.20	0.05	21.8	4.0	★
KBMFR0620-05	6.0	4.00	0.20	0.05	21.8	4.0	★
KBMFR0630-05	6.0	4.00	0.20	0.05	21.8	4.0	★

Internal Grooving

Sumitomo Catalog #	Dimensions (mm)						ACZ310
	Min. Bore Dia.	F	e	Nose Radius	L	ℓ	
KBMGR0411-05	4.0	4.90	1.10	0.05	28.5	11	★
KBMGR0411-10				0.10			★
KBMGR0511-05	5.0	5.10	1.30	0.05	28.5	11	★
KBMGR0511-10				0.10			★

Boring Bars

Pages 107 - 137

BORING BARS **PAGES**

Boring Bar Nomenclature

A

Boring Bar Type

A

Solid Steel Bar with Coolant Hole

B

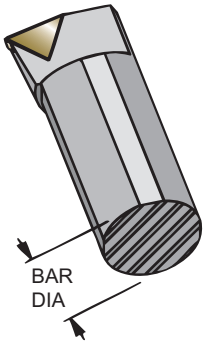
Solid Steel Bar with Anti-Vibration Device

E

Carbide Bar with Fixed Steel Head & Coolant Hole

08-

Boring Bar Diameter



This indicates D dimensions in sixteenths (1/16).

examples:

08 = 8/16 = 1/2" Diameter

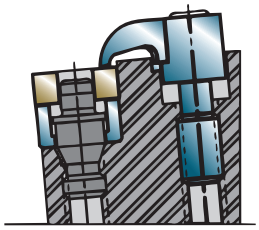
16 = 16/16 = 1.0" Diameter

24 = 24/16 = 1-1/2" Diameter

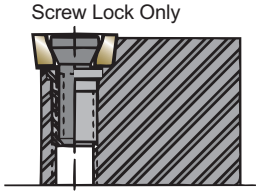
S

Insert Holding

M
Clamp and Lock Pin



S
Screw Lock Only

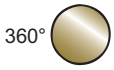


C

Insert Shape

C
Diamond


D
Diamond


R
Round


S
Square

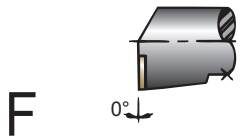

T
Triangle


V
Diamond

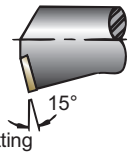

W
Trigon


Boring Bar Nomenclature

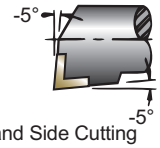
L — Boring Bar Style



F — 0° End Cutting

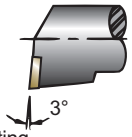


K — 15° End Cutting

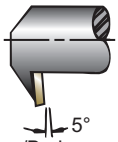


L — -5° End and Side Cutting

Q — -17.5° End Cutting



U — -3° End Cutting



X — -5° Back Facing/Boring

C — Insert Relief Angle

B

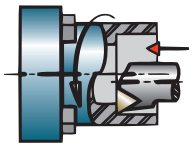
C

N

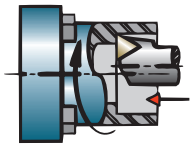
P

R — Hand

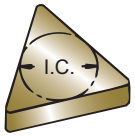
R Right Hand



L Left Hand



2 — Insert Size



For equal sided inserts this indicates the inscribed circle (I.C.) in eighths (1/8).

examples,

6 = 6/8 = 3/4" I.C.

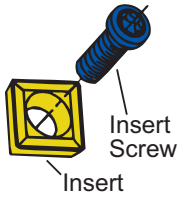
4 = 4/8 = 1/2" I.C.

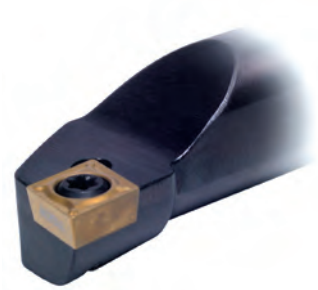
2.5 = 2.5/8 = 5/16" I.C.

Overview – Insert Holding Methods

ANSI/ISO "Screw-On" Boring Bars

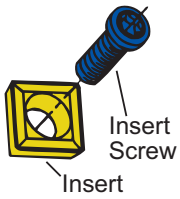
- Available with steel, carbide, or heavy metal shanks, ranging in size from 3/8″ to 1″ and coolant through the tool
- Designed to ISO-ANSI standards
- Uses TORX* insert holding screws
- Available with Anti-Vibration steel shanks





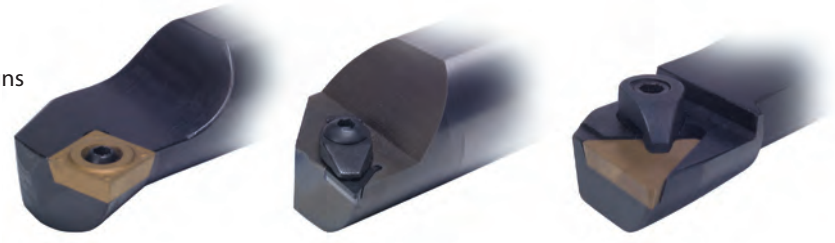
X-BAR Boring Bars

- Special dampener mechanism eliminates chatter
- Up to 6X L/D overhang (depth / bar diameter)
- Cost effective solution to carbide bars when deep hole boring
- Available in both coolant-through and non-coolant-through
- Effectively rough bores deep holes
- Bars available with CCMT, TCMT and TPMT style inserts

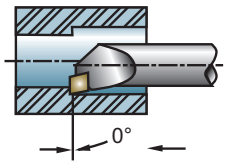


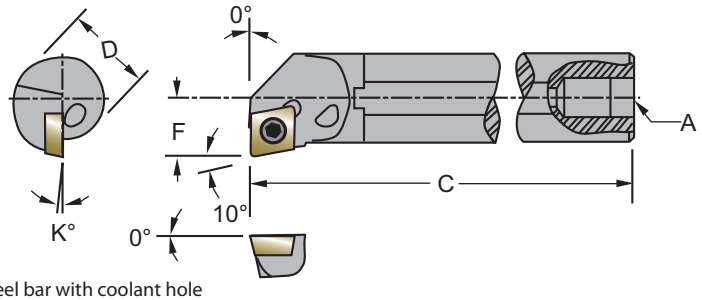
Sumitomo Design Boring Bars

- Styles available using negative inserts and 5°, 7°, 11° and 15° positive inserts
- For bores as small as .228″ using the BSWJO design
- Available in steel or carbide shanks
- Various locking methods / unique Sumitomo designs



A-SCFP



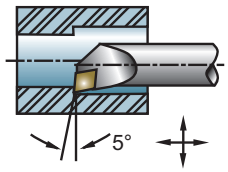


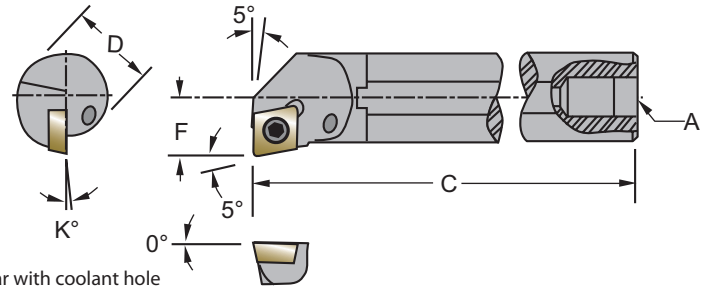
Solid steel bar with coolant hole

Sumitomo Cat. No.			D	C	F	K°	Min. Bore	A		
Right Hand	Left Hand	11° Positive Gage Insert							Insert Screw	Torx Wrench
A06SCFPR2	–	CPMT21.51	.375	6.000	.250	4°	.480	1/8*	ST21.5	TRX08
A08SCFPR2	A08SCFPL2	CPMT21.51	.500	8.000	.312	2°	.600	1/16-27 NPT	ST21.5	TRX08
A10SCFPR2	A10SCFPL2	CPMT21.51	.625	10.000	.406	0°	.770	1/8-27 NPT	ST21.5	TRX08
A12SCFPR3	–	CPMT32.52	.750	10.000	.500	0°	.930	1/8-27 NPT	ST32.5	TRX15
A16SCFPR3	–	CPMT32.52	1.000	12.000	.640	0°	1.200	1/4-18 NPT	ST32.5	TRX15

*Through hole only. No threads.

A-SCLC





Solid steel bar with coolant hole

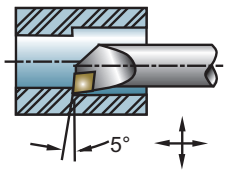
Sumitomo Cat. No.			D	C	F	K°	Min. Bore	A		
Right Hand	Left Hand	7° Positive Gage Insert							Insert Screw	Torx Wrench
A06SCLCR2	A06SCLCL2	CCMT21.51	.375	6.000	.250	-15°	.480	1/8*	ST21.5	TRX08
A08SCLCR2	A08SCLCL2	CCMT21.51	.500	6.000	.312	-13°	.600	1/16-27 NPT	ST21.5	TRX08
A10SCLCR2	A10SCLCL2	CCMT21.51	.625	10.000	.406	-10°	.770	1/8-27 NPT	ST21.5	TRX08
A10SCLCR3	A10SCLCL3	CCMT32.52	.625	10.000	.406	-10°	.770	1/8-27 NPT	ST32.5	TRX15
A12SCLCR3	A12SCLCL3	CCMT32.52	.750	10.000	.500	-8°	.930	1/8-27 NPT	ST32.5	TRX15
A16SCLCR3	A16SCLCL3	CCMT32.52	1.000	12.000	.640	-7°	1.200	1/4-18 NPT	ST32.5	TRX15

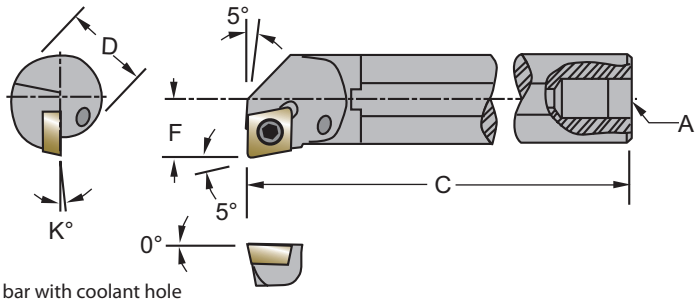
*Through hole only. No threads.

Note: For right-handed boring bars, please use left-handed or neutral inserts. For left-handed boring bars, please use right-handed or neutral inserts

ANSI-ISO Boring Bars
with through coolant

A-SCLP



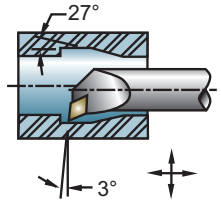


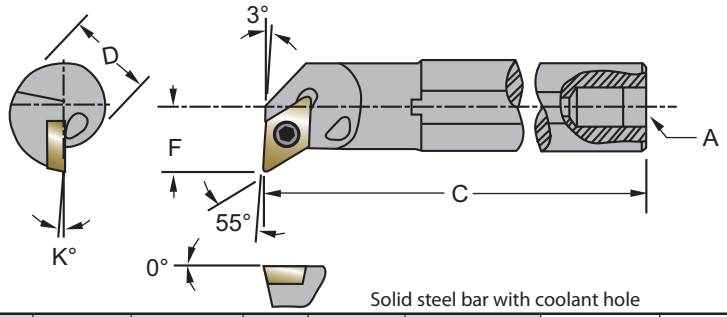
Solid steel bar with coolant hole

Sumitomo Cat. No.			D	C	F	K°	Min. Bore	A		
Right Hand	Left Hand	11° Positive Gage Insert							Insert Screw	Torx Wrench
A06SCLPR2	A06SCLPL2	CPMT21.51	.375	6.000	.250	-6°	.480	1/8*	ST21.5	TRX08
A08SCLPR2	A08SCLPL2	CPMT21.51	.500	8.000	.312	-3°	.600	1/16-27 NPT	ST21.5	TRX08
A10SCLPR2	A10SCLPL2	CPMT21.51	.625	10.000	.406	-2°	.770	1/8-27 NPT	ST21.5	TRX08
A10SCLPR3	A10SCLPL3	CPMT32.52	.625	10.000	.406	-2°	.770	1/8-27 NPT	ST32.5	TRX15
A12SCLPR3	A12SCLPL3	CPMT32.52	.750	10.000	.500	-2°	.930	1/8-27 NPT	ST32.5	TRX15
A16SCLPR3	A16SCLPL3	CPMT32.52	1.000	12.000	.640	0°	1.200	1/4-18 NPT	ST32.5	TRX15

*Through hole only. No threads.

A-SDUP





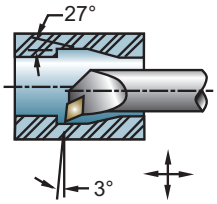
Solid steel bar with coolant hole

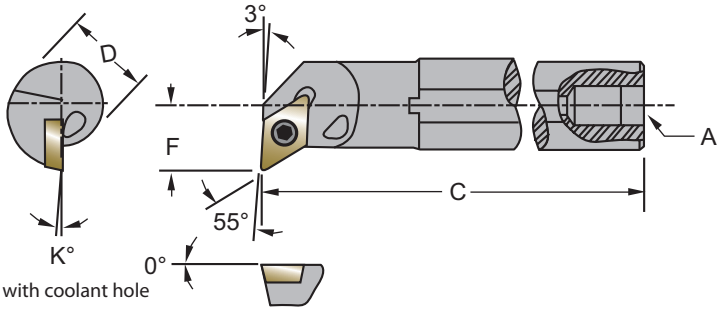
Sumitomo Cat. No.			D	C	F	K°	Min. Bore	A		
Right hand	Left Hand	11° Positive Gage Insert							Insert Screw	Torx Wrench
A06SDUPR2	A06SDUPL2	DPMT21.51	.375	6.000	.375	-3°	.600	1/8*	ST21.5	TRX08
A08SDUPR2	A08SDUPL2	DPMT21.51	.500	8.000	.437	-2°	.730	1/16-27NPT	ST21.5	TRX08
A10SDUPR2	A10SDUPL2	DPMT21.51	.625	10.000	.500	0°	.850	1/8-27NPT	ST21.5	TRX08
A12SDUPR3	A12SDUPL3	DPMT32.52	.750	10.000	.562	0°	.980	1/8-27NPT	ST32.5	TRX15
A16SDUPR3	A16SDUPL3	DPMT32.52	1.000	12.000	.750	0°	1.300	1/4-18NPT	ST32.5	TRX15

*Through hole only. No threads.

Note: For right-handed boring bars, please use left-handed or neutral inserts. For left-handed boring bars, please use right-handed or neutral inserts

A-SDUC



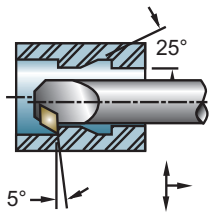


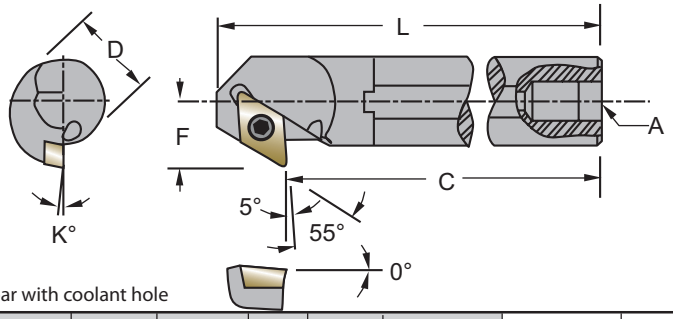
Solid steel bar with coolant hole

Sumitomo Cat. No.			D	C	F	K°	Min. Bore	A		
Right Hand	Left Hand	7° Positive Gage Insert							Insert Screw	Torx Wrench
A06SDUCR2	A06SDUCL2	DCMT21.51	.375	6.000	.375	-7°	.600	1/8*	ST21.5	TRX08
A08SDUCR2	A08SDUCL2	DCMT21.51	.500	6.000	.437	-7°	.730	1/16-27 NPT	ST21.5	TRX08
A10SDUCR2	A10SDUCL2	DCMT21.51	.625	8.000	.500	-7°	.850	1/8-27 NPT	ST21.5	TRX08
A12SDUCR3	A12SDUCL3	DCMT32.52	.750	10.000	.562	-7°	.980	1/8-27 NPT	ST32.5	TRX15
A16SDUCR3	A16SDUCL3	DCMT32.52	1.000	12.000	.750	-5°	1.300	1/4-18 NPT	ST32.5	TRX15

*Through hole only. No threads.

A-SDXP





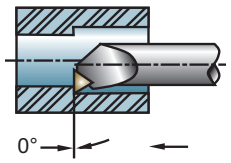
Solid steel bar with coolant hole

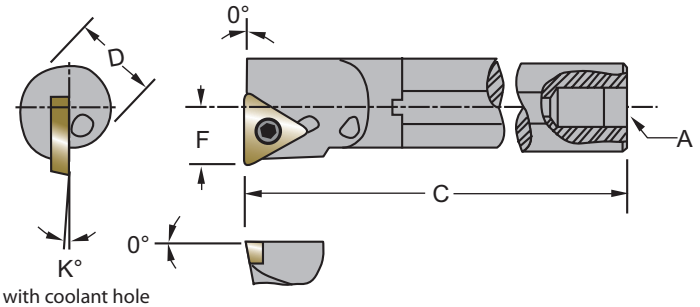
Sumitomo Cat. No.			D	C	F	L	K°	Min. Bore	A		
Right Hand	Left Hand	11° Positive Gage Insert								Insert Screw	Torx Wrench
A08SDXPR2	A08SDXPL2	DPMT21.51	.500	8.000	.437	8-1/2	0°	.730	1/16-27 NPT	ST21.5	TRX08
A10SDXPR2	A10SDXPL2	DPMT21.51	.625	10.000	.500	10-1/2	0°	.850	1/8-27 NPT	ST21.5	TRX08
A12SDXPR3	A12SDXPL3	DPMT32.52	.750	10.000	.562	10-3/4	-2°	.980	1/8-27 NPT	ST32.5	TRX15
A16SDXPR3	A16SDXPL3	DPMT32.52	1.000	12.000	.750	12-3/4	0°	1.300	1/4-18 NPT	ST32.5	TRX15

Note: For right-handed boring bars, please use left-handed or neutral inserts. For left-handed boring bars, please use right-handed or neutral inserts

ANSI-ISO Boring Bars
with through coolant

A-STFC

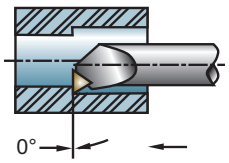


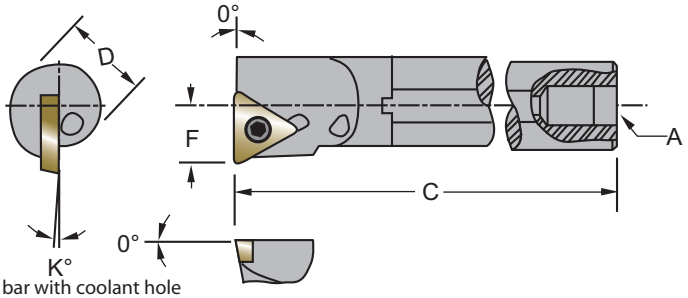


Solid steel bar with coolant hole

Sumitomo Cat. No.			D	C	F	K°	Min. Bore	A		
Right Hand	Left Hand	7° Positive Gage Insert							Insert Screw	Torx Wrench
A08STFCR2	A08STFCL2	TCMT21.51	.500	6.000	.312	-13°	.600	1/16-27 NPT	ST21.5	TRX08
A10STFCR2	–	TCMT21.51	.625	8.000	.406	-10°	.770	1/8-27 NPT	ST21.5	TRX08
A12STFCR3	A12STFCL3	TCMT32.52	.750	10.000	.500	-8°	.930	1/8-27 NPT	ST32.5	TRX15
A16STFCR3	A16STFCL3	TCMT32.52	1.000	12.000	.640	-7°	1.200	1/4-18 NPT	ST32.5	TRX15

A-STFP





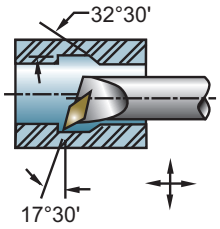
Solid steel bar with coolant hole

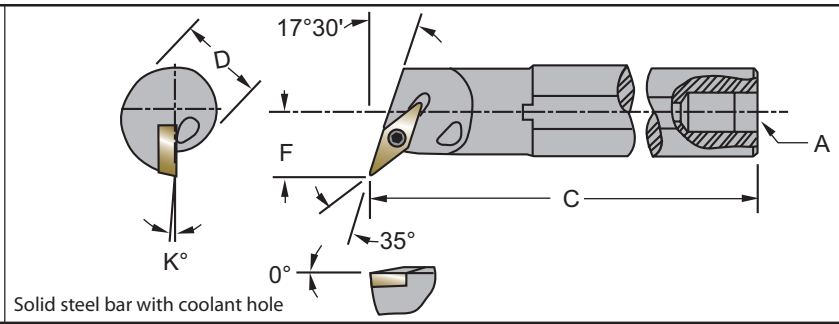
Sumitomo Cat. No.			D	C	F	K°	Min. Bore	A		
Right Hand	Left Hand	11° Positive Gage Insert							Insert Screw	Torx Wrench
A05STFPR1.8	A05STFPL1.8	TPMT1.81.51	.3125	5.000	.219	-8°	.415	3/32*	ST21.5	TRX08
A06STFPR2	A06STFPL2	TPMT21.51	.375	6.000	.250	-4°	.480	1/8*	ST21.5	TRX08
A08STFPR2	A08STFPL2	TPMT21.51	.500	8.000	.312	-2°	.600	1/16-27 NPT	ST21.5	TRX08
A10STFPR2	A10STFPL2	TPMT21.51	.625	10.000	.406	0°	.770	1/8-27 NPT	ST21.5	TRX08
A12STFPR3	A12STFPL3	TPMT32.52	.750	10.000	.500	-2°	.930	1/8-27 NPT	ST32.5	TRX15
A16STFPR3	A16STFPL3	TPMT32.52	1.000	12.000	.640	0°	1.200	1/4-18 NPT	ST32.5	TRX15

*Through hole only. No threads.

Note: For right-handed boring bars, please use left-handed or neutral inserts. For left-handed boring bars, please use right-handed or neutral inserts

A-SVQB

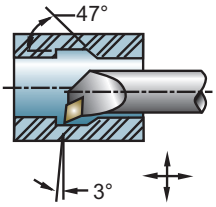


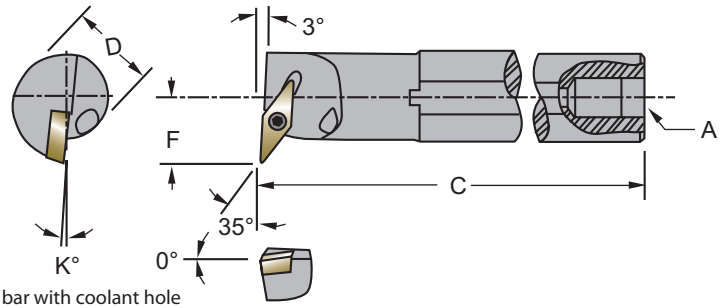


Solid steel bar with coolant hole

Sumitomo Cat. No.			D	C	F	K°	Min. Bore	A		
Right Hand	Left Hand	5° Positive Gage Insert							Insert Screw	Torx Wrench
A10SVQBR2	A10SVQBL2	VBMT221	.625	10.000	.500	-6°	.850	1/8-27 NPT	ST21.5	TRX08
A12SVQBR2	A12SVQBL2	VBMT221	.750	10.000	.562	-5°	.980	1/8-27 NPT	ST21.5	TRX08
A16SVQBR3	–	VBMT332	1.000	12.000	.750	-5°	1.300	1/4-18 NPT	ST32.5	TRX15

A-SVUB



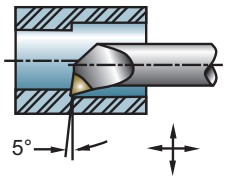


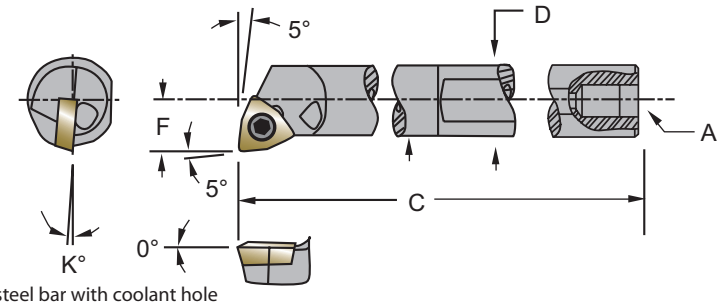
Solid steel bar with coolant hole

Sumitomo Cat. No.			D	C	F	K°	Min. Bore	A		
Right Hand	Left Hand	5° Positive Gage Insert							Insert Screw	Torx Wrench
A12SVUBR2	A12SVUBL2	VBMT221	.750	10.000	.562	-6°	.980	1/8-27 NPT	ST21.5	TRX08
A16SVUBR3	A16SVUBL3	VBMT332	1.000	12.000	.750	-6°	1.300	1/4-18 NPT	ST32.5	TRX15
A20SVUBR3	A20SVUBL3	VBMT332	1.250	14.000	1.000	-6°	2.000	1/4-18 NPT	ST32.5	TRX15
A24SVUBR3	A24SVUBL3	VBMT332	1.500	14.000	1.250	-6°	2.250	1/4-18 NPT	ST32.5	TRX15

Note: For right-handed boring bars, please use left-handed or neutral inserts. For left-handed boring bars, please use right-handed or neutral inserts

A-SWLP





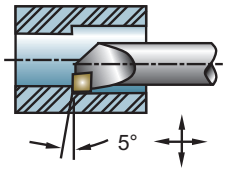
Solid steel bar with coolant hole

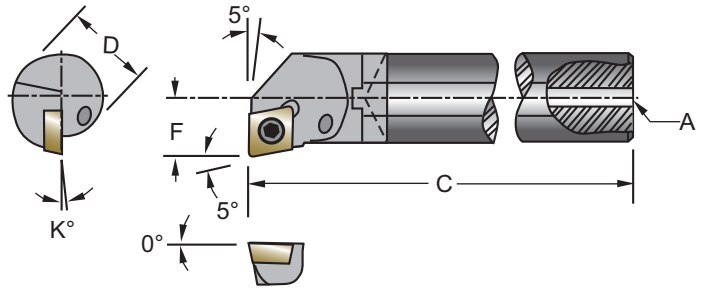
Sumitomo Cat. No.			D	C	F	K°	Min. Bore	A		
Right Hand	Left Hand	11° Positive Gage Insert							Insert Screw	Torx Wrench
A06SWLPR2	A06SWLPL2	WPMT21.51	.375	6.000	.250	-5°	.480	1/8*	ST21.5	TRX08
A08SWLPR2	A08SWLPL2	WPMT21.51	.500	8.000	.312	-2°	.600	1/16-27 NPT	ST21.5	TRX08
A10SWLPR2	–	WPMT21.51	.625	10.000	.406	-3°	.770	1/8-27 NPT	ST21.5	TRX08

*Through hole only. No threads.

ISO-ANSI CARBIDE SHANK BORING BARS

E-SCLC





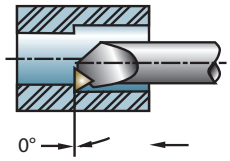
Solid carbide bar with fixed steel head and coolant hole

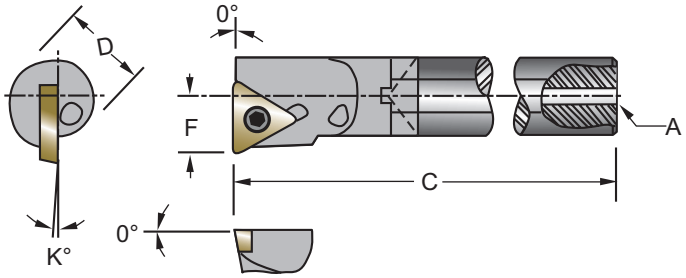
Sumitomo Cat. No.			D	C	F	K°	Min. Bore	A		
Right Hand	Left Hand	7° Positive Gage Insert							Insert Screw	Torx Wrench
E06MSCLCR2	E06MSCLCL2	CCMT21.51	.375	6.000	.250	-15°	.480	.093*	ST21.5	TRX08
E08RSCLCR2	E08RSCLCL2	CCMT21.51	.500	6.000	.312	-13°	.600	.093*	ST21.5	TRX08
E10SCLCR3	E10SCLCL3	CCMT32.52	.625	8.000	.406	-10°	.770	.125*	ST32.5	TRX15
E12SCLCR3	E12SCLCL3	CCMT32.52	.750	10.000	.500	-8°	.930	.142*	ST32.5	TRX15
E16SCLCR3	E16SCLCL3	CCMT32.52	1.000	12.000	.640	-7°	1.200	.193*	ST32.5	TRX15

*Through hole only. No threads.

Note: For right-handed boring bars, please use left-handed or neutral inserts. For left-handed boring bars, please use right-handed or neutral inserts

E-STFP



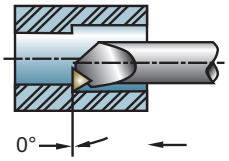


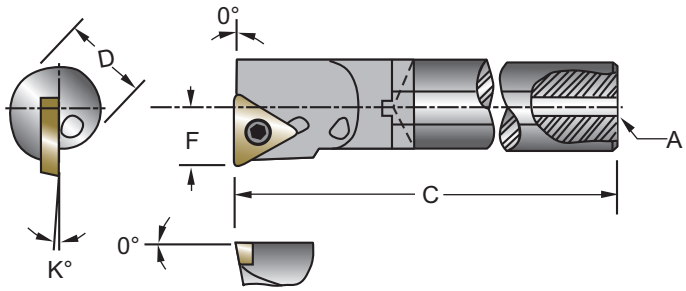
Solid carbide bar with fixed steel head and coolant hole

Sumitomo Cat. No.			D	C	F	K°	Min. Bore	A		
Right Hand	Left Hand	11° Positive Gage Insert							Insert Screw	Torx Wrench
E05STFPR1.8	E05STFPL1.8	TPMT1.81.51	.3125	5.000	.219	-8°	.415	.062	ST21.5	TRX08

*Through hole only. No threads.

E-STFC





Solid carbide bar with fixed steel head and coolant hole

Sumitomo Cat. No.			D	C	F	K°	Min. Bore	A		
Right Hand	Left Hand	7° Positive Gage Insert							Insert Screw	Torx Wrench
E06STFCR2	E06STFCL2	TCMT21.51	.375	6.000	.250	-15°	.480	.093*	ST21.5	TRX08
E08STFCR2	E08STFCL2	TCMT21.51	.500	6.000	.312	-13°	.600	.093*	ST21.5	TRX08
E10STFCR2	E10STFCL2	TCMT21.51	.625	8.000	.406	-10°	.770	.125*	ST21.5	TRX08
E12STFCR3	–	TCMT32.52	.750	10.000	.500	-8°	.930	.142*	ST32.5	TRX15
E16STFCR3	–	TCMT32.52	1.000	12.000	.640	-7°	1.200	.193*	ST32.5	TRX15

*Through hole only. No threads.

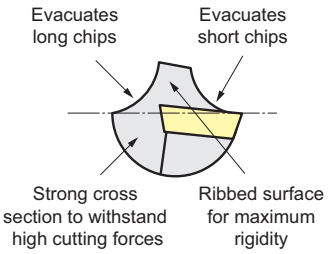
Note: For right-handed boring bars, please use left-handed or neutral inserts. For left-handed boring bars, please use right-handed or neutral inserts

■ Features & Benefits

- Special dampener mechanism eliminates chatter.
- Up to 6X L/D overhang (depth / bar diameter).
- Cost effective solution to carbide bars when deep hole boring.
- Available in both coolant-through and non-coolant-through
- Effectively rough bores deep holes.
- ***NEW*** negative X-Bars now available.
- Positive X-Bar expansion now includes bars for CC--, CP--, DC--, TC--, TP--, and VB-- style inserts.

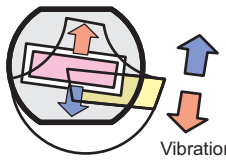
■ X-BAR Technical Information

Good Chip Evacuation from new head design



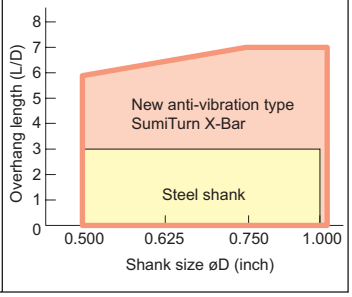
Anti-Chatter System - Eliminates Vibration

Unique structure of the X-Bar



The dampener resists vibration (Patent pending)

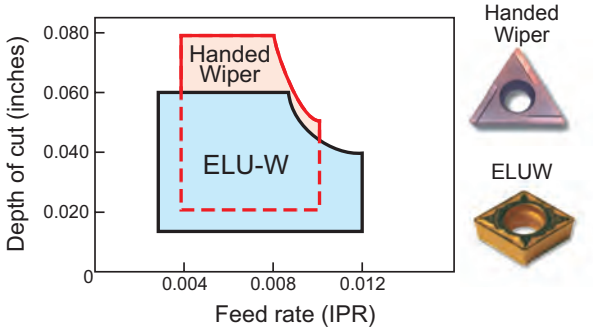
Application Range



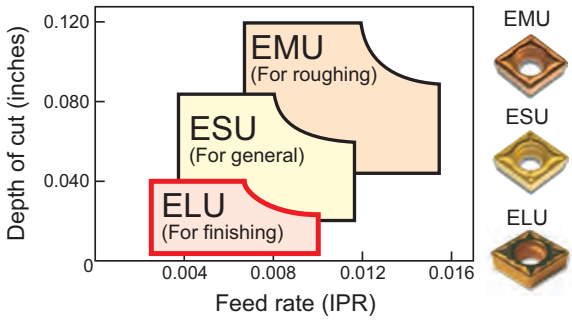
■ Recommended Overhang Length / Shank Diameter (L/D)

Chipbreakers	Type of Boring Bar	Overhang Length (L/D) 1 2 3 4 5 6 7
ELU, ESU, EMU (M class inserts) 	Steel shank	
	SumiTurn X-Bar	
ELUW, Handed Wiper ("Wiper" style inserts) 	Steel shank	
	SumiTurn X-Bar	

● "Wiper" Style Positive Inserts

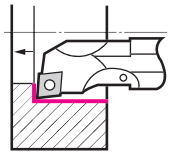


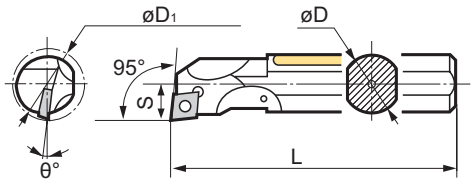
● M Class Positive Inserts



■ SumiTurn X-Bar Availability-POSITIVE

D-SCLC

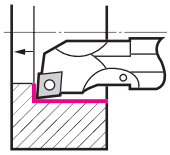


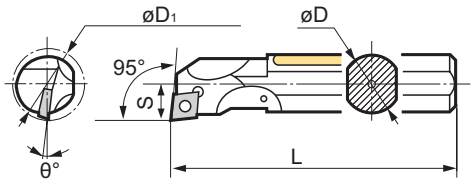


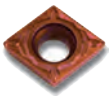
GAGE INSERT
CC□□

Sumitomo Cat. No.		Dimensions					Gage Insert	Hardware	
Right Hand	Left Hand	Min. Bore	D	L	S	θ°		Screw	Wrench
D08RSCLCR2	D08RSCLCL2	0.600"	0.500"	8"	0.300"	-10°	CC-21.5	BFTX02506N	TRX08
D10SSCLCR3	D10SSCLCL3	0.770"	0.625"	10"	0.385"	-8°	CC-32.5	BFTX0407N	TRX15
D12SSCLCR3	D12SSCLCL3	0.930"	0.750"	10"	0.465"	-7°	CC-32.5	BFTX0409N	TRX15
D16TSCLCR3	D16TSCLCL3	1.200"	1.000"	12"	0.600"	-6°	CC-32.5	BFTX0409N	TRX15

D-SCLP



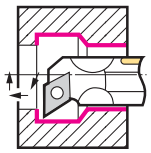


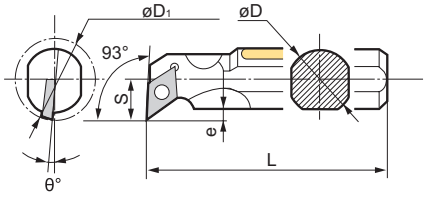


GAGE INSERT
CP□□

Sumitomo Cat. No.		Dimensions					Gage Insert	Hardware	
Right Hand	Left Hand	Min. Bore	D	L	S	θ°		Screw	Wrench
D10SSCLPR2	D10SSCLPL2	0.770"	0.625"	10"	0.355"	-5°	CP-21.5	BFTX0256N	TRX08
D12SSCLPR3	D12SSCLPL3	0.930"	0.750"	10"	0.450"	-4°	CP-32.5	BFTX0409N	TRX15
D16TSCLPR3	D16TSCLPL3	1.200"	1.000"	12"	0.550"	-2°	CP-32.5	BFTX0409N	TRX15

D/B-SDUC





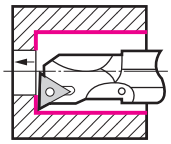
GAGE INSERT
DC□□

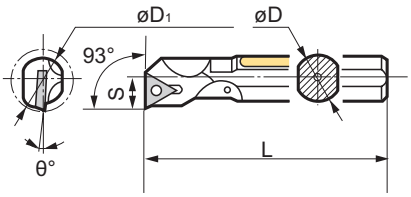
Sumitomo Cat. No.		Dimensions					Gage Insert	Hardware	
Right Hand	Left Hand	Min. Bore	D	L	S	θ°		Screw	Wrench
*B06RSDUCR2		0.600"	0.375"	8"	0.276"	-8°	DC-21.5	BFTX02506N	TRX08
D08RSDUCR2	D08RSDUCL2	0.730"	0.500"	8"	0.360"	-8°	DC-21.5	BFTX02506N	TRX08
D10SSDUCR2	D10SSDUCL2	0.850"	0.625"	10"	0.430"	-6°	DC-21.5	BFTX02506N	TRX08
D12SSDUCR3	D12SSDUCL3	0.980"	0.750"	10"	0.510"	-6°	DC-32.5	BFTX0409N	TRX15
D16TSDUCR3	D16TSDUCL3	1.300"	1.000"	12"	0.670"	-6°	DC-32.5	BFTX0409N	TRX15

*Non-coolant through

Note: For right-handed boring bars, please use left-handed or neutral inserts. For left-handed boring bars, please use right-handed or neutral inserts

D-STUC

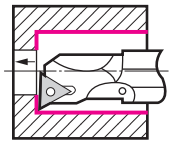


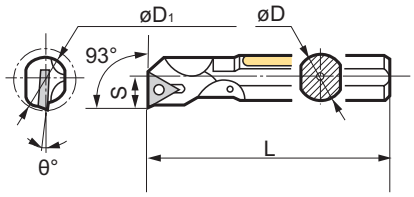


GAGE INSERT
TC□□

Sumitomo Cat. No.		Dimensions					Gage Insert	Hardware	
Right Hand	Left Hand	Min. Bore	D	L	S	θ°		Screw	Wrench
D08RSTUCR2	D08RSTUCL2	0.600"	0.500"	8"	0.300"	-10°	TC-21.5	BFTX02506N	TRX08
D10SSTUCR2	D10SSTUCL2	0.770"	0.625"	10"	0.385"	-8°	TC-21.5	BFTX02506N	TRX08
D12SSTUCR3	D12SSTUCL3	0.930"	0.750"	10"	0.465"	-7°	TC-32.5	BFTX0409N	TRX15
D16TSTUCR3	D16TSTUCL3	1.200"	1.000"	12"	0.600"	-6°	TC-32.5	BFTX0409N	TRX15

D-STUP

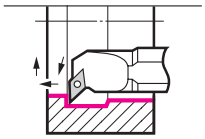


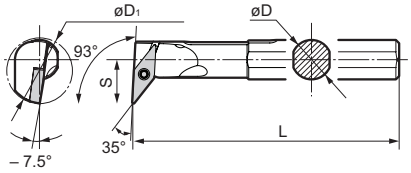


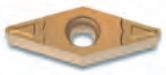
GAGE INSERT
TP□□

Sumitomo Cat. No.		Dimensions					Gage Insert	Hardware	
Right Hand	Left Hand	Min. Bore	D	L	S	θ°		Screw	Wrench
D08RSTUPR2	D08RSTUPL2	0.600"	0.500"	8"	0.300"	-7°	TP-22	BFTX0306A	TRX10
D10SSTUPR2	D10SSTUPL2	0.770"	0.625"	10"	0.385"	-4°	TP-22	BFTX0306A	TRX10
D12SSTUPR2	D12SSTUPL2	0.930"	0.750"	10"	0.465"	-2°	TP-22	BFTX0307A	TRX10
D16TSTUPR3	D16TSTUPL3	1.200"	1.000"	12"	0.600"	-2°	TP-33	BFTX0410A	TRX15

D-SVUB



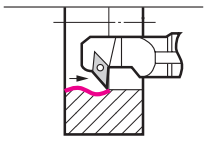


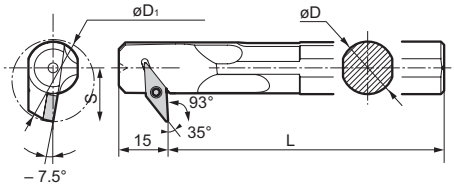


GAGE INSERT
VB□□

Sumitomo Cat. No.		Dimensions					Gage Insert	Hardware	
Right Hand	Left Hand	Min. Bore	D	L	S	θ°		Screw	Wrench
D10SSVUBR2	D10SSVUBL2	0.850"	0.625"	10"	0.500"	-7.5°	VB-22	BFTX02506N	TRX08
D12SSVUBR2	D12SSVUBL2	0.980"	0.750"	10"	0.562"	-7.5°	VB-22	BFTX02506N	TRX08

D-SVZB





GAGE INSERT
VB□□

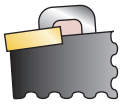
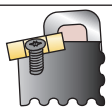
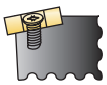
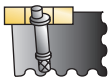
Sumitomo Cat. No.		Dimensions					Gage Insert	Hardware	
Right Hand	Left Hand	Min. Bore	D	L	S	θ°		Screw	Wrench
D08RSVZBR2	-	0.800"	0.500"	8"	0.532"	-7.5°	VB-22	BFTX02506N	TRX08
D10SSVZBR2	-	1.000"	0.625"	10"	0.650"	-7.5°	VB-22	BFTX02506N	TRX08

SUMITOMO BORING BAR NOMENCLATURE

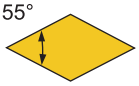
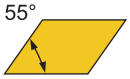
1 Type of Bar

Solid Steel	Solid Carbide
B	C

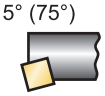
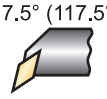
2 Clamping System

 C Clamp Lock	 M Multiple Lock
 S Screw Clamp	
 P Pin Lock	

3 Insert Shape

 S	 60° T
 80° C	 55° D
 55° K	 35° V
 80° W	

4 Bar Style

 -5° (95°) L	 15° (75°) K
 0° (90°) F	 -3° (93°) J
 -17.5° (117.5°) Q	 H

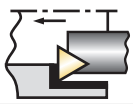
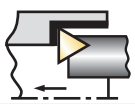
B	S	C	L	O	R	-	06	2
1	2	3	4	5	6		7	8

5 Insert Relief Angle

 0° N	 11° P	 O

*Varies

6 Hand of Tool

 R	 L

7 Bar Diameter

The two-digit number represents the Bar Diameter in 1/16 of an inch increments.

06 = 3/8	24 = 1 1/2	42 = 2 5/8
08 = 1/2	26 = 1 5/8	44 = 1 3/4
10 = 5/8	28 = 1 3/4	46 = 1 7/8
12 = 3/4	30 = 1 7/8	48 = 3
14 = 7/8	32 = 2	
16 = 1	34 = 2 1/8	
18 = 1 1/8	36 = 2 1/4	
20 = 1 1/4	38 = 2 3/8	
22 = 1 3/8	40 = 2 1/2	

8 Insert I.C. Size

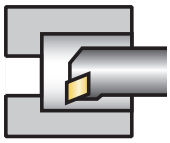
I.C. Size in 1/8 inch increments.

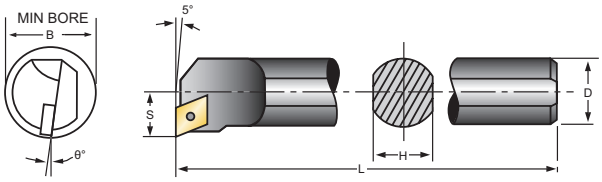
Under 1/4 I.C.	Over 1/4 I.C.
2 = 5/16	2 = 1/4
5 = 5/32	3 = 3/8
6 = 3/16	4 = 1/2
	5 = 5/8
	6 = 3/4
	7 = 7/8
	8 = 1

Note: For right-handed boring bars, please use left-handed or neutral inserts. For left-handed boring bars, please use right-handed or neutral inserts

BSCLO Series

For Internal Boring





GAGE INSERT
CPGM□□□

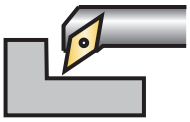
These figures show right hand tools.

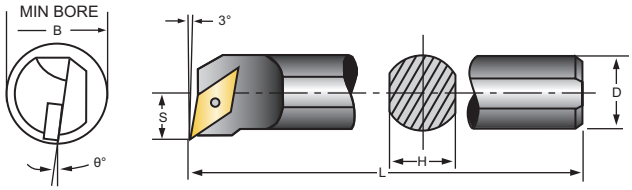
Sumitomo Cat. No.	STKD. R	STKD. L	Dimensions Min. Bore B	D	L	S	H	θ°	Insert Shape	Insert Size	Screw	Wrench
BSCLOR/L 062	•	•	.500	.375	6.000	.250	.336	–5°	CP□□	2.51.5□	BFTX0305A	TRX10
BSCLOR/L 082	•	•	.625	.500	6.000	.313	.462	–2°				
BSCLOR/L 103	•	•	.750	.625	6.500	.375	.586	–2°	CP□□	32□	BFTX0407A	TRX15
BSCLOR/L 123	•	•	1.000	.750	10.000	.500	.672	0°				

Maximum overhang = 3 x D

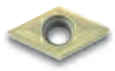
BSDJO Series

For Internal Boring





GAGE INSERT
DCGT□□□



These figures show right hand tools.

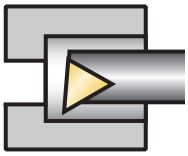
Sumitomo Cat. No.	STKD. R	STKD. L	Dimensions Min. Bore B	D	L	S	H	θ°	Insert Shape	Insert Size	Screw	Wrench
BSDJOR/L 062	•	•	.516	.375	5.000	.306	.336	–6°	DC□□	21.5□	BFTX02506	TRX08
BSDJOR/L 082	•		.687	.500	6.000	.368	.461	–6°				
BSDJOR/L 102	•	•	.813	.625	8.000	.431	.586	–6°				
BSDJOR/L 123	•	•	1.000	.750	10.000	.493	.671	–6°	DC□□	32.5□	BFS0410T	TRX10

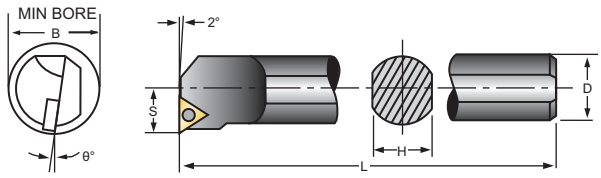
Maximum overhang = 3 x D

Note: For right-handed boring bars, please use left-handed or neutral inserts. For left-handed boring bars, please use right-handed or neutral inserts

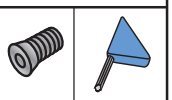
BSTJO Series

For Internal Boring





GAGE INSERT
T□GT□□□



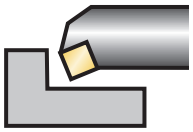
These figures show right hand tools.

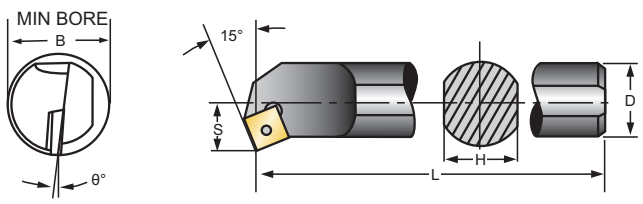
Sumitomo Cat. No.	STKD. R	STKD. L	Dimensions Min. Bore B	D	L	S	H	θ°	Insert Shape	Insert Size	Screw	Wrench
BSTJOR/L 065	•	•	.313	.375	5.000	.156	.336	–12°	TBG□	52□	BFTX0204A	TRX06
BSTJOR/L 066	•	•	.375	.375	5.000	.188	.336	–8°	TPG□	63□		
BSTJOR/L 062	•	•	.500	.375	6.000	.250	.336	–5°			BFTX0306A	TRX10
BSTJOR/L 082	•	•	.625	.500	6.000	.312	.462	–4°		22□	BFTX0307A	
BSTJOR/L 102	•	•	.750	.625	6.500	.375	.586	–2°				
BSTJOR/L 123	•	•	1.000	.750	10.000	.500	.672	–2°		33□	BFTX0410A	TRX15
BSTJOR/L 163	•	•	1.125	1.000	12.000	.563	.882	0°				

Maximum overhang = 3 x D

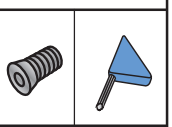
BSSKO Series

For Internal Boring





GAGE INSERT
SPGG322L



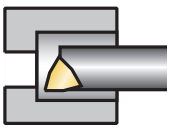
These figures show right hand tools.

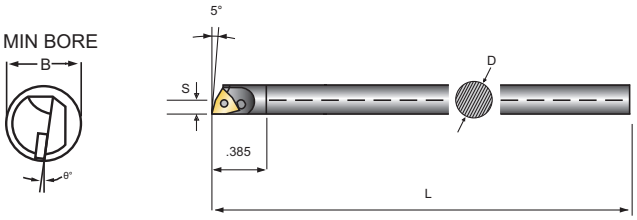
Sumitomo Cat. No.	STKD. R	STKD. L	Dimensions Min. Bore B	D	L	S	H	θ°	Insert Shape	Insert Size	Screw	Wrench
BSSKOR/L 083	•		.625	.500	6.000	.312	.462	–4°	SP□□	32□	BFTX0307A	TRX10
BSSKOR/L 103	•	•	.750	.625	6.500	.375	.586	–2°				
BSSKOR/L 123	•	•	1.000	.750	10.000	.500	.672	0°				
BSSKOR/L 163	•		1.125	1.000	12.000	.563	.882	0°				

Maximum overhang = 3 x D

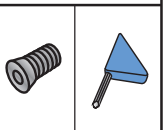
BSWJO Series

For Internal Boring





GAGE INSERT
WBGT521L



These figures show right hand tools.

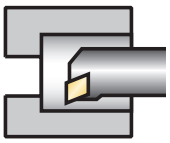
Sumitomo Cat. No.	STKD.	Dimensions Min. Bore B	D	H	L	S	θ°	ℓ	Insert	Screw	Wrench
BSWJOR 035	•	.228	.187	–	2.500	.062	–12°	–	WBGT 52□L	BHF0203T	TH015

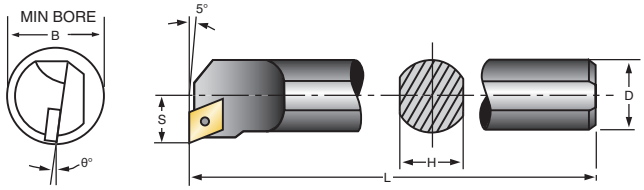
Maximum overhang = 5 x D

Note: For right-handed boring bars, please use left-handed or neutral inserts. For left-handed boring bars, please use right-handed or neutral inserts

CSCLO Series

For Internal Boring





Solid carbide bar with fixed steel head

GAGE INSERT
CPGT□□□

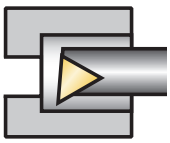
These figures show right hand tools.

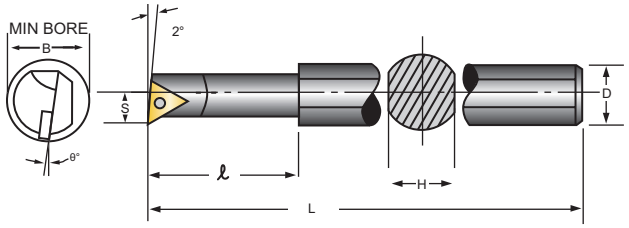
Sumitomo Cat. No.	STKD. R	STKD. L	Dimensions Min. Bore B	D	L	S	H	θ°	Insert Shape	Insert Size	Screw	Wrench
CSCLOR/L 062	•	•	.500	.375	6.000	.250	.336	–5°	CP□□	2.51.5□	BFTX0305A	TRX10
CSCLOR/L 082	•	•	.625	.500	6.000	.313	.462	–2°				
CSCLOR/L 103	•	•	.750	.625	6.500	.375	.586	–2°	CP□□	32□	BFTX0407A	TRX15

Maximum overhang = 5 x D

CSTJO Series

For Internal Boring





Solid carbide bar with fixed steel head

GAGE INSERT
T□GT□□□

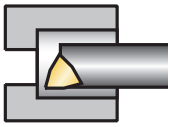
These figures show right hand tools.

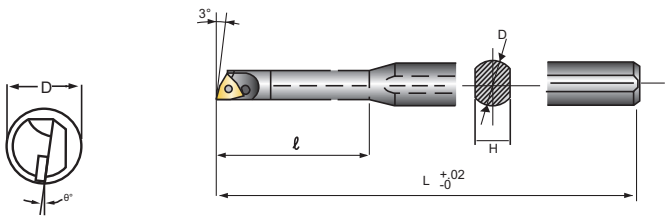
Sumitomo Cat. No.	STKD. R	STKD. L	Dimensions Min. Bore B	D	L	S	H	ℓ	θ°	Insert Shape	Insert Size	Screw	Wrench
CSTJOR/L 065	•	•	.313	.375	5.000	.1560	.336	1.781	–12°	TBG□	52□	BFTX0204A	TRX06
CSTJOR/L 066	•	•	.375	.375	5.000	.1880	.336	1.781	–8°	TPG□	63□		
CSTJOR/L 062	•	•	.500	.375	7.000	.2500	.336	–	–5°		22□	BFTX0306A	
CSTJOR/L 082	•	•	.625	.500	8.000	.3125	.462	–	–2°		22□	BFTX0307A	TRX10
CSTJOR/L 102	•	▲	.750	.625	10.000	.3750	.586	–	–2°				
CSTJOR/L 123	•	•	1.000	.750	10.000	.5000	.672	–	–2°		33□	BFTX0410A	TRX15

Maximum overhang = 5 x D

CSWJO Series

For Internal Boring





Solid carbide bar with fixed steel head

GAGE INSERT
WBG□52□

These figures show right hand tools.

Sumitomo Cat. No.	STKD.	Dimensions Min. Bore B	D	H	L	S	θ°	ℓ	Insert	Screw	Wrench
CSWJOR 055	•	.234	.375	.276	5.000	.117	–12°	1.18	WBG□ 52□L	BFTX0203A	TRX06
CSWJOL 055	•	.234							WBG□ 52□R		

Maximum overhang = 5 x D

Note: For right-handed boring bars, please use left-handed or neutral inserts. For left-handed boring bars, please use right-handed or neutral inserts

SUMI-UFO Boring Bars Nomenclature

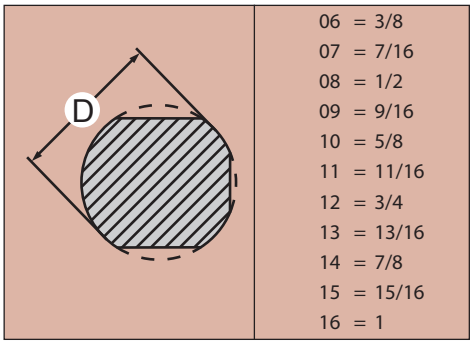
The SUMI-UFO bars feature a wider more rigid cross section for deeper cutting (up to 5 times with steel bars, up to 7 times with carbide bars) without chatter, an ultra high positive cutting edge for freer cutting and a larger chip groove for better chip flow. With these features, SUMI-UFO bars give you the ability to bore deeper holes with better surface finishes and improved chip control.

Boring Bar Identification System

1 Type of Bar

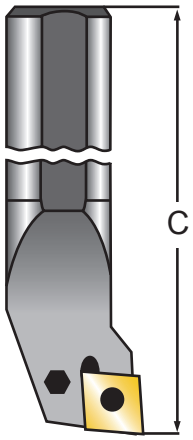
Solid Steel	Solid Carbide
S	C

2 Shank Diameter



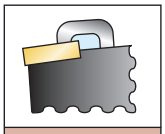
06	= 3/8
07	= 7/16
08	= 1/2
09	= 9/16
10	= 5/8
11	= 11/16
12	= 3/4
13	= 13/16
14	= 7/8
15	= 15/16
16	= 1

3 Bar Length

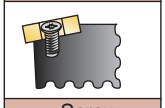


C mm (inch) mm	Symbol
(3) 80	F
(4) 100	H
(5) 125	K
(6) 150	M
(7) 180	Q
(8) 200	R
(10) 250	S
(12) 300	T
(14) 350	U
(15.75) 400	V
(17.75) 450	W
(19.7) 500	Y
Special	X

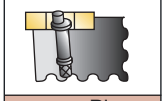
4 Clamping System



C Clamp Lock



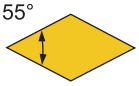
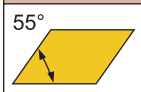
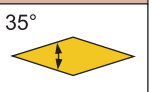
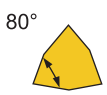
S Screw Clamp



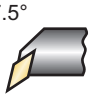
P Pin Lock

S	06	K	-	S	T	U	B	R	5
1	2	3		4	5	6	7	8	9

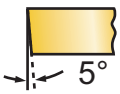
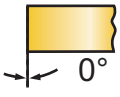
5 Insert Shape

	
S	T
	
C	D
	
K	V
	
W	

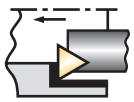
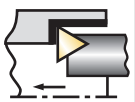
6 Bar Style

	
L	K
	
F	U
	
Q	

7 Insert Clearance Angle

	
B	C
	
N	P

8 Hand of Tool

	
R	L

9 Insert I.C.

5 = 5/32
6 = 3/16
7 = 7/32
8 = 1/4
0 = 5/16

Sumitomo Steel Shank Boring Bars

Finish-Medium Cut

S-SCLC
Bottom Facing

Steel

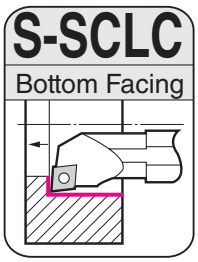


Fig. 1

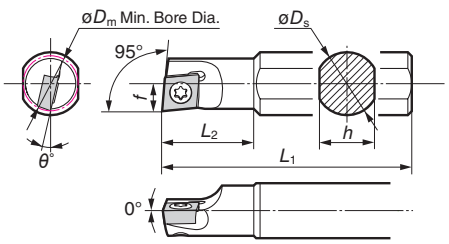
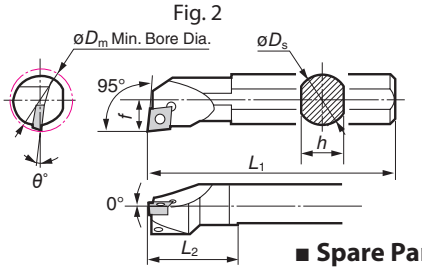


Fig. 2



■ Spare Parts



(For Torx Holes)

■ Holder

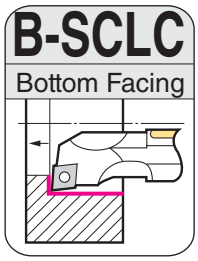
Right handed toolholders are applicable with left handed or neutral inserts.
Left handed toolholders are applicable with right handed or neutral inserts.

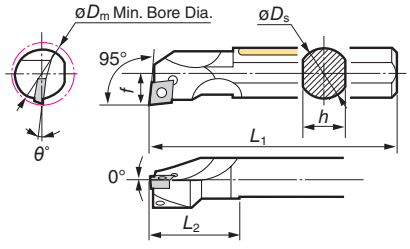
Above figures show right hand tools.

Shank	Cat. No.	Conventional Cat. No.	Stock R	Stock L	Min. Bore Dia. øDm	Dimensions (mm) øDs	h	L1	f	L2	rε	Fig.	Gage Insert	Screw	Recommended Tightening Torque (N•m)	Wrench
Steel	S08H-SCLC R/L03X1-05	-			5	8	7	100	2.5	24	-5	1	CC□□ 03X1○○	BFTX016033	0.2	TRX06
	S08H-SCLC R/L03X1-06	-			6	8	7	100	3.0	28	-13					
	S08H-SCLC R/L04X1-07	-			7	8	7	100	3.5	32	-13	1	CC□□04X1○○	BFTX0203N	0.5	
	S08H-SCLC R/L04X1-08	-			8	8	7	100	4.0	37	-11					
	S08H-SCLC R/L0602-10	S08H-SCLC R/L06	★	★	10	8	7	100	5.5	19	-13	2	CC□□21.5 □	BFTX02505N	1.1	TRX08
	S10K-SCLC R/L0602-12	S10K-SCLC R/L06-12	★	★	12	10	9	125	6.0	21	-12			BFTX02506N	1.5	
	S12M-SCLC R/L0602-14	S12M-SCLC R/L06-14	★	★	14	12	11	150	7.0	25	-10					
	S16R-SCLC R/L0602-18	-	★	★	18	16	15	200	9.0	27	-8					
	S16R-SCLC R/L09T3-18	-	★	★	18	16	15	200	9.0	30	-10	2	CC□□32.5 □	BFTX0407N	3.0	TRX15
	S20S-SCLC R/L09T3-22	-	★	★	22	20	18	250	11.0	30	-8			BFTX0409N	3.4	TRX15
	S25T-SCLC R/L09T3-27	-	★	★	27	25	23	300	13.5	35	-6					

B-SCLC
Bottom Facing

Anti-vibration





■ Spare Parts



(For Torx Holes)

■ Holder

Right handed toolholders are applicable with left handed or neutral inserts.
Left handed toolholders are applicable with right handed or neutral inserts.

Above figures show right hand tools.

Shank	Cat. No.	Stock R	Stock L	Min. Bore Dia. øDm	Dimensions (mm) øDs	h	L1	f	L2	rε	Gage Insert	Screw	Recommended Tightening Torque (N•m)	Wrench
Anti-vibration	B08H-SCLC R/L0602-10	★	★	10	8	7	100	5.5	19	-13	CC□□21.5 □	BFTX02505N	1.1	TRX08
	B10K-SCLC R/L0602-12	★	★	12	10	9	125	6.0	21	-12		BFTX02506N	1.5	
	B12M-SCLC R/L0602-14	★	★	14	12	11	150	7.0	25	-10				
	B12M-SCLC R/L0602-16	★	★	16	12	11	150	9.0	25	-10				
	B16R-SCLC R/L09T3-20	★	★	20	16	15	200	11.0	30	-8	CC□□32.5 □	BFTX0407N	3.0	TRX15
	B20S-SCLC R/L09T3-25	★	★	25	20	18	250	13.0	30	-7		BFTX0409N	3.4	
	B25T-SCLC R/L1204-32	★	★	32	25	23	300	17.0	38	-6	CC□□43 □	BFTX0511N	5.0	TRX20

Finish-Medium Cut

Carbide

C-SCLC
Bottom Facing

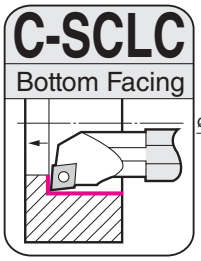


Fig. 1

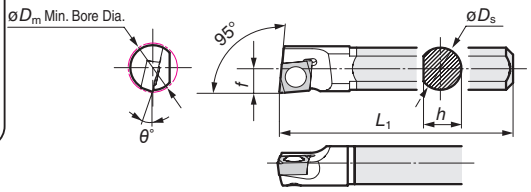
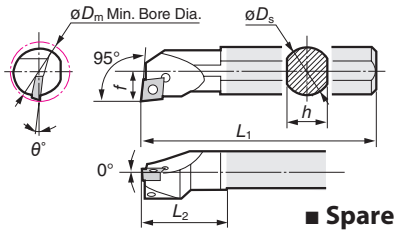


Fig. 2



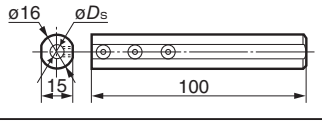
■ **Holder** Right handed toolholders are applicable with left handed or neutral inserts.

■ **Spare Parts**

(For Torx Holes)

Shank	Cat. No.	Conventional Cat. No.	Stock R	Min. Bore Dia. øDm	Dimensions (mm) øDs	h	L1	f	L2	rε	Fig.	Gage Insert	Screw	Recommended Tightening Torque (N•m)	Wrench
Carbide	C04G-SCLC R03X1-05*	C04G-SCLC R03X1-05*	★	5	4	3.8	90	2.5	Q	-15	1	CC□□03X1○○	BFTX016033	0.2	TRX06
	C05H-SCLC R03X1-06*	C05H-SCLC R03X1-06*	★	6	5	4.4	100	3.0	Q	-13					
	C06J-SCLC R04X1-07*	C06J-SCLC R04X1-07*	★	7	6	5.4	110	3.5	Q	-13	1	CC□□04X1○○	BFTX0203N	0.5	TRX06
	C07K-SCLC R04X1-08*	C07K-SCLC R04X1-08*	★	8	7	6.4	125	4.0	Q	-11					
	C08H-SCLC R0602-10	C08H-SCLC R06	★	10	8	7.0	100	5.5	19	-13	2	CC21.5 □	BFTX02505N	1.1	TRX08
	C10K-SCLC R0602-12	C10K-SCLC R06-12	★	12	10	9.0	125	6.0	21	-12			BFTX02506N	1.5	
	C10K-SCLC R0602-13	C10K-SCLC R06	★	13	10	9.0	125	7.0	21	-12					
	C12M-SCLC R0602-14	C12M-SCLC R06-14	★	14	12	11.0	150	7.0	25	-10					
	C12M-SCLC R0602-16	C12M-SCLC R06	★	16	12	11.0	150	9.0	25	-10					
	C16R-SCLC R09T3-20	C16R-SCLC R09	★	20	16	15.0	200	11.0	30	-8	2	CC□□32.5 □	BFTX0407N	3.4	TRX15
	C20S-SCLC R09T3-25	C20S-SCLC R09	★	25	20	18.0	250	13.0	35	-7			BFTX0409N	3.4	

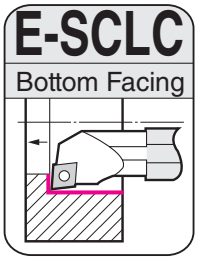
* Requires the separately sold sleeve.

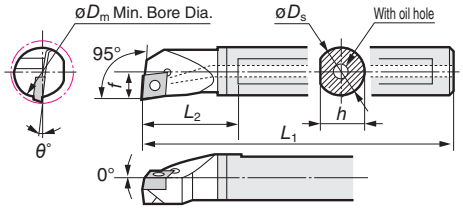


Sleeve	Stock	øDs	Applicable Holder
HBB 416	★	4	C04G-SCLC R03X1-05*
HBB 516	★	5	C05H-SCLC R03X1-06*
HBB 616	★	6	C06J-SCLC R04X1-07*
HBB 716	★	7	C07K-SCLC R04X1-08*

Carbide
Oil Hole

E-SCLC
Bottom Facing





■ **Holder** Right handed toolholders are applicable with left handed or neutral inserts.

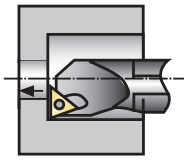
■ **Spare Parts**

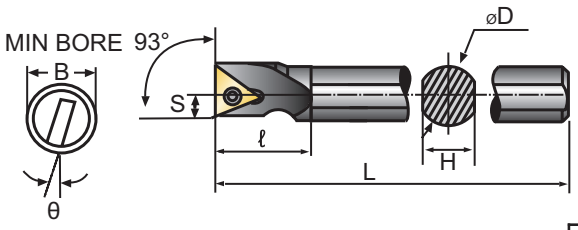
(For Torx Holes)

Shank	Cat. No.	Conventional Cat. No.	Stock R	Min. Bore Dia. øDm	Dimensions (mm) øDs	h	L1	f	L2	rε	Gage Insert	Screw	Recommended Tightening Torque (N•m)	Wrench
Carbide with oil hole	E08H-SCLC R0602-10	E08H-SCLC R06	★	10	8	7.5	100	5.5	18	-13	CC□□21.5 □	BFTX02505N	1.1	TRX08
	E10K-SCLC R0602-13	E10K-SCLC R06	★	13	10	9.5	125	7.0	19	-12		BFTX02506N	1.5	
	E12M-SCLC R0602-16	E12M-SCLC R06	★	16	12	11.5	150	9.0	25	-10				
	E16R-SCLC R09T3-20	E16R-SCLC R09	★	20	16	15.5	200	11.0	30	-8	CC□□32.5 □	BFTX0407N	3.4	TRX15

S-STUP Series

For Internal Boring





Steel shank bar

GAGE INSERT
TPGT□□□

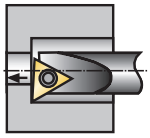
These figures show right hand tools.

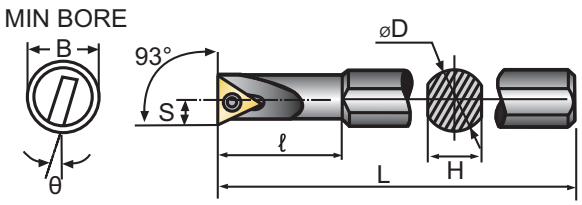
Sumitomo Cat. No.	STKD. R	STKD. L	Dimensions Min. Bore B	D	L	H	S	ℓ	θ°	Insert Shape	Insert Size	Screw	Wrench
S06K-STUPR/L6	•	•	.375	.375	5.000	.336	.1875	1.250	-10°	TPG□	63□	BFTY02205	TRX06
S06M-STUPR/L8	•	•	.500	.375	6.000	.336	.250	—	-8°	TPG□	21.5□	BFTX02507	
S08M-STUPR/L8	•		.625	.500	6.000	.461	.3125	—	-6°	TPG□	21.5□	BFTX02507	
S10Q-STUPR/L8	•	•	.750	.625	7.000	.591	.625	—	-2°	TPG□	21.5□	BFTX02507	TRX08
S12S-STUPR/L8	•	•	1.000	.750	10.000	.669	.500	—	-4°	TPG□	21.5□	BFTX02507	
S16T-STUPR/L8	•	•	11.125	1.000	12.000	.832	.5625	—	-2°	TPG□	21.5□	BFTX02507	

Maximum overhang = 5 x D

S-STUB Series

For Internal Boring





Steel shank bar

GAGE INSERT
TBGT52□

These figures show right hand tools.

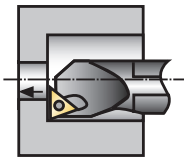
Sumitomo Cat. No.	STKD. R	STKD. L	Dimensions Min. Bore B	D	L	H	S	ℓ	θ°	Insert Shape	Insert Size	Screw	Wrench
S06K-STUBR/L5	•	•	.313	.375	5.000	.336	.156	1.0	-12°	TBG□	52□	BFTX0204A	TRX06

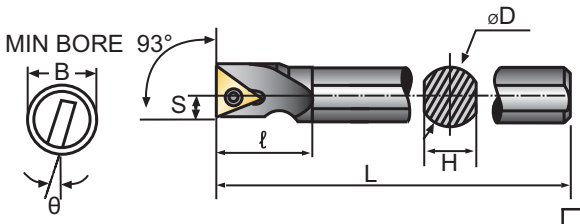
Maximum overhang = 5 x D

Note: For right-handed boring bars, please use left-handed or neutral inserts. For left-handed boring bars, please use right-handed or neutral inserts

C-STUP Series

For Internal Boring





Solid carbide bar with fixed steel head

GAGE INSERT
TPGT□□□

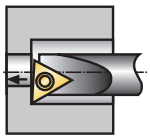
These figures show right hand tools.

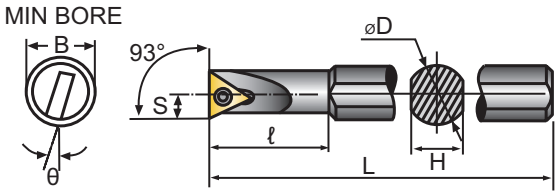
Sumitomo Cat. No.	STKD. R	STKD. L	Dimensions Min. Bore B	D	L	H	S	ℓ	θ°	Insert Shape	Insert Size	Screw	Wrench	Replacement Head
C06K-STUPR/L6	•	•	.375	.375	5.000	.336	.188	1.800	-10°	TPG□	63□	BFTX0204A	TRX06	RH06STUPR/L6
C06Q-STUPR/L8	•	•	.500	.375	7.000	.336	.250	—	-8°	TPG□	21.5□	BFTX02507	TRX08	RH06STUPR/L8
C08R-STUPR/L8	•	•	.625	.500	8.000	.461	.313	—	-6°	TPG□	21.5□	BFTX02507		RH08STUPR/L8
C10S-STUPR/L8	•	•	.750	.625	10.000	.591	.375	—	-2°	TPG□	21.5□	BFTX02507		RH10STUPR/L8
C12S-STUPR/L8	•		1.000	.750	10.000	.669	.500	—	-4°	TPG□	21.5□	BFTX02507		RH12STUPR/L8

Maximum overhang = 7 x D

C-STUB Series

For Internal Boring





Solid carbide bar with fixed steel head

GAGE INSERT
TBGT52□

These figures show right hand tools.

Sumitomo Cat. No.	STKD. R	STKD. L	Dimensions Min. Bore B	D	L	H	S	ℓ	θ°	Insert Shape	Insert Size	Screw	Wrench	Replacement Head
C06K-STUBR/L5	•		.313	.375	5.00	.336	.156	1.800	-12°	TBG□	52□	BFTX0204A	TRX06	RH06STUR/L5

Maximum overhang = 7 x D

Note: For right-handed boring bars, please use left-handed or neutral inserts. For left-handed boring bars, please use right-handed or neutral inserts

Small Hole Finishing

S-SWUB Steel
Stop Boring

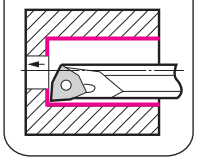


Fig. 1

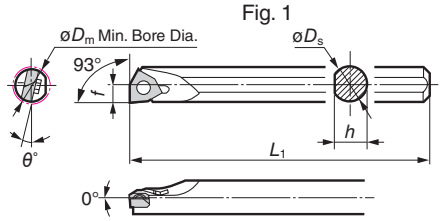
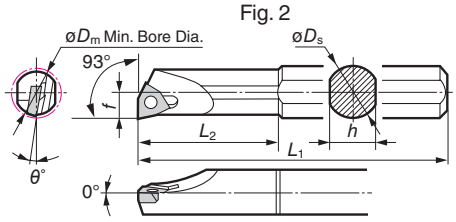


Fig. 2



■ Spare Parts

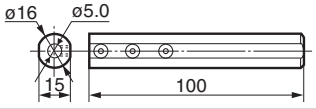

(For Torx Holes)

■ **Holder** Right handed toolholders are applicable with left handed or neutral inserts.
Left handed toolholders are applicable with right handed or neutral inserts.

Above figures show right hand tools.

Shank	Cat. No.	Conventional Cat. No.	Stock R	Stock L	Min. Bore Dia. øDm	Dimensions (mm) øDs	h	L1	f	L2	θ°	Fig.	Gage Insert	Screw	Recommended Tightening Torque (N•m)	Wrench
Steel	**S05H-SWUB R/L0601-06K**	BBPW-508 RK/LK*	★	★	**5.5**	5	4.7	100	2.75	-	-12	1	WB□□52 □	BFTX0203N	0.5	TRX06
	S08H-SWUB R/L0601-06	BBPW-508 R/L	★	★	**5.5**	8	7.0	100	2.75	18	-12	2				
	S08H-SWUB R/L0601-08	BBPW-508 R/L08*	★	★	**8.0**	8	7.0	100	4	30	-10					
	S08H-SWUB R/L0802-10	BBPW-608 R/L*	★	★	**10.0**	8	7.0	100	5	18	-13		WB□□63 □	BFTX02205N	0.5	TRX06
	S10K-SWUB R/L0802-12	BBPW-610 R/L*	★	★	**12.0**	10	9.0	125	6	20	-10					

S05H-SWUB R/L0601-06K needs adaptor sleeve (HBB516)
* Product will be marked with ISO Cat. No.



Sleeve	Stock
HBB 516	★

Adaptor sleeve is optional

C-SWUB Carbide
Stop Boring

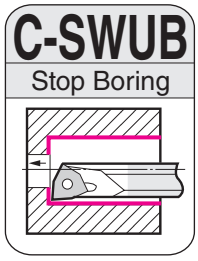


Fig. 1

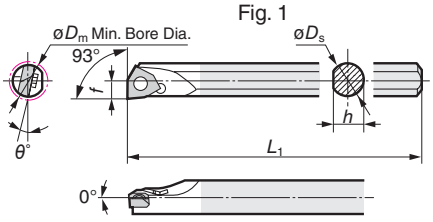
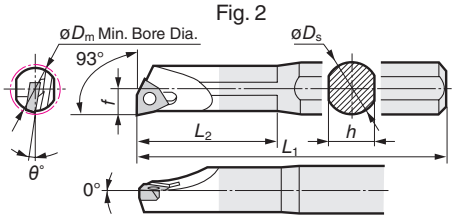


Fig. 2



■ Spare Parts

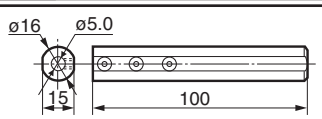

(For Torx Holes)

■ Holder Right handed toolholders are applicable with left handed or neutral inserts.
Left handed toolholders are applicable with right handed or neutral inserts.

Above figures show right hand tools.

Shank	Cat. No.	Conventional Cat. No.	Stock R	Stock L	Min. Bore Dia. øDm	Dimensions (mm) øDs	h	L1	f	L2	θ°	Fig.	Gage Insert	Screw	Recommended Tightening Torque (N•m)	Wrench
Carbide	**C05H-SWUB R/L0601-06K**	WBPW-508 RK/LK*	★	★	**5.5**	5	4.7	100	2.75	-	-12	1	WB□□52 □	BFTX0203N	0.5	TRX06
	C08K-SWUB R/L0601-06	WBPW-508 R/L	★	★	**5.5**	8	7.0	125	2.75	30	-12	2				

C05H-SWUB R/L0601-06K needs adaptor sleeve (HBB516)
* Product will be marked with ISO Cat. No.



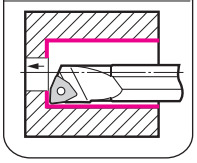
Sleeve	Stock
HBB 516	★

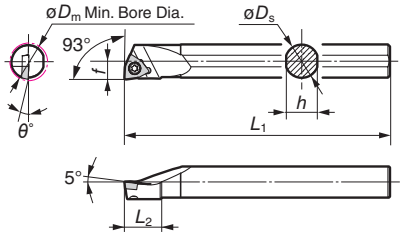
Adaptor sleeve is optional

Note: For right-handed boring bars, please use left-handed or neutral inserts. For left-handed boring bars, please use right-handed or neutral inserts

Small Hole Finishing

S-SWUP Steel
Stop Boring





■ **Holder** Right handed toolholders are applicable with left handed or neutral inserts.
Left handed toolholders are applicable with right handed or neutral inserts.

Above figures show right hand tools.

■ **Spare Parts**


(For Torx Holes)

Shank	Cat. No.	Stock R	Stock L	Min. Bore Dia. øDm	Dimensions (mm) øDs	h	L1	f	L2	rε	Gage Insert	Screw	Recommended Tightening Torque (N•m)	Wrench
Steel	**S12M-SWUP R/L1102-14**	★		**14**	12	11	150	7	17	-6	WP□□1102○○	BFTX02505N	1.1	TRX08
	S16Q-SWUP R/L1102-18	★		**18**	16	15	180	9	18	-3				
	S16Q-SWUP R/L1603-18	★		**18**	16	15	180	9	18	-3	WP□□1603○○	BFTX0407N	3.4	TRX15
	S20R-SWUP R/L1603-22	★		**22**	20	18	200	11	18	-2				

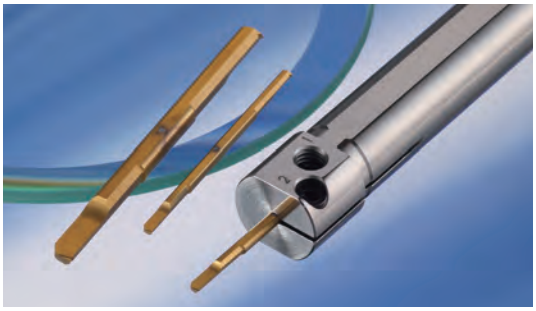
■ **Insert** Coated: Cermet:

-11° Relief M-Class

WPMT
LB

Cat. No.	Stock AC820P	AC830P	AC6030M	AC6040M	T1500Z	T3000Z	T1500A	Dimensions (mm) Inscribed circle	Thickness	Nose Radius
WPMT 110204N-LB	★	★	★	★	★	★	★	6.35	2.38	0.4
WPMT 160308N-LB	★	★	★	★	★	★	★	9.525	3.18	0.8

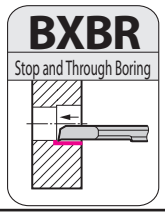
Note: For right-handed boring bars, please use left-handed or neutral inserts. For left-handed boring bars, please use right-handed or neutral inserts



■ Characteristics

- Economical, two-cornered insert.
- Maximum boring depth 5D (5 times the shank diameter)
- Useable 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



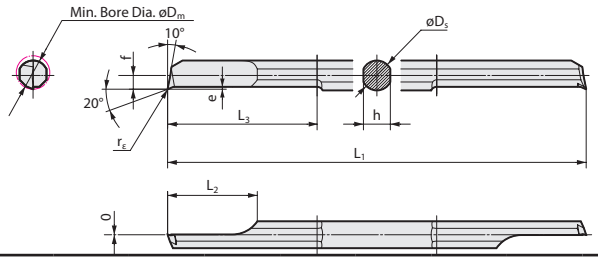
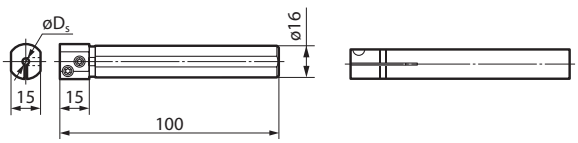


Figure shows tool with breaker.

■ Brazed Boring Bar

	Catalog Number	Stock	*Min. Bore Dia.	Dimensions (mm)								Applicable Sleeve
		ACZ150	øDm	øDs	h	L1	f	L2	L3	e	rε	
With Breaker	BXBR 02005R	★	2.0	2.0	1.8	50	0.80	6.0	10.0	0.20	0.05	HBX 2016
	BXBR 02020R	★	2.0	2.0	1.8	50	0.80	6.0	10.0	0.20	0.20	HBX 2016
	BXBR 02505R	★	2.5	2.5	2.2	50	1.05	7.5	12.5	0.20	0.05	HBX 2516
	BXBR 02520R	★	2.5	2.5	2.2	50	1.05	7.5	12.5	0.20	0.20	HBX 2516
	BXBR 03005R	★	3.0	3.0	2.7	50	1.30	9.0	15.0	0.25	0.05	HBX 3016
	BXBR 03020R	★	3.0	3.0	2.7	50	1.30	9.0	15.0	0.25	0.20	HBX 3016
	BXBR 03505R	★	3.5	3.5	3.1	60	1.55	10.5	17.5	0.25	0.05	HBX 3516
	BXBR 03520R	★	3.5	3.5	3.1	60	1.55	10.5	17.5	0.25	0.20	HBX 3516
	BXBR 04005R	★	4.0	4.0	3.6	60	1.80	12.0	20.0	0.35	0.05	HBX 4016
	BXBR 04020R	★	4.0	4.0	3.6	60	1.80	12.0	20.0	0.35	0.20	HBX 4016
	BXBR 04505R	★	4.5	4.5	4.1	70	2.05	13.5	22.5	0.35	0.05	HBX 4516
	BXBR 04520R	★	4.5	4.5	4.1	70	2.05	13.5	22.5	0.35	0.20	HBX 4516
	BXBR 05005R	★	5.0	5.0	4.5	70	2.30	15.0	25.0	0.40	0.05	HBX 5016
	BXBR 05020R	★	5.0	5.0	4.5	70	2.30	15.0	25.0	0.40	0.20	HBX 5016
No Breaker	BXBR 02005R-NB	★	2.0	2.0	1.8	50	0.80	6.0	10.0	0.20	0.05	HBX 2016
	BXBR 02020R-NB	★	2.0	2.0	1.8	50	0.80	6.0	10.0	0.20	0.20	HBX 2016
	BXBR 02505R-NB	★	2.5	2.5	2.2	50	1.05	7.5	12.5	0.20	0.05	HBX 2516
	BXBR 02520R-NB	★	2.5	2.5	2.2	50	1.05	7.5	12.5	0.20	0.20	HBX 2516
	BXBR 03005R-NB	★	3.0	3.0	2.7	50	1.30	9.0	15.0	0.25	0.05	HBX 3016
	BXBR 03020R-NB	★	3.0	3.0	2.7	50	1.30	9.0	15.0	0.25	0.20	HBX 3016
	BXBR 03505R-NB	★	3.5	3.5	3.1	60	1.55	10.5	17.5	0.25	0.05	HBX 3516
	BXBR 03520R-NB	★	3.5	3.5	3.1	60	1.55	10.5	17.5	0.25	0.20	HBX 3516
	BXBR 04005R-NB	★	4.0	4.0	3.6	60	1.80	12.0	20.0	0.35	0.05	HBX 4016
	BXBR 04020R-NB	★	4.0	4.0	3.6	60	1.80	12.0	20.0	0.35	0.20	HBX 4016
	BXBR 04505R-NB	★	4.5	4.5	4.1	70	2.05	13.5	22.5	0.35	0.05	HBX 4516
	BXBR 04520R-NB	★	4.5	4.5	4.1	70	2.05	13.5	22.5	0.35	0.20	HBX 4516
	BXBR 05005R-NB	★	5.0	5.0	4.5	70	2.30	15.0	25.0	0.40	0.05	HBX 5016
	BXBR 05020R-NB	★	5.0	5.0	4.5	70	2.30	15.0	25.0	0.40	0.20	HBX 5016

* Boring depth L_3 or less.



■ Adaptor Sleeve

Cat. No.	Stock	Dimensions (mm) øDs	Applicable Bar
HBX 2016	★	2.0	BXBR 020SSR(-NB)
HBX 2516	★	2.5	BXBR 025SSR(-NB)
HBX 3016	★	3.0	BXBR 030SSR(-NB)
HBX 3516	★	3.5	BXBR 035SSR(-NB)
HBX 4016	★	4.0	BXBR 040SSR(-NB)
HBX 4516	★	4.5	BXBR 045SSR(-NB)
HBX 5016	★	5.0	BXBR 050SSR(-NB)

* BXBR bars can be used with HBB type sleeves. Commercially available sleeves may also be used. Please see page 133 for more information regarding HBX

■ Spare Parts (For sleeve)

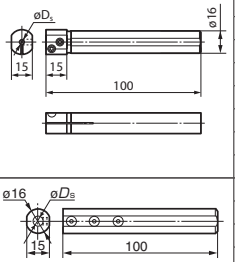


Screw	Setting Screw	Wrench	Applicable Sleeve
BFTX0409N	BT06035T	TRD15	HBX____

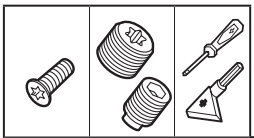
* Adaptor sleeve is optional

BNBX Small Hole Brazed Boring Bar

Catalog No.	BN250	BN700	BN2000	BN7000	Min. Boring Dia.	Dimensions (mm) øD	H	L	R	Applicable Adapter Sleeve	ød (mm)
BNBX020R	★	★	★	★	2.5	2.0	1.7	40	0.2	HBX2016	2.0
BNBX025R	★	★	★	★	3.0	2.5	2.2	40	0.2	HBX2516	2.5
BNBX030R	★	★	★	★	3.5	3.0	2.7	40	0.2	HBX3016	3.0
BNBX035R	★	★	★	★	4.0	3.5	3.2	40	0.2	HBX3516	3.5
BNBX040R	★	★	★	★	4.5	4.0	3.7	40	0.2	HBX4016	4.0
BNBX045R	★	★	★	★	5.0	4.5	4.2	40	0.2	HBX4516	4.5
BNBX050R	★	★	★	★	5.5	5.0	4.7	60	0.2	HBX5016	5.0
BNBX055R	★	★	★	★	6.0	5.5	5.2	60	0.2	HBX5516	5.5
BNBX060R	★	★	★	★	6.5	6.0	5.7	60	0.2	HBX6016	6.0
BNBX065R	★		★		7.0	6.5	6.2	60	0.2	HBB6516	6.5
BNBX070R	★		★		7.5	7.0	6.7	80	0.2	HBB716	7.0
BNBX075R	★		★		8.0	7.5	7.2	80	0.2	HBB7516	7.5
BNBX080R	★		★		8.5	8.0	7.7	80	0.2	HBB816	8.0



Adapter Sleeve Hardware



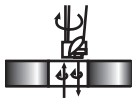
Screw	Setting Screw	Wrench	Applicable Sleeve
BFTX0409N	BT06035T	TRD15	HBX○○○○
-	BT0404	TH020	HBB○○○○

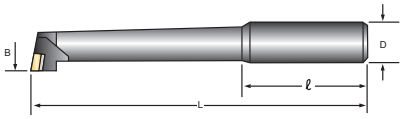
NOTE: BNBX bars can be used with HBB type sleeves, however, HBX type sleeves are recommended for bars below ø6mm

★ = Worldwide Warehouse Item

SUMIBORON Mini Boring Bars SJB Series

Jig Boring Tools





These figures show right hand tools.

Sumitomo Cat. No.	Dimensions (Inches) Min. Bore B	D	L	ℓ	Grade BN250
SJB2416	.250	.375	2.000	1.1875	•
SJB2420	.3125	.375	2.375	1.1875	•
SJB2424	.375	.375	2.750	1.1875	•
SJB2432	.500	.375	2.750	1.1875	•
SJB2440	.625	.375	3.750	1.1875	•

• = USA stocked item

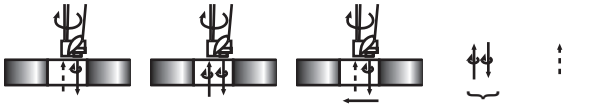
Sumitomo Cat. No.	Dimensions (mm) øD	ød	L	ℓ	Grade BN250
SJB0804	8	4	45	32	★
SJB0805	8	5	45	32	★
SJB0806	8	6	50	30	★
SJB0808	8	8	60	30	★
SJB1006	10	6	50	30	★
SJB1008	10	8	60	30	★
SJB1010	10	10	70	30	★
SJB1012	10	12	70	30	★
SJB1015	10	15	70	30	★

★ = Worldwide Warehouse item

Recommended Cutting Conditions

Rotating speed	800 rpm, or more	Low speed may cause chattering and chipping on the cutting edge
Depth of cut	001~.012 in./ per side	Excessive depth of cut may cause larger tool deflection resulting in deterioration of bore size
Feed rate (f)	.001~.004 in. IPR	—

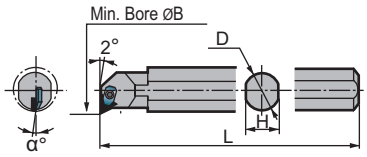
NOTE

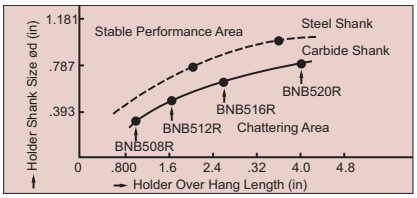


Either rotate the tool when removing or pull the tool away from work piece.

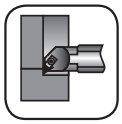
CBN Boring Series

- Solid carbide shank and head adds rigidity.
- Max. overhang, L = 5 x D
- Minimal bar deformation produces excellent boring accuracy.
- Minimal vibration produces a superior surface finish.





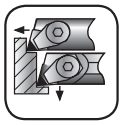
BNB-Type
For Blind Hole Through Hole



Sumitomo Cat. No.	Dimensions					Hardware				Insert		
Right Hand	Min. Bore øB	D	L	H	α°	Clamp	Clamp Screw	Wrench	Nut	I.C.	Thick	Cat. No.
BNB508R	.394" (10mm)	.315" (8mm)	5.5" (140mm)	.275" (7mm)	–9°	BNBC	BH0306	TH020	BNB W2	.156	.125	TBGE52-
BNB512R	.591" (15)	.472" (12)	6.3" (160)	.433" (11)	–6°				BNB W4			
BNB516R	.787" (20)	.630" (16)	7" (180)	.551" (14)	–5°		BH0308		BNB W7			
BNB520R	.984" (25)	.787" (20)	7" (180)	.709" (18)	–4°							

* BNB boring bars are 100% solid carbide (head and shank).

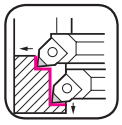
BNC-Type
For Boring and Facing



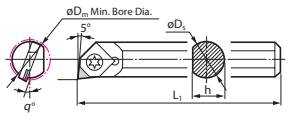
Sumitomo Cat. No.	Dimensions					Hardware				Insert		
Right Hand	Min. Bore øB	D	L	H	α°	Clamp	Clamp Screw	Wrench	Nut	I.C.	Thick	Cat. No.
BNC508R	.394" (10mm)	.315" (8mm)	5.5" (140mm)	.275" (7mm)	–9°	BNBC	BH0306	TH020	BNB W2	.1875	.125	NU-CCGE62-
BNC510R	.472" (12)	.394" (10)	5.5" (140)	.35" (9)	–8°				BNB W4			
BNC512R	.591" (15)	.472" (12)	6.3" (160)	.43" (11)	–6°		BH0308		BNB W7			
BNC516R	.787" (20)	.630" (16)	7" (180)	.551" (14)	–5°							
BNC520R	.984" (25)	.787" (20)	7" (180)	.709" (18)	–4°							

* BNC boring bars are 100% solid carbide (head and shank).

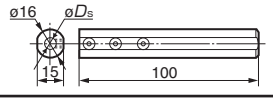
BNZ-Type
For General Facing



Sumitomo Cat. No.	Dimensions (mm)						
Cat. Number	Stock	Min. Bore øDm	øDs	h	L1	θ°	
BNZ606R	★	7.0	6.0	3.0	24	0.2	
BNZ608R	★	9.0	8.0	3.5	2.9	0.2	
BNZ610R	★	11.0	10.0	4.0	3.4	0.2	
BNZ612R	★	13.0	12.0	4.5	3.9	0.2	
BNZ616R	★	17.0	16.0	5.0	4.4	0.2	
BNZ620R	★	21.0	20.0	5.5	4.9	0.2	



Adapter Sleeve *for BNZ type*



Sleeve	Stock	øDs	Applicable Holder
HBB 616	○	6	BNZ 606R
HBB 816	○	8	BNZ 608R

★ = Worldwide Warehouse item • = USA stocked item ○= New Product Arriving January 2015

■ Characteristics

- Achieves the minimum bore diameter of ø2.5mm in the boring of hardened steel.
- Achieves high-precision cutting edge positioning thanks to the newly-developed clamp mechanism
- Expands the range of small hole boring to achieve more high-efficiency machining requiring no grinding.
- Brazed BSME: Applicable to bore diameters ranging from ø2.5 to 5.0mm
- SEXC with indexable insert: Applicable to bore diameters ranging from ø4.0 to 6.0mm

SUMIBORON

BSME
General/Facing

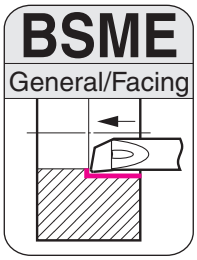


Fig. 1

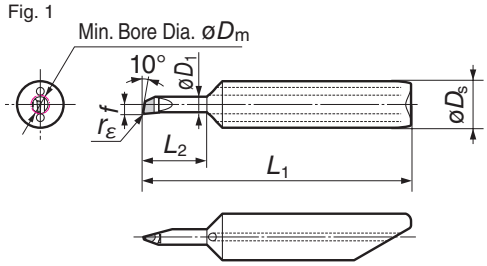
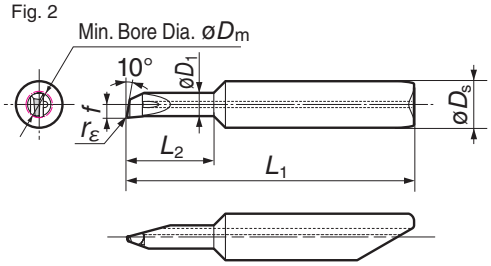


Fig. 2

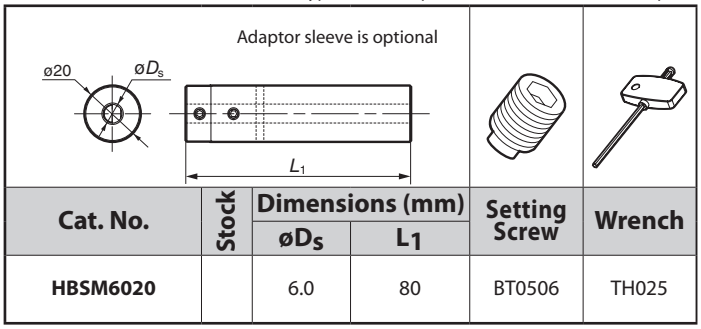


■ Brazed Boring Bar

Cat. No.	Stock		Min. Bore Dia.	Dimensions (mm)						Fig.	Applicable Sleeve
	BN2000		øDm	øDs	øD1	L1	f	L2	O		
	R	L									
BSME R/L25020D2S6			2.5	6.0	2.0	32.0	1.20	5.3	0.2	1	HBSM6020
BSME R/L25020D3S6			2.5	6.0	2.0	34.5	1.20	7.8	0.2		
BSME R/L25020D4S6			2.5	6.0	2.0	37.0	1.20	10.3	0.2		
BSME R/L30020D2S6			3.0	6.0	2.5	32.8	1.45	6.3	0.2	2	
BSME R/L30020D3S6			3.0	6.0	2.5	35.8	1.45	9.3	0.2		
BSME R/L30020D4S6			3.0	6.0	2.5	38.8	1.45	12.3	0.2		
BSME R/L35020D2S6			3.5	6.0	3.0	33.5	1.70	7.3	0.2		
BSME R/L35020D3S6			3.5	6.0	3.0	37.0	1.70	10.8	0.2		
BSME R/L35020D4S6			3.5	6.0	3.0	40.5	1.70	14.3	0.2		
BSME R/L40020D2S6			4.0	6.0	3.5	33.9	1.95	8.3	0.2		
BSME R/L40020D3S6			4.0	6.0	3.5	37.9	1.95	12.3	0.2		
BSME R/L40020D4S6			4.0	6.0	3.5	41.9	1.95	16.3	0.2		
BSME R/L45020D2S6			4.5	6.0	4.0	35.0	2.20	9.3	0.2		
BSME R/L45020D3S6			4.5	6.0	4.0	39.5	2.20	13.8	0.2		
BSME R/L45020D4S6			4.5	6.0	4.0	44.0	2.20	18.3	0.2		
BSME R/L50020D2S6			5.0	6.0	4.5	35.8	2.45	10.3	0.2		
BSME R/L50020D3S6			5.0	6.0	4.5	40.8	2.45	15.3	0.2		
BSME R/L50020D4S6			5.0	6.0	4.5	45.8	2.45	20.3	0.2		

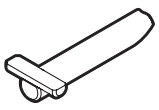
■ Adaptor Sleeve

The BSME Type needs adapter sleeve HBSM6020 (sold separately).



Cat. No.	Stock	Dimensions (mm)		Setting Screw	Wrench
		øDs	L1		
HBSM6020		6.0	80	BT0506	TH025

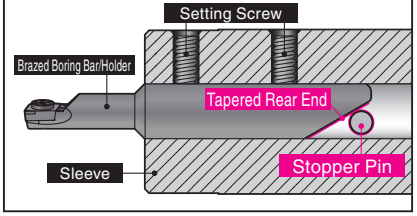
■ Alignment Jig*



Cat. No.	Stock
AFBSM60	

■ Newly Developed Clamp Mechanism

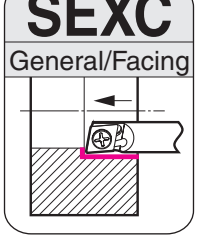
Achieving high-precision cutting edge positioning with a combination of a tapered ended tool/holder and a sleeve with an internal stopper pin. (Common to BSME and SEXC Types.)

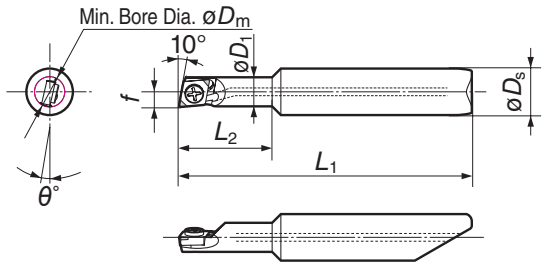


* This jig is used for centering sleeves when setting them into holders.

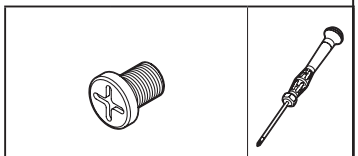
SUMIBORON

SEXC
General/Facing





■ Spare Parts

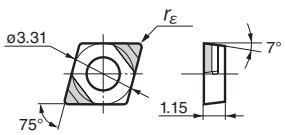


■ Holder

Cat. No.	Stock R	Stock L	Min. Bore Dia. øDm	Dimensions (mm) øDs	øD1	L1	f	L2	rε	Sleeve	Clamp Bolt	Recommended Tightening Torque (N•m)	Wrench
E06D2-SEXC R/L03-04P			4.0	6.0	3.75	33.75	1.95	8	-13	HBSM6020	MIB1.6-2	0.2	SDBSM
E06D3-SEXC R/L03-04P			4.0	6.0	3.75	37.75	1.95	12	-13				
E06D2-SEXC R/L03-05P			5.0	6.0	4.75	35.25	2.45	10	-12		MIB1.6-2.5		
E06D3-SEXC R/L03-05P			5.0	6.0	4.75	40.25	2.45	15	-12				
E06D2-SEXC R/L03-06P			6.0	6.0	5.75	36.75	2.95	12	-11		MIB1.6-3		
E06D3-SEXC R/L03-06P			6.0	6.0	5.75	42.75	2.95	18	-11				

The SEXC Type needs adapter sleeve HBSM6020 (sold separately).

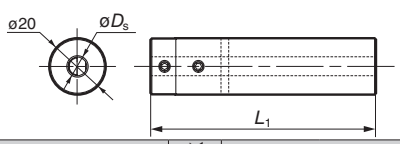
■ Insert

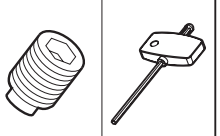


Cat. No.	Stock BN2000	Stock BN7000	Dimensions (mm) Nose Radius U
2NU-ECXA 030X02LE			0.2
2NU-ECXA 030X02LF			0.2

LE: Honed Edge, LF: Sharp Edge

■ Adaptor Sleeve

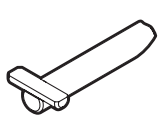




Cat. No.	Stock	Dimensions (mm) øDs	L1	Setting Screw	Wrench
HBSM6020		6.0	80	BT0506	TH025

Adaptor sleeve is optional

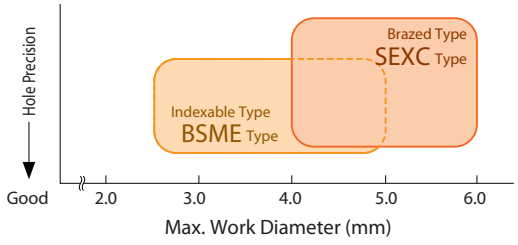
■ Alignment Jig*



Cat. No.	Stock
AFBSM60	

* This jig is used for centering sleeves when setting them into holders.

■ Application Range



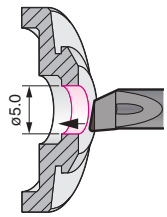
■ Recommended Cutting Conditions

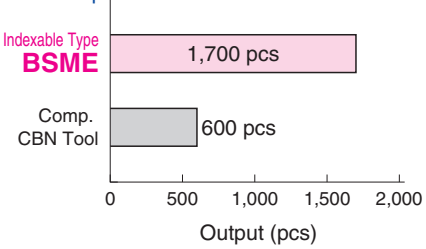
Spindle Speed *n*	Above 2,000min^{-1}	May cause chattering or chipping at the cutting edge in low-speed machining.
Depth-of-cut a_p	0.01 to 0.15mm	Excessive cutting depth causes deformation of the tool, which consequently leads to dimensional accuracy deterioration.
Feed Rate *f*	0.01 to 0.10mm/rev	–

■ Application Example

Hardened Alloy Steel Valve Component — BSME

The BSME type provides stable machining and a tool life that is over 2 times longer than our competitors' CBN tools.

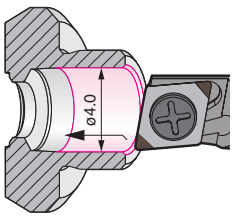


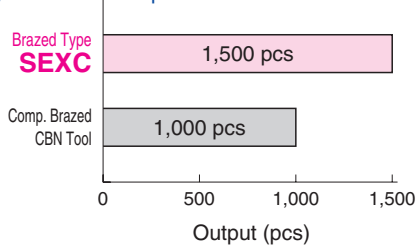


Work Material : Hardened Alloy Steel Valve Component (Automotive Component)
Tool : BSME R50020D2S6 Grade : BN2000
Cutting Conditions : v_c=135m/min (7,500min^{-1}) f=0.02mm/rev a_p=0.10mm Dry

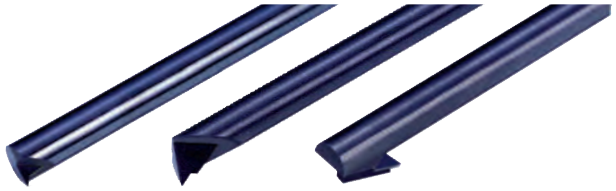
Bearing Steel Small Automotive Component — SEXC

The SEXC type provides drastically reduced tool costs and a tool life that is 1.5 times longer than our competitors' brazed CBN tools.



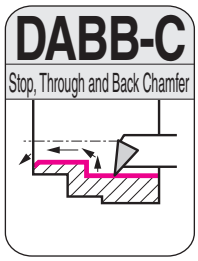


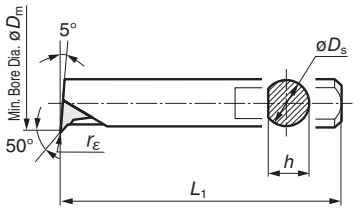
Work Material : Bearing Steel Small Automotive Component (60HRC)
Holder : E06D2-SEXC R/L03-04P Insert : 2NU-ECXA 030X02LF (BN2000)
Cutting Conditions : v_c=50m/min (4,000min^{-1}) f=0.02mm/rev a_p=0.02mm Wet



SUMIDIA

DABB-C
Stop, Through and Back Chamfer

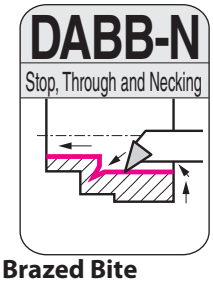


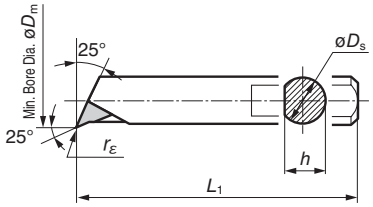


■ **Brazed Bite**

Cat. No.	Stock	Min. Bore Dia.	Dimensions (mm)				Applicable Sleeve
	DA2200	øDm	øDs	h	L1	rε	
DABB 025CR	★	3.0	2.5	2.2	60	0.1	HBB 2516
DABB 035CR	★	4.0	3.5	3.2	60	0.1	HBB 3516
DABB 045CR	★	5.0	4.5	4.1	80	0.1	HBB 4516
DABB 060CR	★	7.0	6.0	5.2	80	0.1	HBB 616

DABB-N
Stop, Through and Necking



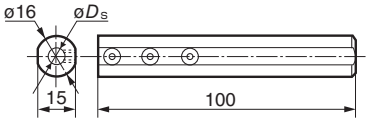


■ **Brazed Bite**

Cat. No.	Stock	Min. Bore Dia.	Dimensions (mm)				Applicable Sleeve
	DA2200	øDm	øDs	h	L1	rε	
DABB 025NR	★	3.0	2.5	2.2	60	0.1	HBB 2516
DABB 035NR	★	4.0	3.5	3.2	60	0.1	HBB 3516
DABB 045NR	★	5.0	4.5	4.1	80	0.1	HBB 4516
DABB 060NR	★	7.0	6.0	5.2	80	0.1	HBB 616

■ **Spare Parts**

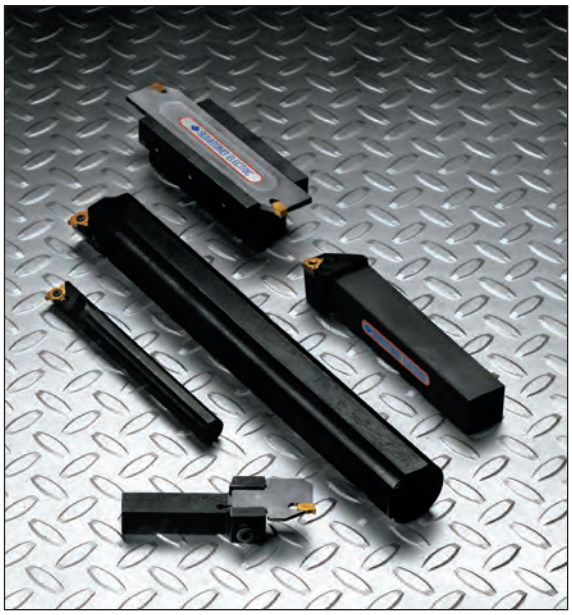
■ **Adaptor Sleeve**



Cat. No.	Stock	øDs (mm)	 Setting Screw	 (For Hexagonal Holes) Wrench
HBB 2516	★	2.5	BT 0404	TH 020
HBB 3516	★	3.5		
HBB 4516	★	4.5		
HBB 616	★	6.0		

Grooving & Cut-Off Toolholders

Pages 139 - 148

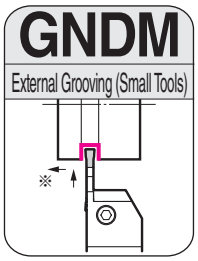


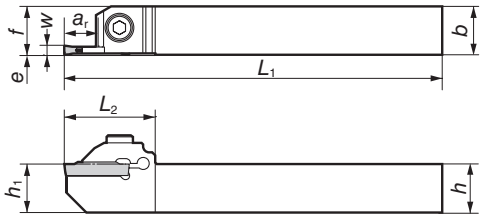
THREADING, GROOVING, & CUT-OFF **PAGES**

Grooving

Series: GNDM • GNDL Type

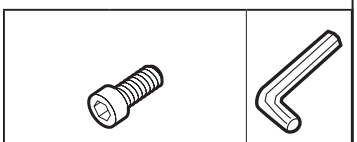
External Multi-purpose Small Tools Type (Grooving, Turning & Copying)





Above figures show right hand tools

■ **Spare Parts**



■ **Holder**

Cat. No.	Stock		Dimensions (mm)						Grooving Width	Max. Grooving Depth(mm)	Gage Insert	Cap Screw	Recommended Tightening Torque (N•m)	Wrench
	R	L	h	b	L_1	f	L_2	e	W	a_r				
GNDM R/L1616JX-1.510	★	★	16	16	120	(16)	8	0	1.5	10	GCM N150005-GF	BX0515	4.0	LH040
GNDM R/L1616JX-212	★	★	16	16	120	(16)	12	0	2.0	12	GCM □20○○-□□			
GNDM R/L1616JX-312	★	★	16	16	120	(16)	10	0	3.0	12	GCM □30○○-□□			

External Grooving / Cut-Off Small Tools

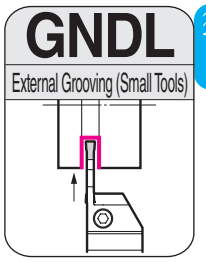


Fig. 1

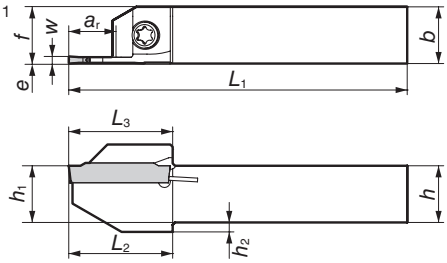
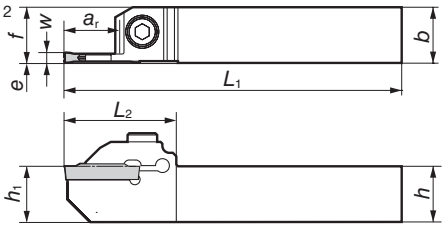


Fig. 2



Above figures show right hand tools

■ **Spare Parts**

■ **Holder**

Select holders & inserts with same grooving widths (w).

Cat. No.	Stock		Dimensions (mm)									Grooving Width	Max. Grooving Depth(mm)	Gage Insert	Fig.	Cap Screw	Recommended Tightening Torque (N•m)	Wrench
	R	L	h	b	L_1	f	h_1	h_2	L_2	L_3	e	W	a_r					
GNDL R/L1010JX-1.2510	★	★	10	10	120	(10)	10	2.0	18	18.3	0	1.25	10.0	GCM N125005-GF	1	BFTX0412N	3.0	LT15-10
GNDL R/L1010JX-1.510	★	★	10	10	120	(10)	10	2.0	18	18.3	0	1.50	10.0	GCM N150005-GF				
GNDL R/L1010JX-210	★	★	10	10	120	(10)	10	2.0	22	22.3	0	2.00	10.0	GCM □20○○-□□				
GNDL R/L1010JX-310	★	★	10	10	120	(10)	10	2.0	22	22.3	0	3.00	10.0	GCM □30○○-□□				
GNDL R/L1212JX-1.2512	★	★	12	12	120	(12)	12	2.0	19	19.3	0	1.25	12.0	GCM N125005-GF	1	BFTX0412N	4.0	LT15-10
GNDL R/L1212JX-1.512	★	★	12	12	120	(12)	12	2.0	19	19.3	0	1.50	12.0	GCM N150005-GF				
GNDL R/L1212JX-212.5	★	★	12	12	120	(12)	12	2.0	22	22.3	0	2.00	12.5	GCM □20○○-□□				
GNDL R/L1212JX-312.5	★	★	12	12	120	(12)	12	2.0	22	22.3	0	3.00	12.5	GCM □30○○-□□				
GNDL R/L1616JX-1.512.5	★	★	16	16	120	(16)	16	-	32	-	0	1.50	12.5	GCM N150005-GF	2	BX0515	4.0	LH040
GNDL R/L1616JX-216	★	★	16	16	120	(16)	16	-	32	-	0	2.00	16.0	GCM □20○○-□□				
GNDL R/L1616JX-316	★	★	16	16	120	(16)	16	-	32	-	0	3.00	16.0	GCM □30○○-□□				

Work Material	Carbon Steel/ Alloy Steel			Stainless Steel			Cast Iron			Exotic Alloy	
Grade	AC830P	AC520U	AC530U	AC830P	AC520U	AC530U	AC425K	AC520U	AC530U	AC520U	AC530U
Cutting Speed Vc (m/min)	80-200	80-200	50-200	70-150	70-150	50-150	80-200	60-200	50-200	20-80	20-60

	Breaker	Feed Rate (mm/rev)						
		MG	ML	GG	GL	GF	RG	CG
Grooving/ Cut-off Grooving Widths W(mm)	1.25	-	-	-	-	0.01-0.08	-	-
	1.5	-	-	-	-	0.02-0.10	-	-
	2.0	-	-	0.05-0.25	0.03-0.15	0.03-0.12	-	0.05-0.20
	3.0	0.08-0.20	0.03-0.15	0.10-0.30	0.05-0.18	0.05-0.15	0.05-0.15	0.08-0.25
	4.0	0.10-0.25	0.05-0.20	0.15-0.35	0.08-0.22	0.05-0.18	0.05-0.18	0.10-0.30
	5.0	0.12-0.30	0.08-0.25	0.20-0.40	0.10-0.25	0.08-0.20	0.08-0.20	-
	6.0	0.15-0.35	0.10-0.30	0.20-0.40	0.12-0.25	0.10-0.25	0.20-0.30	-

	Breaker	MG		ML		RG	
		Feed Rate f (mm/rev)	Depth of Cut a_p (mm)	Feed Rate f (mm/rev)	Depth of Cut a_p (mm)	Feed Rate f (mm/rev)	Depth of Cut a_p (mm)
Turning Grooving Widths W(mm)	3.0	0.08 - 0.25	0.4 - 1.5	0.05 - 0.18	0.3 - 1.5	0.10 - 0.40	0.3 - 1.2
	4.0	0.10 - 0.30	0.5 - 2.0	0.05 - 0.20	.4 - 2.0	0.15 - 0.45	0.6 - 1.6
	5.0	0.12 - 0.35	0.8 - 2.5	0.08 - 0.25	0.5 - 2.5	0.20 - 0.50	0.8 - 2.0
	6.0	0.15 - 0.40	1.0 - 3.0	0.10 - 0.30	0.5 - 3.0	0.30 - 0.60	1.0 - 2.2

Fig. 1

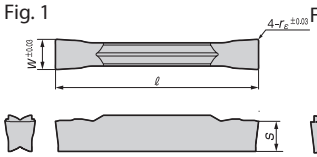
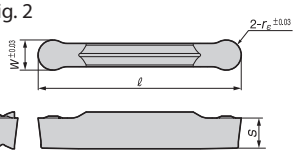


Fig. 2



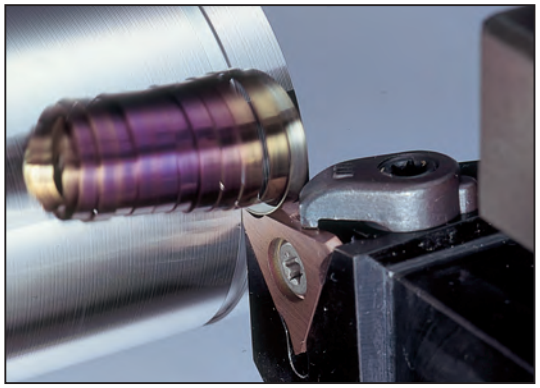
Type		Cat. No.	Coated Carbide								Dimensions (inch)					Fig.
			S				P		K		W	rε	ℓ	Seat	S	
			AC520U		AC530U		AC830P		AC425K							
Light Cutting	GF Type	GCMN125005-GF			★						.049	.0020	.685	1.25	.126	1
		GCMN150005-GF			★						.059	.0020	.685	1.5	.146	
Deep Grooving Cut Off	General Feed GG Type	GCMN2002-GG	●		●		●		●		.078	.0078	.831	2	.142	
		GCMN2094R0.5-GG	●		●		●		●		.094	.0078	.831	2	.142	
		GCMN3002-GG	●		●		●		●		.118	.0078	.831	3	.150	
		GCMN3004-GG	●		●		●		●		.118	.0156	.831	3	.150	
		GCMN3125R0.5-GG	●		●		●		●		.125	.0078	.831	3	.150	
	Low Feed GL Type	GCMN2002-GL	●		●		●		●		.078	.0078	.831	2	.142	
		GCMN2094R0.5-GL	●		●		●		●		.094	.0078	.831	2	.142	
		GCMN3002-GL	●		●		●		●		.118	.0078	.831	3	.150	
		GCMN3125R0.5-GL	●		●		●		●		.125	.0078	.831	3	.150	
Multi function (traversing)	General Feed MG Type	GCMN3004-MG	●		●		●		●		.118	.0156	.831	3	.150	
		GCMN3125R1.0-MG	●		●		●		●		.125	.0156	.831	3	.150	
	Low Feed ML Type	GCMN3002-ML	●		●		●		●		.118	.0078	.831	3	.150	
		GCMN3125R0.5-ML	●		●		●		●		.125	.0078	.831	3	.150	
Profiling	General Feed RG Type	GCMN3015-RG	●		●		●		●		.118	.059	.831	3	.150	2
		GCMN3125-RG	●		●		●		●		.125	.0625	.831	3	.150	

Type		Cat. No.	Coated Carbide								Dimensions (inch)					Fig.
			S				P		K		W	rε	ℓ	Seat	S	
			AC520U		AC530U		AC830P		AC425K							
			R	L	R	L	R	L	R	L						
Cut-off (Handed)	CG-05 Type	GCM_2002-CG-05	●	●	●	●	●	●	●	●	.078	.0078	.831	2	.142	1
		GCM_3002-CG-05	●	●	●	●	●	●	●	●	.118	.0078	.831	3	.150	

★: Worldwide Warehouse Item

Grooving

Series: GWC Type



Characteristics of GWC Series

- Similar insert can be use for both external and internal grooving
- Full range of insert grades to cover a wide range of work materials available:
  - Coated Carbide: AC530U
  - Uncoated Carbide: H1
  - Coated Cermet: T3000Z
  - Cermet :T1500A/T1200A
  - SUMIBORON: BN2000/BN250
  - SUMIDIA: DA2200
- A wide variation of grooving widths from 0.33mm to 4.8mm
- Insert with Chipbreaker, SumiTurn B-Groove, are now stocked
- Customers can modify the grooving width, nose radius and rake angle according to their own requirements using the grooving insert blanks (* Sumitomo Electric Hardmetal also accepts special orders.)

External Shallow Grooves

GWC
External Grooving

External

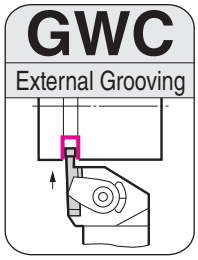


Fig. 1

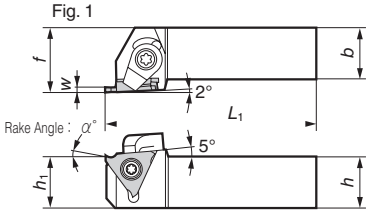


Fig. 2

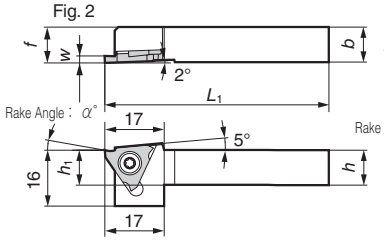
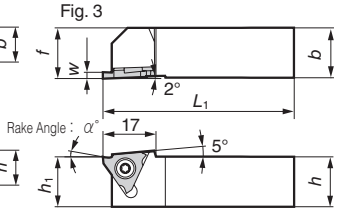


Fig. 3



Note 1: Refer to insert table on F5 for a° dimensions.
Note 2: Figures show right hand tools.

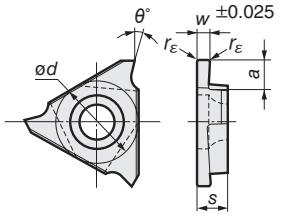
■ Spare Parts

■ Holders Right handed holders are applicable with right handed inserts.

Cat. No.	Stock		Dimensions (mm)					Fig.	Grooving Width (mm)	Max. Grooving Depth (mm)	* Group No.	Screw	Recommended Tightening Torque (N•m)	Spanner	Clamp	Double Screw	Spanner
	R	L	h	b	L_1	f	h_1		w								
GWC R/L1010-3	★	★	10	10	125	10	10	2	0.33 to 2.80	0.8 to 2.5	1	BFTX0409N	3.4	TRX15	-	-	-
GWC R/L1212-3	★	★	12	12	125	12	12	2	0.33 to 2.80	0.8 to 2.5	1						
GWC R/L1616-3	★	★	16	16	125	16	16	3	0.33 to 2.80	0.8 to 2.5	1						
GWC R/L2020-3	★	★	20	20	125	25	20	1	0.33 to 2.80	0.8 to 2.5	1	BFTX0409N	3.4	TRX15	CCM6B L/R	WB6-20T/TL	LT20
GWC R/L2525-3	★	★	25	25	150	30	25	1	0.33 to 2.80	0.8 to 2.5	1						
GWC R/L2020-15	★	★	20	20	125	25	20	1	1.00 to 1.45	2.0	2	BFTX0511N	5.0	TRX20	CCM8U L/R	WB8-22T/TL	LT27
GWC R/L2020-25	★	★	20	20	125	25	20	1	1.50 to 2.30	3.5	3						
GWC R/L2020-35	★	★	20	20	125	25	20	1	2.50 to 4.80	5.0	4						
GWC R/L2525-15	★	★	25	25	150	30	25	1	1.00 to 1.45	2.0	2						
GWC R/L2525-25	★	★	25	25	150	30	25	1	1.50 to 2.30	3.5	3						
GWC R/L2525-35	★	★	25	25	150	30	25	1	2.50 to 4.80	5.0	4						

* Refer to pages F6, F7, and F8 for applicable TGA type inserts. Select applicable inserts for the holders by using matching group numbers.

■ Insert



Above figures show right hand tools.

Grade		Cutting Edge	P
Coated Carbide	AC530U	Honing	15°
Carbide	H1	Sharp	25°
Coated Cermet	T3000Z	Honing	15°
Cermet	T1500A	Sharp	10°
	T1200A	Sharp	10°
SUMIBORON	BN2000	Negative Land	5°
	BN250	Negative Land	5°
SUMIDIA	DA2200	Sharp	15°

* For rake angle when fitted on the holder, refer to page F5.

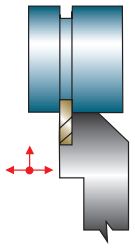
Cat. No. (Add E to the end of the Cat. No. for T1500A grades)	Coated Carbide AC530U		Carbide H1		Coated Cermet T3000Z		Cermet T1500A		SUMIBORON BN2000		SUMIDIA DA2200		Grooving Width (mm)	Max. Grooving Depth (mm)		Dimensions (mm)				* Group No.
	R	L	R	L	R	L	R	L	R	L	R	L	w	External	Internal	a	r_ε	ød	s	
TGA R/L3033(E)	★	★	★	★	★	★	★	★	★	★	★	★	0.33	0.8	0.5	1.0	0.05	9.525	3.18	1
TGA R/L3050(E)	★	★	★	★	★	★	★	★	★	★	★	★	0.50	1.2	0.8	1.4				
TGA R/L3075(E)	★	★	★	★	★	★	★	★					0.75	2.0	1.5	2.5	0.1 0.2 for T1500A/ T1200A			
TGA R/L3095(E)	★	★	★	★	★	★	★	★					0.95							
TGA R/L3100(E)	★	★	★	★	★	★	★	★					1.00							
TGA R/L3110(E)	★	★			★	★	★	★					1.10							
TGA R/L3125(E)	★	★	★	★	★	★	★	★					1.25							
TGA R/L3135(E)	★	★			★	★	★	★					1.35							
TGA R/L3145(E)	★	★	★	★	★	★	★	★					1.45							
TGA R/L3150(E)	★	★	★	★	★	★	★	★					1.50							
TGA R/L3165(E)	★	★			★	★	★	★					1.65							
TGA R/L3175(E)	★	★			★	★	★	★					1.75							
TGA R/L3185(E)	★	★	★	★	★	★	★	★					1.85							
TGA R/L3200(E)	★	★	★	★	★	★	★	★					2.00	2.5	2.0	3.0				
TGA R/L3220(E)	★	★			★	★	★	★					2.20							
TGA R/L3230(E)	★	★	★	★	★	★	★	★					2.30							
TGA R/L3250(E)	★	★	★	★	★	★	★	★					2.50							
TGA R/L3265(E)	★	★			★	★	★	★					2.65							
TGA R/L3270(E)	★	★			★	★	★	★					2.70							
TGA R/L3280(E)	★	★			★	★	★	★					2.80							
TGA R/L4125(E)	★	★	★	★	★	★	★	★	★		★		1.25	2.0	1.7	2.5	0.2 *2	12.70	4.76	2
TGA R/L4145(E)	★	★	★	★	★	★	★	★					1.45							
TGA R/L4150(E)	★	★	★	★	★	★	★	★	★		★		1.50	3.5	2.5	3.9				3
TGA R/L4165(E)	★	★			★	★	★	★					1.65							
TGA R/L4175(E)	★	★	★	★	★	★	★	★					1.75							
TGA R/L4185(E)	★	★	★	★	★	★	★	★					1.85							
TGA R/L4200(E)	★	★	★	★	★	★	★	★	★		★		2.00							
TGA R/L4220(E)	★	★			★	★	★	★					2.20							
TGA R/L4230(E)	★	★	★	★	★	★	★	★					2.30							
TGA R/L4250(E)	★	★	★	★	★	★	★	★	★		★		2.50	5.0 *1	2.5	5.4 *1	0.3 *2			4
TGA R/L4265(E)	★	★	★	★	★	★	★	★					2.65							
TGA R/L4270(E)	★	★			★	★	★	★					2.70							
TGA R/L4280(E)	★	★	★	★	★	★	★	★					2.80							
TGA R/L4300(E)	★	★	★	★	★	★	★	★	★		★		3.00							
TGA R/L4320(E)	★	★			★	★	★	★					3.20							
TGA R/L4330(E)	★	★	★	★	★	★	★	★					3.30							
TGA R/L4350(E)	★	★	★	★	★	★	★	★	★		★		3.50	5.0	2.5	5.4	0.4 *2			
TGA R/L4370(E)	★	★			★	★	★	★					3.70							
TGA R/L4390(E)	★	★			★	★	★	★					3.90							
TGA R/L4400(E)	★	★	★	★	★	★	★	★	★		★		4.00							
TGA R/L4410(E)	★	★			★	★	★	★					4.10							
TGA R/L4420(E)	★	★			★	★	★	★					4.20							
TGA R/L4430(E)	★	★	★	★	★	★	★	★					4.30							
TGA R/L4440(E)	★	★			★	★	★	★					4.40							
TGA R/L4450(E)	★	★	★	★	★	★	★	★					4.50							
TGA R/L4480(E)	★	★	★	★	★	★	★	★					4.80						5.00	

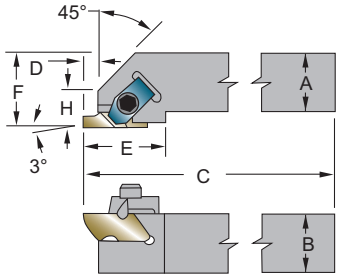
* Refer to pages F4, F5 for applicable holders GWC, GWCS and GWCI types.
Select applicable inserts for the holders by using matching group numbers.

*1: SUMIBORON, SUMIDIA is a = 4.4 (4.0)
*2: SUMIBORON is r_ε = 0.2, SUMIDIA is r_ε = 0.1

■ SUMINOTCH GROOVING TOOLHOLDERS

SS Series

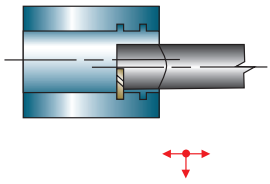


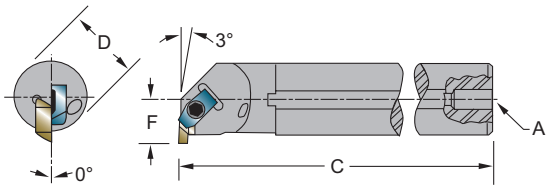


Sumitomo Cat. No.		Gage Insert		A	B	C	D	E	F	H	Right Hand Clamp	Left Hand Clamp	Clamp Screw
Right Hand	Left Hand	R.H.	L.H.										
SSR-82V	SSL-82V	SG-2R	SG-2L	.500	.500	3.500	.140	1.25	.750	.50	TF-74	TF-75	S-310
SSR-102B	SSL-102B	SG-2R	SG-2L	.625	.625	4.500	.140	1.25	1.000	.50	TF-74	TF-75	S-310
SSR-122B	SSL-122B	SG-2R	SG-2L	.750	.750	4.500	.140	1.25	1.000	.50	TF-74	TF-75	S-310
SSR-162C	SSL-162C	SG-2R	SG-2L	1.000	1.000	5.000	.140	1.25	1.250	.50	TF-74	TF-75	S-310
SSR-123A	SSL-123A	SG-3R	SG-3L	.750	.750	4.000	.210	1.25	1.000	.50	TF72	TF-73	S-412
SSR-123B	SSL-123B	SG-3R	SG-3L	.750	.750	4.500	.210	1.25	1.000	.50	TF72	TF-73	S-412
SSR-163C	SSL-163C	SG-3R	SG-3L	1.000	1.000	5.000	.210	1.25	1.250	.50	TF72	TF-73	S-412
SSR-163D	SSL-163D	SG-3R	SG-3L	1.000	1.000	6.000	.210	1.25	1.250	.50	TF72	TF-73	S-412
SSR-853D	SSL-853D	SG-3R	SG-3L	1.000	1.250	6.000	.210	1.25	1.500	.50	TF72	TF-73	S-412
SSR-203D	SSL-203D	SG-3R	SG-3L	1.250	1.250	6.000	.210	1.25	1.500	.50	TF72	TF-73	S-412

■ SUMINOTCH GROOVING BORING BARS

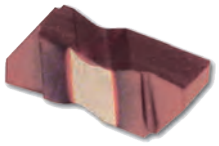
A-SE Series

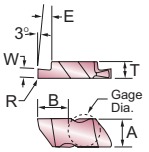




Sumitomo Cat. No.		Gage Insert		D	C	F	Min. Bore	A	Right Hand Clamp	Left Hand Clamp	Clamp Screw
Right Hand	Left Hand	R.H.	L.H.								
A08-SER2	A08-SEL2	SG-2R	SG-2L	.500	8.000	.437	0.730	1/4-18 NPT	TF-74	TF-75	S-310
A10-SER2	A10-SEL2	SG-2R	SG-2L	.625	10.000	.500	1.000	1/4-18 NPT	TF-74	TF-75	S-310
A12-SER2	A12-SEL2	SG-2R	SG-2L	.750	10.000	.562	1.125	1/4-18 NPT	TF-74	TF-75	S-310
A16-SER2	A16-SEL2	SG-2R	SG-2L	1.000	12.000	.688	1.375	1/4-18 NPT	TF-74	TF-75	S-310
A16-SER3	A16-SEL3	SG-3R	SG-3L	1.000	12.000	.688	1.375	1/4-18 NPT	TF72	TF-73	S-412
A20-SER3	A20-SEL3	SG-3R	SG-3L	1.250	14.000	.875	1.750	1/4-18 NPT	TF72	TF-73	S-412
A24-SER3	A24-SEL3	SG-3R	SG-3L	1.500	14.000	1.000	2.000	1/4-18 NPT	TF72	TF-73	S-412

Note: Right-hand boring bars use left-hand inserts. Left-hand boring bars use right-hand inserts.





- ● USA Stocked Item
- ★ Worldwide Warehouse Item
- ▲ USA Limited Availability Item

SUMINOTCH GROOVING INSERTS

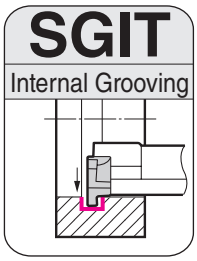
Left				Dimensions (in)							Right			
	Coated	CBN										Coated	CBN	
SG	EH520V	BN250	BN350	W ±.001	R	E ±.001	T	A	B	Gage Dia.	SG	EH520V	BN250	BN350
SG-2031L	●			.031	.002/.005	.050					SG-2031R	●		
SG-2041L	●			.041	.002/.005	.050					SG-2041R	●		
SG-2047L	●			.047	.002/.005	.050					SG-2047R	●		
SG-2058L	●			.058	.005/.010	.050	.150	.219	.2700	.1875	SG-2058R	●		
SG-2062L	●			.062	.005/.010	.110					SG-2062R	●		
SG-2094L	●			.094	.005/.010	.110					SG-2094R	●		
SG-2125L	●			.125	.005/.010	.110					SG-2125R	●		
SG-3047L	●			.047	.005/.010	.120					SG-3047R	●	●	●
SG-3062L	●	●	●	.062	.005/.010	.120					SG-3062R	●	●	●
SG-3072L	●			.072	.005/.010	.120					SG-3072R	●		
SG-3088L	●			.088	.005/.010	.180					SG-3088R	●		
SG-3094L	●	●	●	.094	.005/.010	.180					SG-3094R	●	●	●
SG-3097L	●			.097	.005/.010	.180					SG-3097R	●		
SG-3105L	●			.105	.005/.010	.180					SG-3105R	●		
SG-3110L	●			.110	.005/.010	.180	.195	.344	.4050	.3750	SG-3110R	●		
SG-3122L	●			.122	.005/.010	.180					SG-3122R	●		
SG-3125L	●	●	●	.125	.005/.010	.180					SG-3125R	●	●	●
SG-3142L	●			.142	.005/.010	.180					SG-3142R	●		
SG-3156L	●			.156	.005/.010	.180					SG-3156R	●		
SG-3178L	●			.178	.005/.010	.180					SG-3178R	●		
SG-3185L	●			.185	.020/.025	.180					SG-3185R	●		
SG-3189L	●			.189	.020/.025	.180					SG-3189R	●		●

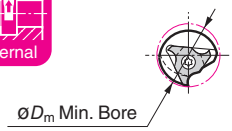
Left		Dimensions (in)							Right	
	Coated									Coated
SG-CB	EH520V	W ±.001	R	E ±.001	T	A	B	Gage Dia.	SG-CB	EH520V
SG-2047L-CB	●	.047	.002/.005	.050					SG-2047R-CB	●
SG-2062L-CB	●	.062	.005/.010	.110					SG-2062R-CB	●
SG-2078L-CB	●	.078	.005/.010	.110	.150	.219	.2700	.1875	SG-2078R-CB	●
SG-2094L-CB	●	.094	.005/.010	.110					SG-2094R-CB	●
SG-2125L-CB	●	.125	.005/.010	.110					SG-2125R-CB	●
SG-3047L-CB	●	.047	.005/.010	.075					SG-3047R-CB	●
SG-3062L-CB	●	.062	.005/.010	.094					SG-3062R-CB	●
SG-3072L-CB	●	.072	.005/.010	.094					SG-3072R-CB	●
SG-3078L-CB	●	.088	.005/.010	.094					SG-3078R-CB	●
SG-3088L-CB	●	.094	.005/.010	.150	.195	.344	.4050	.3750	SG-3088R-CB	●
SG-3094L-CB	●	.097	.005/.010	.150					SG-3094R-CB	●
SG-3125L-CB	●	.185	.020/.025	.150					SG-3125R-CB	●
SG-3189L-CB	●	.189	.020/.025	.150					SG-3189R-CB	●

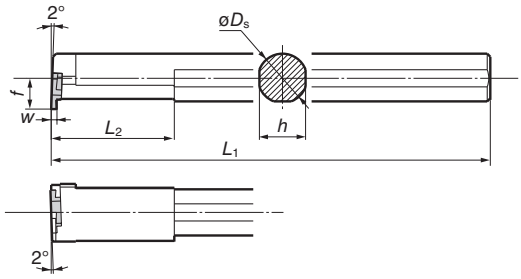
■ RECOMMENDED RUNNING CONDITIONS

Material		Speed (SFM)	Feed Rate (in/rev)
Steels	free-machining carbon alloys	450-750	.004 - .012
	plain carbon steels	400-700	
	alloy steels 190-330HB	400-700	
	alloy steels 330-450HB	350-600	
Stainless Steels	martensitic/ferritic stainless steel	250-650	.004 - .009
	austenitic stainless steel	175-700	
	gray cast iron 190-330HB	400-700	
Cast Iron	gray cast iron 330-450HB	350-600	.004 - .015
	alloy/ductile irons	250-650	
	high temp alloys 200-260HB	60-250	
High Temperature Alloys	high temp alloys 260-450HB	30-175	.003 - .008
	titanium alloys Ti 6Al-4V	90-250	
Non-Ferrous Materials	free-machining aluminum alloys	600-2500	.004 - .012
	copper/zinc/brass	300-900	
	non-metallics	350-1200	

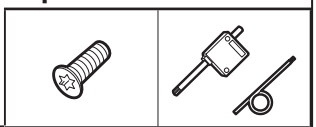
Internal Grooving







■ Spare Parts

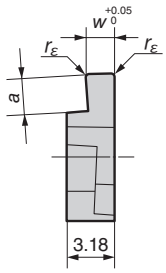


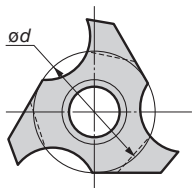
■ Holders

Cat. No.	Stock	Dimensions (mm)					Min. Bore (mm)	Grooving Width (mm)	Max. Grooving Depth (mm)	Gage Insert	Screw	Spanner
		øDs	h	L1	f	L2		w				
SGIT R08	★	8	7.0	125	5.0	20	10.0	**0.50 to 2.00**	**0.8***	GITL3SSS	BFTX02506NS	RT08
SGIT R10	★	10	9.0	150	6.0	25	12.0		**0.8***			
SGIT R12	★	12	11.0	180	7.0	30	14.0	**1.00 to 2.00**	**1.8**	GITL5SSS	BFTX0307NS	RT10
SGIT R14	★	14	13.0	180	8.0	35	16.0		**1.8**			
SGIT R16	★	16	15.0	200	10.0	40	20.0	**1.50 to 2.00**	**2.8**	GITL6SSS		
SGIT R20	★	20	19.0	200	12.0	40	25.0		**2.8**			

*Maximum grooving depth is 0.5mm when GITL3050 is set.

■ Inserts





Cat. No.	Coated Carbide	Dimensions (mm)				Holder
	ACZ150	w	a	rε	ød	
GIT L3050	★	**0.50**	1.2	0.05	5.56	SGIT R08 SGIT R10
GIT L3065	★	**0.65**	1.2	0.05	5.56	
GIT L3075	★	**0.75**	1.2	0.05	5.56	
GIT L3100	★	**1.00**	1.2	0.05	5.56	
GIT L3125	★	**1.25**	1.2	0.20	5.56	
GIT L3145	★	**1.45**	1.2	0.20	5.56	
GIT L3150	★	**1.50**	1.2	0.05	5.56	
GIT L3200	★	**2.00**	1.2	0.10	5.56	
GIT L5100	★	**1.00**	2.2	0.05	7.94	SGIT R12 SGIT R14
GIT L5145	★	**1.45**	2.2	0.20	7.94	
GIT L5150	★	**1.50**	2.2	0.05	7.94	
GIT L5175	★	**1.75**	2.2	0.20	7.94	
GIT L5200	★	**2.00**	2.2	0.10	7.94	
GIT L6150	★	**1.50**	3.2	0.20	9.525	SGIT R16 SGIT R20
GIT L6175	★	**1.75**	3.2	0.20	9.525	
GIT L6200	★	**2.00**	3.2	0.20	9.525	

Cut-Off Tools

Series: SCT Type

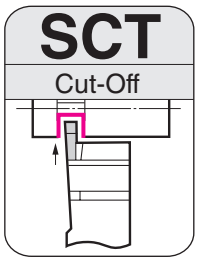


Fig.1

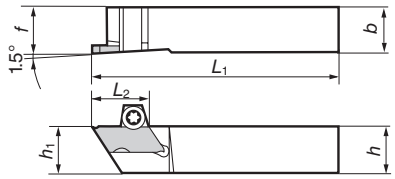
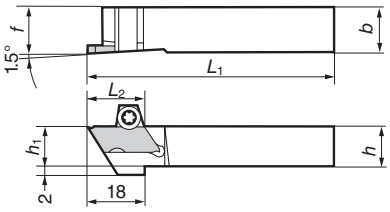
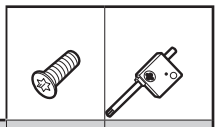


Fig.2



Above figures show right hand tools.

■ Spare Parts



■ Holders (Right Hand)

Cat. No.	Stock	Dimensions (in/mm)						Gage Insert	Fig.	Screw	Spanner
		h	b	L1	f	h1	L2				
SCTR08	●	.500	.500	6.00	.500	.500	.591	CTR12	1	BFTX0410T8L	TRX08
SCTR10	●	.625	.625	6.00	.625	.625	.591				
SCTR12	●	.750	.750	6.00	.750	.750	.591				
SCT R1010	★	10	10	120	10	10	15	CT R05○○○○(-NB) CT R12○○○○(-NB)			
SCT R1212	★	12	12	120	12	12	15				
SCT R1616	★	16	16	120	16	16	15				
SCT R1010-16	★	10	10	120	10	10	18	CT R16○○○○(-NB)	2		
SCT R1212-16	★	12	12	120	12	12	18		1		
SCT R1616-16	★	16	16	120	16	16	18				

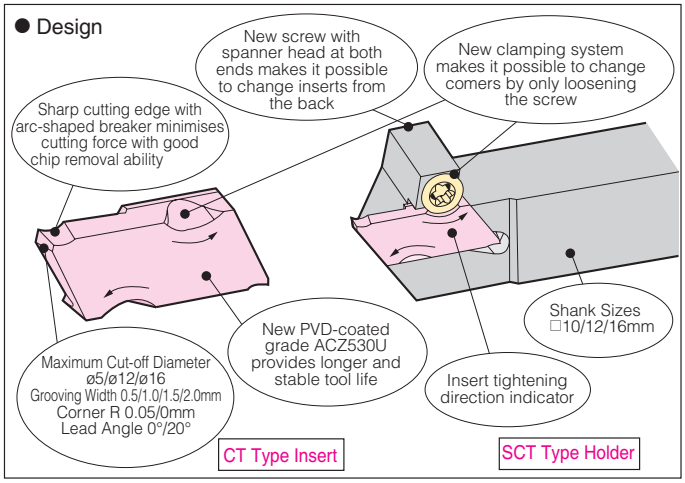
■ Holders (Left Hand)

SCTL08	●	.500	.500	6.00	.500	.500	.591	CTR12	1	BFTX0410T8R	TRX08
SCTL10	●	.625	.625	6.00	.625	.625	.591				
SCTL12	●	.750	.750	6.00	.750	.750	.591				
SCT L1010	★	10	10	120	10	10	15	CT L05○○○○(-NB) CT L12○○○○(-NB)			
SCT L1212	★	12	12	120	12	12	15				
SCT L1616	★	16	16	120	16	16	15				
SCT L1010-16	★	10	10	120	10	10	18	CT L16○○○○(-NB)	2		
SCT L1212-16	★	12	12	120	12	12	18		1		
SCT L1616-16	★	16	16	120	16	16	18				

■ Characteristics

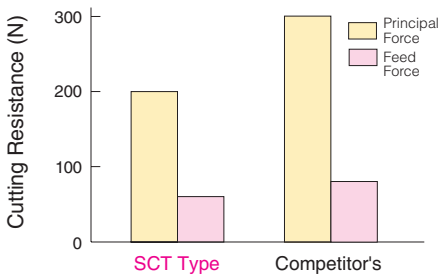
- New clamping system
  New clamping system makes it possible to change corners by only loosening the screw from the back.
- High quality surface finish
  Excellent chip removal with good surface finish even at the centre of the end face.
- Stable and long tool life
  PVD-coated grade AC530U provides stability and longer tool life.

● Design



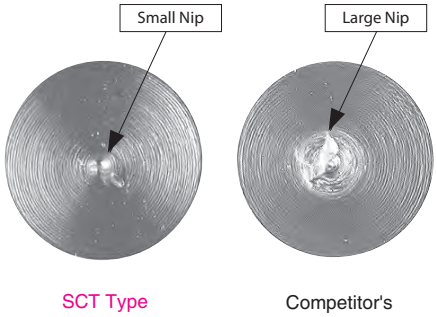
■ Comparison Test

● Wear Resistance



Work Material: S45C (ø10mm) Grooving Width: 1.5mm
V_c=60m/min f=0.06mm/rev Wet

● Surface Finish Comparison

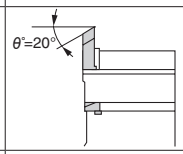
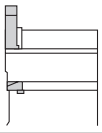
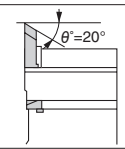
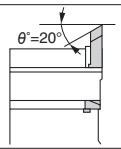
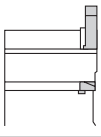
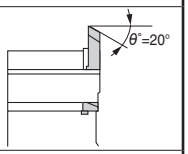
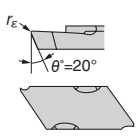
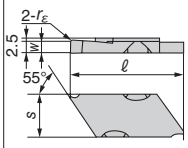
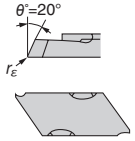
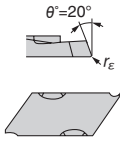
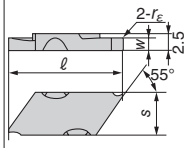
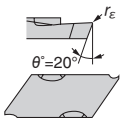


Work Material: SUS430 (ø8mm) Grooving Width: 1.0mm (handed)
V_c=45m/min f=0.02mm/rev Wet

Cut-Off Tools

Series: SCT Type

■ Insert and Holder Variations (Figures below show inserts with chipbreaker)

Holder Style	SCTR			SCTL		
Insert	CTRSSR	CTRSSN	CTRSSL	CTLSSR	CTLSSN	CTLSSL
Orientation						
Insert Shape & Dimensions						

■ Inserts (For Right-handed Holders)

Cat. No.	Coated Carbide AC530U			Max. Cut-off Diameter (mm)	Dimensions (mm)				Chipbreaker	Toolholder
	R	N	L		w	r_ε	L	s		
CTR 050505 R/N/L	★	★	★	5	0.5	0.05	19	7	Yes	SCT R1010 SCT R1212 SCT R1616
CTR 050500 R/N/L	★	★		5		0				
CTR 121005 R/N/L	★	★	★	12	1.0	0.05				
CTR 121505 R/N/L	★	★	★	12	1.5					
CTR 122005 R/N/L	★	★		12	2.0					
CTR 121000 R/N/L	★	★		12	1.0	0				
CTR 121500 R/N/L	★	★		12	1.5					
CTR 122000 R/N/L	★	★		12	2.0					
CTR 161005 R/N/L				16	1.0	0.05	23.1	8.3		SCT R1010-16 SCT R1212-16 SCT R1616-16
CTR 161505 R/N/L	★	★		16	1.5					
CTR 162005 R/N/L	★	★	★	16	2.0					
CTR 161000 R/N/L				16	1.0	0				
CTR 161500 R/N/L	★	★		16	1.5					
CTR 162000 R/N/L	★	★	★	16	2.0					
CTR 050500 R/N/L-NB				5	0.5	0	19	7	No	SCT R1010 SCT R1212 SCT R1616
CTR 121000 R/N/L-NB	★			12	1.0					
CTR 121500 R/N/L-NB	★			12	1.5					
CTR 122000 R/N/L-NB	★			12	2.0					
CTR 161000 R/N/L-NB				16	1.0		23.1	8.3		SCT R1010-16 SCT R1212-16 SCT R1616-16
CTR 161500 R/N/L-NB				16	1.5					
CTR 162000 R/N/L-NB	★			16	2.0					

■ Inserts (For Left-handed Holders)

Cat. No.	Coated Carbide AC530U			Max. Cut-off Diameter (mm)	Dimensions (mm)				Chipbreaker	Toolholder
	R	N	L		w	r_ε	L	s		
CTL 050505 R/N/L	★	★		5	0.5	0.05	19	7	Yes	SCT L1010 SCT L1212 SCT L1616
CTL 050500 R/N/L	★	★		5		0				
CTL 121005 R/N/L	★	★	★	12	1.0	0.05				
CTL 121505 R/N/L	★	★	★	12	1.5					
CTL 122005 R/N/L	★	★		12	2.0					
CTL 121000 R/N/L	★	★		12	1.0	0				
CTL 121500 R/N/L	★	★		12	1.5					
CTL 122000 R/N/L	★	★		12	2.0					
CTL 161005 R/N/L				16	1.0	0.05	23.1	8.3		SCT L1010-16 SCT L1212-16 SCT L1616-16
CTL 161505 R/N/L	★	★		16	1.5					
CTL 162005 R/N/L	★	★	★	16	2.0					
CTL 161000 R/N/L				16	1.0	0				
CTL 161500 R/N/L	★	★		16	1.5					
CTL 162000 R/N/L	★	★		16	2.0					
CTL 050500 R/N/L-NB				5	0.5	0	19	7	No	SCT L1010 SCT L1212 SCT L1616
CTL 121000 R/N/L-NB				12	1.0					
CTL 121500 R/N/L-NB				12	1.5					
CTL 122000 R/N/L-NB				12	2.0					
CTL 161000 R/N/L-NB				16	1.0		23.1	8.3		SCT L1010-16 SCT L1212-16 SCT L1616-16
CTL 161500 R/N/L-NB				16	1.5					
CTL 162000 R/N/L-NB				16	2.0					

Solid Carbide Endmills

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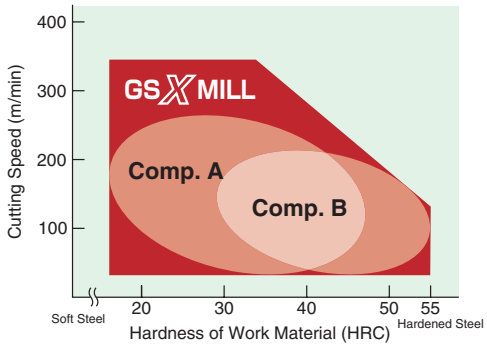
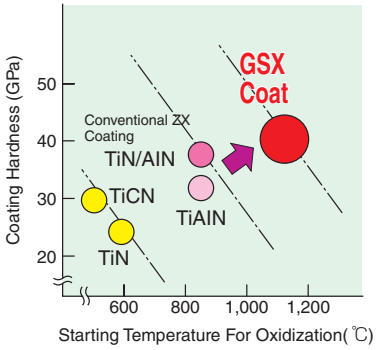
Features & Benefits

- Wide variation of three flute types and four flute lengths enable use in a wide variety of applications.
- Fine carbide substrate provides high traverse rupture strength and excellent thermal shock resistance improving reliability in wet cutting applications.
- GSX Coat provides improved reliability and longer tool life.
- Large rake angle and unique flute design improve sharpness and chip evacuation.
- Corner edge with gash land improves cutting edge strength.
- Sharper edge S type and fracture resistant C type added to the 2D size series.

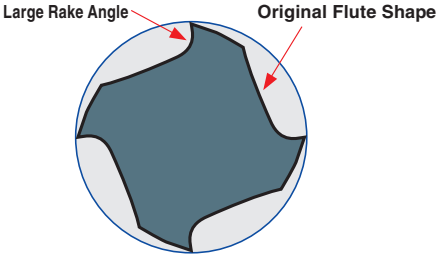
■ Wear Resistance



■ Thermal Resistance



■ Improved Chip Evacuation

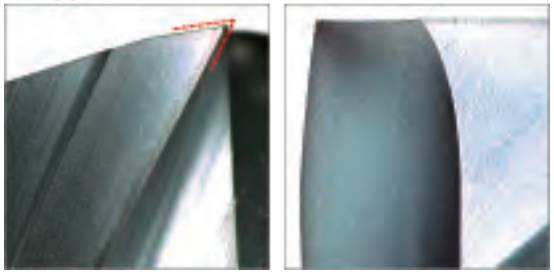


Large rake angle combined with our unique flute design improves sharpness and chip evacuation.

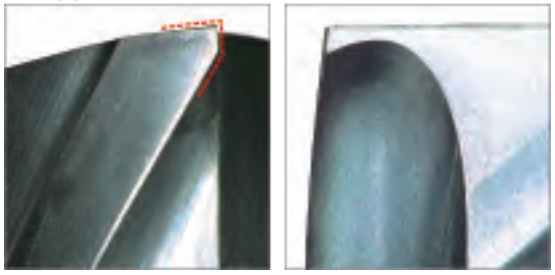
■ 2 cutting edge designs expand machining applications

Sharper edge S type and fracture resistant C type added to the 2D size series.

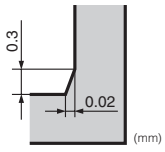
S Type Sharp Corner: Sharper Edge Design



C Type Gash Land: Fracture Resistant Design



Note: When using endmills with gash land, some material remains as shown on the right. If you need sharp corners, use the S Type.



Ex.: Corner on a ϕ10mm hole

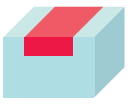
■ Application Range

◎ : Best ○ : Good Blank : Not recommended

P					H			M	S		K	N			
					Hardened Steel										
General Structure Rolled Steel	Carbon Steel	Alloy Steel	Pre-hardened Steel	Die Steel	45 to 55 HRC	55 to 60 HRC	60 HRC	Stainless Steel	Ti Alloy	Heat Resistant Alloy	Cast Iron	Al Alloy	Copper Alloy	Graphite	CFRP
○	◎	◎	◎	◎	◎ *1			◎	○	○	○				

*1 : GSXSLT30000C is recommended for 50 HRC or less.

■ Recommended Milling Examples

Application	Surface Milling		Groove Milling		Groove Finishing	
Form						
	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing
S Type		◎		○ *2		◎
C Type	◎	○	◎	◎	◎	○

S Type is best for removing inside corners

*2 : Use with small depth of cut.

■ Product Range

Application	No. of Teeth	Flute Length					
		1.5D	2D		3D		4D
		C Type	S Type	C Type	S Type	C Type	C Type
General Purpose	2	GSX20000C-1.5D φ1.0 to φφ20.0mm	Expansion GSX20000S-2D φ0.5 to φφ20.0mm	Expansion GSX20000C-2D φ0.5 to φφ25.0mm	New GSX20000S-3D φ0.5 to φφ20.0mm	GSX20000C-3D φ1.0 to φφ20.0mm	GSX20000C-4D φ1.0 to φφ20.0mm
	3	GSX30000C-1.5D φ1.0 to φφ20.0mm		GSX30000C-2D φ1.0 to φφ20.0mm			
	4	GSX40000C-1.5D φ1.0 to φφ20.0mm	Expansion GSX40000S-2D φ1.0 to φφ20.0mm	Expansion GSX40000C-2D φ1.0 to φφ25.0mm	New GSX40000S-3D φ1.0 to φφ20.0mm	GSX40000C-3D φ1.0 to φφ20.0mm	GSX40000C-4D φ1.0 to φφ20.0mm

*1 C type end cutting edge (gash land) GS MILL Series

■ High Precision

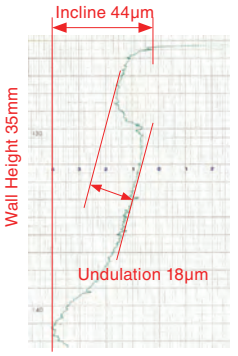
Diametrical tolerance held to 2/3 of the previous type. Also features reduced variation and does not require tool diameter correction when replacing tools.

■ Multi-Purpose

Optimized flute design of slotted 3 flute (short) type reduces cutting resistance.

1. Allows drilling, slot milling and other continuous (compound) applications.
2. Perfect for use on thin walls and small machining centres.

■ Long, High Rigidity Flutes



GSX MILL-4D

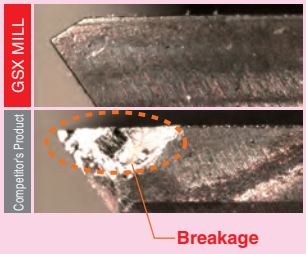
Tool Dimensions : ø10 (2 Flutes)
Work Material : S50C
Cutting Speed : 44m/min (1,400min-1)
Feed Rate : 240mm/min (0.086mm/t)

Competitor's Product

Depth-of-cut:a_p=35mm
a_e=0.1mm×25 times
Coolant : Wet
BT30 Vertical Machining Centre

■ Application Examples

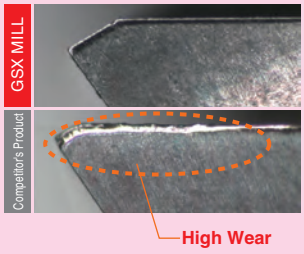
Carbon Steel Grooving with GSX20000C



Gash land for stronger cutting edge.

Tool Dimension	ϕ6 (2 Flutes)
Work Material	S50C
Cutting Speed	87m/min (4615min^{-1})
Feed Rate	553mm/min (0.06mm/t)
Depth-of-cut	a_p=3mm
	a_e=6mm
Coolant	Dry
Vertical Machining Centre	BT50

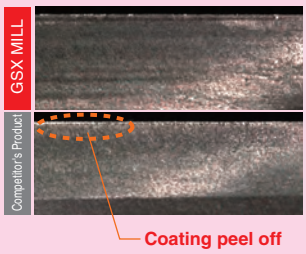
Cast Iron Grooving with GSX20000C



GSX Coat for improved wear resistance.

Tool Dimension	ϕ10(2 Flutes)
Work Material	Equivalent to FDC600
Cutting Speed	66m/min(2100min^{-1})
Feed Rate	302mm/min(0.072mm/t)
Depth-of-cut	a_p=5mm×5 passes
	a_e=10mm
Coolant	Dry
Vertical Machining Centre	BT40

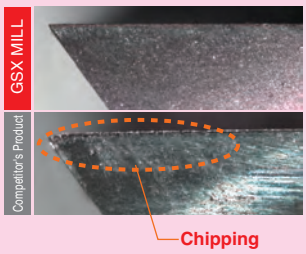
Stainless Steel Machining with GSX20000C



Improved reliability even under wet machining.

Tool Dimension	ϕ10(2 Flutes)
Work Material	SUS304
Cutting Speed	50m/min(1591min^{-1})
Feed Rate	127mm/min(0.04mm/t)
Depth-of-cut	a_p=10mm
	a_e=0.5mm
Coolant	Wet
Vertical Machining Centre	BT50

Surface Milling S50C with GSX20000S



S type delivers optimum cutting performance.

Tool Dimension	ϕ6(2 Flutes)
Work Material	S50C
Cutting Speed	87m/min(4615min^{-1})
Feed Rate	553mm/min(0.06mm/t)
Depth-of-cut	a_p=10mm
	a_e=0.3mm
Coolant	Dry
Vertical Machining Centre	BT50

GSX Series Solid Carbide Endmills

■ Recommended Milling Examples

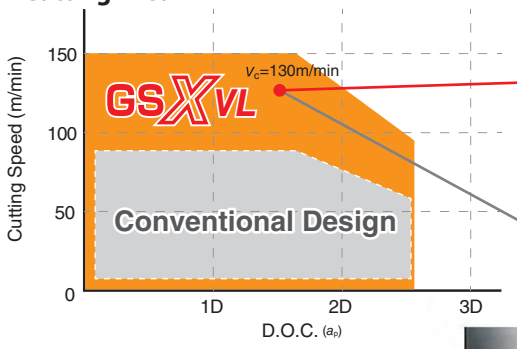
Application	Side Milling		Groove Milling		Groove Finishing	
	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing
Square Type	◎	○	◎	◎	◎	○
Radius Type	◎	○	◎	◎	◎	○

■ Diameter

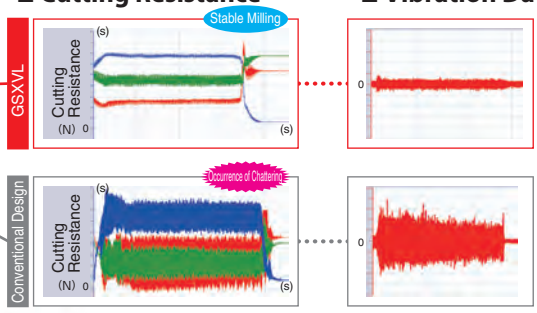
■ Drastically improved resistance to chattering and breakage

Optimization of irregular pitch and lead design drastically improve vibration and breakage resistance. Achieving high-speed, high efficiency milling by lowering cutting resistance.

■ Cutting Area



■ Cutting Resistance



■ Vibration Data

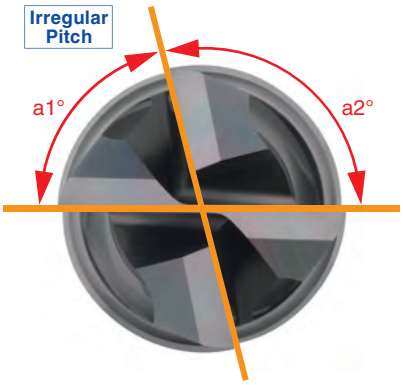
●Side Milling

Work Material: S50C Tool diameter : φ10

Cutting Conditions: n=4,100min^{-1}
v_f=1,450mm/min
a_p=15mm, a_e=2mm, Wet

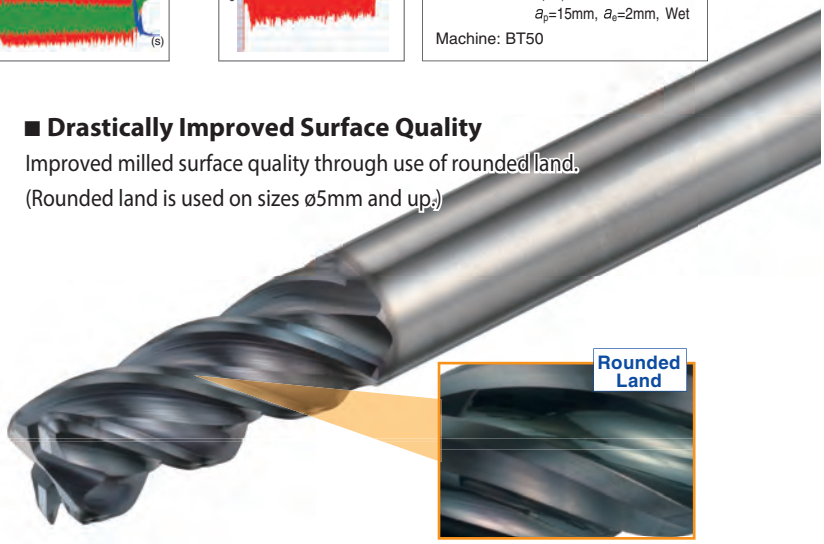
Machine: BT50

■ Irregular Pitch and Irregular Lead



■ Drastically Improved Surface Quality

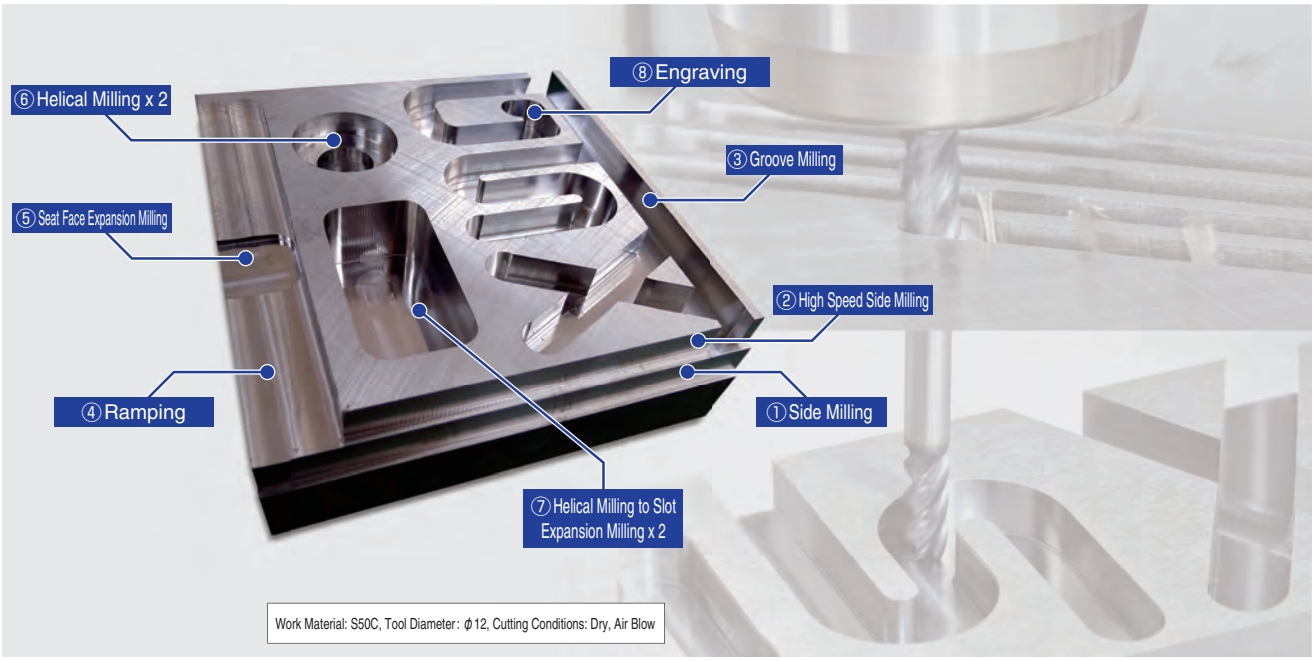
Improved milled surface quality through use of rounded land.
(Rounded land is used on sizes ø5mm and up.)



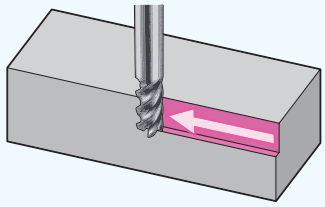
■ Application Examples (Work Material: SUS304)

Tool	Cutting Conditions	Surface Finish Quality	Enlarged Machined Surface	Surface Roughness
GSXVL Anti-vibration Type Irregular Pitch Irregular Lead φ12	n=1,200min^{-1} v_f=300mm/min a_p=18mm, a_e=1.2mm Wet	◎ Good		◎ Ideal for finishing
	n=1,300min^{-1} v_f=630mm/min a_p=18mm, a_e=1.2mm Wet	○ Surface is rough but without chattering		○ Ideal for (high feed) roughing
Competitor's Product Regular Pitch φ12	n=1,200min^{-1} v_f=300mm/min a_p=18mm, a_e=1.2mm Wet	✕ Occurrence of chattering		✕ NG due to chattering

■ Application Examples

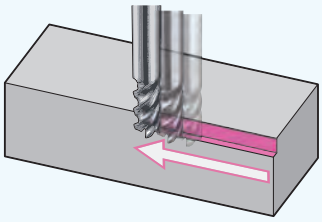


① Side Milling



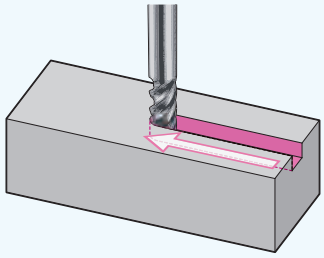
Cutting Conditions: V_c=102m/min (n=4,100min^{-1})
V_f=1,080mm/min (0.1mm/t)
a_p=24mm, a_e=2.0mm

② High Speed Side Milling



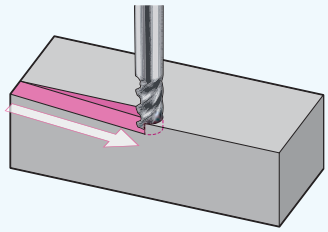
Cutting Conditions: V_c=151m/min (n=4,000min^{-1})
V_f=4,800mm/min (0.3mm/t)
a_p=12mm, a_e=2.0mm

③ Groove Milling



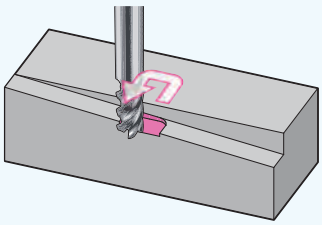
Cutting Conditions: V_c=90m/min (n=2,400min^{-1})
V_f=960mm/min (0.1mm/t)
a_p=12mm

④ Ramping



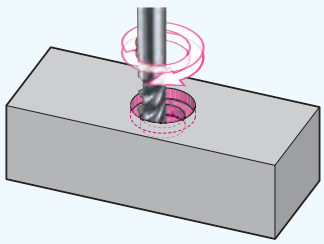
Cutting Conditions: V_c=90m/min (n=2,400min^{-1})
V_f=480mm/min (0.05mm/t)
Ramp Angle 5°

⑤ Seat Face Expansion Milling



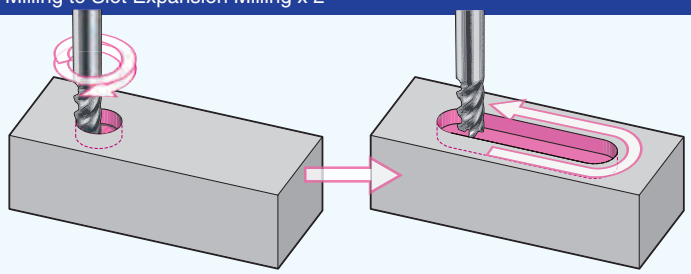
Cutting Conditions: V_c=90m/min (n=2,400min^{-1})
V_f=960mm/min (0.1mm/t)

⑥ Helical Milling x 2



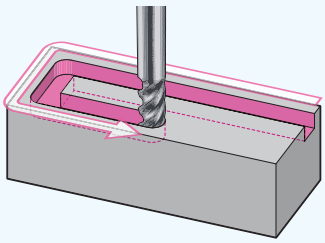
Cutting Conditions: V_c=90m/min (n=2,400min^{-1})
V_f=480mm/min (0.05mm/t)
Ramp Angle 3°

⑦ Helical Milling to Slot Expansion Milling x 2



Cutting Conditions: V_c=90m/min (n=2,400min^{-1})
[Helical] V_f=480mm/min (0.05mm/t) [Slot Expansion] V_f=672mm/min (0.07mm/t) [Finishing] V_f=1,920mm/min (0.2mm/t)
Ramp Angle 3°
a_p=24mm, a_e=0.1mm

⑧ Engraving



Cutting Conditions: V_c=79m/min (n=2,100min^{-1})
V_f=588mm/min (0.07mm/t)
a_p=12mm

GSX Series Solid Carbide Endmills

■ Recommended Milling Examples

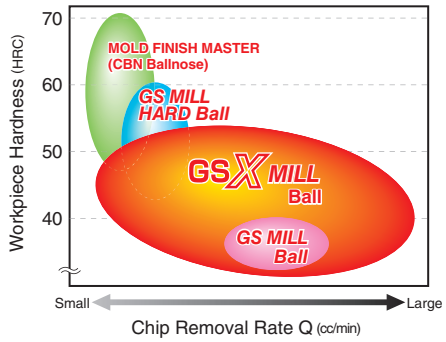
Application	Radius Milling		Copy Millimg		Pocket Millimg	
	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing
Ballnose Type	◎	◎	◎	◎	◎	◎

■ Diameter

■ Improved Thermal Resistance and Wear Resistance

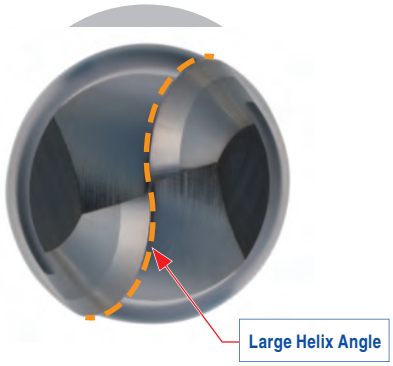
New coating combined with a fine-grained carbide substrate exhibit better thermal and wear resistance.

■ Application Range



■ Reduced Cutting Resistance

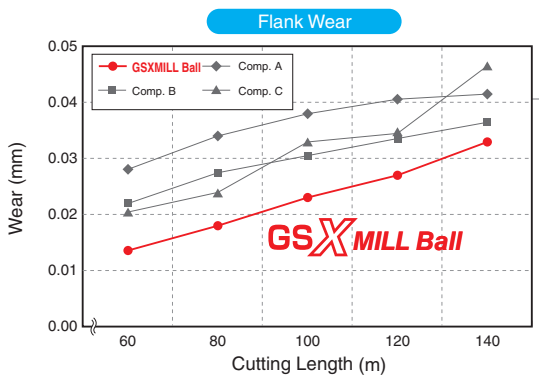
Large helix angle on cutting edge reduces cutting resistance.



■ Improved Chip Evacuation

Unique pocket design and expanded pocket area promotes better chip evacuation.

■ Application Examples

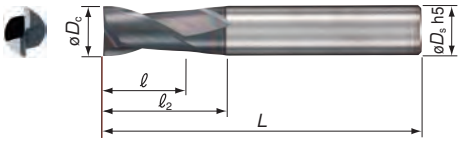


Work Material: SKD61 (50HRC)
Tool Dimensions: R3 (2 Flutes)
Cutting Conditions: v_c=179m/min(n=9,500min^{-1}), v_f=2,250mm/min(f_z=0.12mm/t)
a_p=0.2 to 1.0mm, p_f=0.3mm, Wet
Equipment: Vertical Machining Centre BT40

GSX End Mill-INCH 1.5D Gash Land

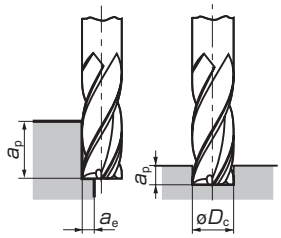
Item	Stock	Flutes	Length	Diam. (inch) φD_C	Diam. (mm) φD_C	Shank Diam. (inch) φD_S	Flute Length (inch) ℓ	Neck Length (inch) ℓ_2	OAL (inch) L	R (inch)
GSX204C-1.5D	○	2	1.5D	0.0625	*1.588*	0.1250	0.0938	0.1331	1.500	-
GSX206C-1.5D	○	2	1.5D	0.0938	*2.381*	0.1250	0.1406	0.1800	1.500	-
GSX208C-1.5D	○	2	1.5D	0.1250	*3.175*	0.1250	0.1875	-	2.000	-
GSX210C-1.5D	○	2	1.5D	0.1563	*3.969*	0.1875	0.2344	0.2934	2.000	-
GSX212C-1.5D	○	2	1.5D	0.1875	*4.763*	0.1875	0.2813	-	2.000	-
GSX214C-1.5D	○	2	1.5D	0.2188	*5.558*	0.2500	0.3282	0.407	2.000	-
GSX216C-1.5D	○	2	1.5D	0.2500	*6.350*	0.2500	0.3750	-	2.000	-
GSX218C-1.5D	○	2	1.5D	0.2813	*7.144*	0.3125	0.4219	0.501	2.500	-
GSX220C-1.5D	○	2	1.5D	0.3125	*7.938*	0.3125	0.4688	-	2.500	-
GSX224C-1.5D	○	2	1.5D	0.3750	*9.525*	0.3750	0.5625	-	3.000	-
GSX228C-1.5D	○	2	1.5D	0.4375	*11.113*	0.4375	0.6563	-	3.000	-
GSX232C-1.5D	○	2	1.5D	0.5000	*12.700*	0.5000	0.7500	-	3.000	-
GSX236C-1.5D	○	2	1.5D	0.5625	*14.288*	0.5625	0.8438	-	3.500	-
GSX240C-1.5D	○	2	1.5D	0.6250	*15.875*	0.6250	0.9375	-	3.500	-
GSX244C-1.5D	○	2	1.5D	0.6875	*17.463*	0.6875	1.0313	-	4.000	-
GSX248C-1.5D	○	2	1.5D	0.7500	*19.050*	0.7500	1.1250	-	4.000	-
GSX256C-1.5D	○	2	1.5D	0.8750	*22.225*	0.8750	1.3125	-	4.000	-
GSX264C-1.5D	○	2	1.5D	1.0000	*25.400*	1.0000	1.5000	-	4.000	-

○ - Items Available 4th Quarter 2015



■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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.



■ Endmill Identification (GSX MILL Series Only)

GSX 2 04 C - 1.5D

1	2	3	4	5
Series Code	# of Flutes	Diameter in 64ths (4/64 = 0.0625")	Cutting Edge S: Sharp Edge C: Gash Land	Cutting Edge Length

■ Recommended Cutting Conditions

■ Side Milling

Work Material / Cond. / D_C (in)	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)
< 0.039	19,600	9.84	19,600	9.84	19,600	9.84	18,300	7.09	12,700	3.94	9,000	2.36	11,000	2.76	9,000	1.97
< 0.078	11,200	13.39	11,200	13.39	11,200	13.39	10,500	9.45	7,300	5.12	5,300	3.15	6,400	3.54	5,300	2.76
< 0.156	6,400	18.11	6,400	18.11	6,400	18.11	6,000	12.60	4,200	7.09	3,000	4.33	3,600	4.72	3,000	3.54
< 0.236	4,600	22.05	4,600	22.05	4,600	22.05	4,300	15.75	3,000	8.27	2,200	5.12	2,700	5.51	2,200	3.94
< 0.315	3,400	22.05	3,400	22.05	3,400	22.05	3,200	15.75	2,200	8.27	1,600	5.12	2,000	5.51	1,600	3.94
< 0.393	2,800	22.05	2,800	22.05	2,800	22.05	2,600	15.75	1,800	8.27	1,300	5.12	1,600	5.51	1,300	3.94
< 0.472	2,300	22.05	2,300	22.05	2,300	22.05	2,200	15.75	1,500	8.27	1,100	5.12	1,300	5.51	1,100	3.94
< 0.630	1,700	17.72	1,700	17.72	1,700	17.72	1,600	12.60	1,100	7.09	800	3.94	1,000	4.33	800	3.35
< 0.787	1,350	14.96	1,350	14.96	1,350	14.96	1,300	11.02	900	6.30	650	3.54	800	3.94	650	2.95
Standard Depth-of-cut a_p	1.5D_C										1.0D_C					
Standard Depth-of-cut a_e	0.05D_C										0.02D_C					

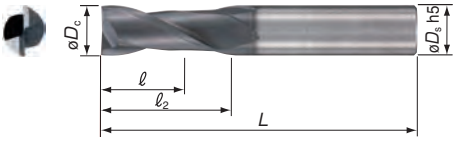
■ Groove Milling

Work Material / Cond. / D_C (in)	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)
< 0.039	19,600	7.87	19,600	9.84	19,600	9.84	18,300	7.09	12,700	3.94	9,000	2.36	11,000	1.97	4,500	0.79
< 0.078	11,200	10.63	11,200	13.39	11,200	13.39	10,500	9.45	7,300	5.12	5,300	3.15	6,400	2.56	2,650	0.98
< 0.156	6,400	14.57	6,400	18.11	6,400	18.11	6,000	12.60	4,200	7.09	3,000	4.33	3,600	3.15	1,500	1.38
< 0.236	4,600	17.72	4,600	22.05	4,600	22.05	4,300	15.75	3,000	8.27	2,200	5.12	2,700	3.94	1,100	1.57
< 0.315	3,400	17.72	3,400	22.05	3,400	22.05	3,200	15.75	2,200	8.27	1,600	5.12	2,000	3.94	800	1.57
< 0.393	2,800	17.72	2,800	22.05	2,800	22.05	2,600	15.75	1,800	8.27	1,300	5.12	1,600	3.94	650	1.57
< 0.472	2,300	17.72	2,300	22.05	2,300	22.05	2,200	15.75	1,500	8.27	1,100	5.12	1,300	3.94	500	1.57
< 0.630	1,700	14.17	1,700	17.72	1,700	17.72	1,600	12.60	1,100	7.09	800	3.94	1,000	3.15	400	1.38
< 0.787	1,350	11.81	1,350	14.96	1,350	14.96	1,300	11.02	900	6.30	650	3.54	800	2.76	320	1.18
Standard Depth-of-cut a_p	0.2D_C		0.5D_C						0.2D_C		0.05D_C		0.2D_C			

GSX End Mill-INCH 2D Gash Land

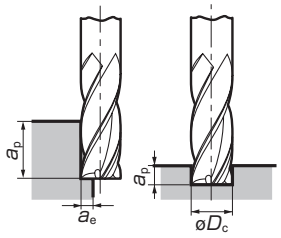
Item	Stock	Flutes	Length	Diam. (inch) φD_C	Diam. (mm) φD_C	Shank Diam. (inch) φD_S	Flute Length (inch) ℓ	Neck Length (inch) ℓ_2	OAL (inch) L	R (inch)
GSX204C-2D	○	2	2D	0.0625	*1.588*	0.1250	0.1250	0.1644	1.500	-
GSX206C-2D	○	2	2D	0.0938	*2.381*	0.1250	0.1875	0.2269	1.500	-
GSX208C-2D	○	2	2D	0.1250	*3.175*	0.1250	0.2500	-	2.000	-
GSX210C-2D	○	2	2D	0.1563	*3.969*	0.1875	0.3125	0.3716	2.000	-
GSX212C-2D	○	2	2D	0.1875	*4.763*	0.1875	0.3750	-	2.000	-
GSX214C-2D	○	2	2D	0.2188	*5.558*	0.2500	0.4376	0.516	2.000	-
GSX216C-2D	○	2	2D	0.2500	*6.350*	0.2500	0.5000	-	2.000	-
GSX218C-2D	○	2	2D	0.2813	*7.145*	0.3125	0.5626	0.641	2.500	-
GSX220C-2D	○	2	2D	0.3125	*7.938*	0.3125	0.6250	-	2.500	-
GSX224C-2D	○	2	2D	0.3750	*9.525*	0.3750	0.7500	-	3.000	-
GSX228C-2D	○	2	2D	0.4375	*11.113*	0.4375	0.8750	-	3.000	-
GSX232C-2D	○	2	2D	0.5000	*12.700*	0.5000	1.0000	-	3.000	-
GSX236C-2D	○	2	2D	0.5625	*14.288*	0.5625	1.1250	-	3.500	-
GSX240C-2D	○	2	2D	0.6250	*15.875*	0.6250	1.2500	-	3.500	-
GSX244C-2D	○	2	2D	0.6875	*17.463*	0.6875	1.3750	-	4.000	-
GSX248C-2D	○	2	2D	0.7500	*19.050*	0.7500	1.5000	-	4.000	-
GSX256C-2D	○	2	2D	0.8750	*22.225*	0.8750	1.7500	-	4.000	-
GSX264C-2D	○	2	2D	1.0000	*25.400*	1.0000	2.0000	-	4.000	-

○ - Items Available 4th Quarter 2015



■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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.



■ Endmill Identification (GSX MILL Series Only)

GSX 2 04 C - 2D

1	2	3	4	5
Series Code	# of Flutes	Diameter in 64ths (4/64 = 0.0625")	Cutting Edge S: Sharp Edge C: Gash Land	Cutting Edge Length

■ Recommended Cutting Conditions

■ Side Milling

Work Material / Cond.		Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_C (in)		Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)
< 0.039		19,600	9.84	19,600	9.84	19,600	9.84	18,300	7.09	12,700	3.94	9,000	2.36	11,000	2.76	9,000	1.97
< 0.078		11,200	13.39	11,200	13.39	11,200	13.39	10,500	9.45	7,300	5.12	5,300	3.15	6,400	3.54	5,300	2.76
< 0.156		6,400	18.11	6,400	18.11	6,400	18.11	6,000	12.60	4,200	7.09	3,000	4.33	3,600	4.72	3,000	3.54
< 0.236		4,600	22.05	4,600	22.05	4,600	22.05	4,300	15.75	3,000	8.27	2,200	5.12	2,700	5.51	2,200	3.94
< 0.315		3,400	22.05	3,400	22.05	3,400	22.05	3,200	15.75	2,200	8.27	1,600	5.12	2,000	5.51	1,600	3.94
< 0.393		2,800	22.05	2,800	22.05	2,800	22.05	2,600	15.75	1,800	8.27	1,300	5.12	1,600	5.51	1,300	3.94
< 0.472		2,300	22.05	2,300	22.05	2,300	22.05	2,200	15.75	1,500	8.27	1,100	5.12	1,300	5.51	1,100	3.94
< 0.630		1,700	17.72	1,700	17.72	1,700	17.72	1,600	12.60	1,100	7.09	800	3.94	1,000	4.33	800	3.35
< 0.787		1,350	14.96	1,350	14.96	1,350	14.96	1,300	11.02	900	6.30	650	3.54	800	3.94	650	2.95
< 1.000		1,000	11.81	1,000	11.81	1,000	11.81	1,000	8.66	700	4.72	500	2.76	640	3.15	500	2.36
Standard Depth-of-cut	a_p	$1.5D_c$										$1.0D_c$					
	a_e	$0.05D_c$										$0.02D_c$					

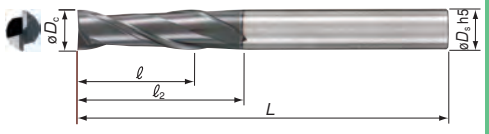
■ Groove Milling

Work Material / Cond.		Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_C (in)		Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)
< 0.039		19,600	7.87	19,600	9.84	19,600	9.84	18,300	7.09	12,700	3.94	9,000	2.36	11,000	1.97	4,500	0.79
< 0.078		11,200	10.63	11,200	13.39	11,200	13.39	10,500	9.45	7,300	5.12	5,300	3.15	6,400	2.56	2,650	0.98
< 0.156		6,400	14.57	6,400	18.11	6,400	18.11	6,000	12.60	4,200	7.09	3,000	4.33	3,600	3.15	1,500	1.38
< 0.236		4,600	17.72	4,600	22.05	4,600	22.05	4,300	15.75	3,000	8.27	2,200	5.12	2,700	3.94	1,100	1.57
< 0.315		3,400	17.72	3,400	22.05	3,400	22.05	3,200	15.75	2,200	8.27	1,600	5.12	2,000	3.94	800	1.57
< 0.393		2,800	17.72	2,800	22.05	2,800	22.05	2,600	15.75	1,800	8.27	1,300	5.12	1,600	3.94	650	1.57
< 0.472		2,300	17.72	2,300	22.05	2,300	22.05	2,200	15.75	1,500	8.27	1,100	5.12	1,300	3.94	500	1.57
< 0.630		1,700	14.17	1,700	17.72	1,700	17.72	1,600	12.60	1,100	7.09	800	3.94	1,000	3.15	400	1.38
< 0.787		1,350	11.81	1,350	14.96	1,350	14.96	1,300	11.02	900	6.30	650	3.54	800	2.76	320	1.18
< 1.000		1,000	9.45	1,000	11.81	1,000	11.81	1,000	8.66	700	4.72	500	2.76	640	2.17	250	0.98
Standard Depth-of-cut	a_p	$0.2D_c$		$0.5D_c$						$0.2D_c$		$0.05D_c$		$0.2D_c$			

GSX End Mill-INCH 3D Gash Land

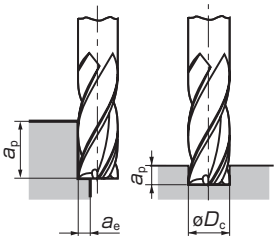
Item	Stock	Flutes	Length	Diam. (inch) φD_C	Diam. (mm) φD_C	Shank Diam. (inch) φD_S	Flute Length (inch) ℓ	Neck Length (inch) ℓ_2	OAL (inch) L	R (inch)
GSX204C-3D	○	2	3D	0.0625	*1.588*	0.1250	0.1875	0.2269	1.500	-
GSX206C-3D	○	2	3D	0.0938	*2.381*	0.1250	0.2813	0.3206	1.500	-
GSX208C-3D	○	2	3D	0.1250	*3.175*	0.1250	0.3750	-	2.000	-
GSX210C-3D	○	2	3D	0.1563	*3.969*	0.1875	0.4688	0.5278	2.000	-
GSX212C-3D	○	2	3D	0.1875	*4.763*	0.1875	0.5625	-	2.000	-
GSX214C-3D	○	2	3D	0.2188	*5.558*	0.2500	0.6564	0.735	2.000	-
GSX216C-3D	○	2	3D	0.2500	*6.350*	0.2500	0.7500	-	2.000	-
GSX218C-3D	○	2	3D	0.2813	*7.145*	0.3125	0.8439	0.923	3.000	-
GSX220C-3D	○	2	3D	0.3125	*7.938*	0.3125	0.9375	-	3.000	-
GSX224C-3D	○	2	3D	0.3750	*9.525*	0.3750	1.1250	-	3.500	-
GSX228C-3D	○	2	3D	0.4375	*11.113*	0.4375	1.3125	-	3.500	-
GSX232C-3D	○	2	3D	0.5000	*12.700*	0.5000	1.5000	-	3.500	-
GSX236C-3D	○	2	3D	0.5625	*14.288*	0.5625	1.6875	-	4.500	-
GSX240C-3D	○	2	3D	0.6250	*15.875*	0.6250	1.8750	-	4.500	-
GSX244C-3D	○	2	3D	0.6875	*17.463*	0.6875	2.0625	-	4.500	-
GSX248C-3D	○	2	3D	0.7500	*19.050*	0.7500	2.2500	-	5.000	-
GSX256C-3D	○	2	3D	0.8750	*22.225*	0.8750	2.6250	-	5.000	-
GSX264C-3D	○	2	3D	1.0000	*25.400*	1.0000	3.0000	-	5.500	-

○ - Items Available 4th Quarter 2015



■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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.



■ Endmill Identification (GSX MILL Series Only)

GSX 2 04 C - 3D

1	2	3	4	5
Series Code	# of Flutes	Diameter in 64ths (4/64 = 0.0625")	Cutting Edge S: Sharp Edge C: Gash Land	Cutting Edge Length

■ Recommended Cutting Conditions

■ Side Milling

Work Material / Cond.	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_C (in)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)
< 0.039	16,600	7.48	16,600	7.48	16,600	7.48	15,500	5.51	10,500	2.76	7,500	1.77	9,400	1.97	7,500	1.38
< 0.078	9,500	9.84	9,500	9.84	9,500	9.84	9,000	7.87	6,200	4.72	4,500	2.36	5,200	2.76	4,500	1.97
< 0.156	5,200	12.99	5,200	12.99	5,200	12.99	4,800	7.87	3,400	5.91	2,250	2.95	2,600	3.54	2,250	2.56
< 0.236	3,500	14.17	3,500	14.17	3,500	14.17	3,200	9.84	2,550	6.69	1,500	3.54	1,700	3.94	1,500	3.15
< 0.315	2,600	12.60	2,600	12.60	2,600	12.60	2,400	9.45	1,900	6.69	1,100	3.54	1,300	3.94	1,100	3.15
< 0.393	2,100	11.81	2,100	11.81	2,100	11.81	1,900	9.06	1,500	6.69	900	3.54	1,000	3.94	900	3.15
< 0.472	1,750	11.02	1,750	11.02	1,750	11.02	1,600	9.06	1,250	6.69	750	3.54	850	3.94	750	3.15
< 0.630	1,300	9.45	1,300	9.45	1,300	9.45	1,200	7.87	950	5.91	550	2.95	650	3.35	550	2.56
< 0.787	1,050	8.66	1,050	8.66	1,050	8.66	950	7.09	750	5.51	450	2.76	500	2.95	450	2.36
Standard Depth-of-cut a_p	2.5D_c								2.0D_c							
Standard Depth-of-cut a_e	Below ø3 : 0.05D_c ø3 and above : 0.1D_c								0.02D_c							

■ Groove Milling

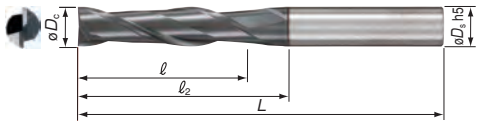
Work Material / Cond.	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_C (in)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)
< 0.039	16,600	2.76	16,600	3.15	16,600	3.15	15,500	1.97	10,500	1.97	7,500	1.38	9,400	1.18	3,750	0.39
< 0.078	9,500	3.15	9,500	3.94	9,500	3.94	9,000	3.54	6,200	2.36	4,500	1.77	5,200	1.57	2,250	0.59
< 0.156	5,200	4.72	5,200	5.91	5,200	5.91	4,800	4.72	3,400	3.15	2,200	1.97	2,600	1.97	1,250	0.79
< 0.236	3,500	5.51	3,500	6.69	3,500	6.69	3,200	5.12	2,550	3.94	1,500	1.97	1,700	2.36	950	0.98
< 0.315	2,600	5.51	2,600	6.30	2,600	6.30	2,400	5.12	1,900	3.94	1,100	1.97	1,300	2.36	700	0.98
< 0.393	2,100	5.12	2,100	5.91	2,100	5.91	1,900	4.72	1,500	3.54	900	1.97	1,000	2.36	550	0.98
< 0.472	1,750	5.12	1,750	5.91	1,750	5.91	1,600	4.72	1,250	3.54	750	1.97	850	2.36	450	0.98
< 0.630	1,300	4.33	1,300	5.12	1,300	5.12	1,200	4.33	950	3.15	550	1.77	650	1.97	350	0.79
< 0.787	1,050	3.94	1,050	4.72	1,050	4.72	950	3.94	750	2.76	450	1.57	500	1.57	280	0.59
Standard Depth-of-cut a_p	0.1D_c		0.2D_c								0.05D_c		0.1D_c			

GSX Series Solid Carbide Endmills

GSX End Mill-INCH 4D Gash Land

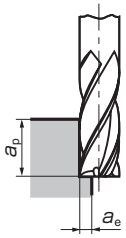
Item	Stock	Flutes	Length	Diam. (inch) φD_C	Diam. (mm) φD_C	Shank Diam. (inch) φD_S	Flute Length (inch) ℓ	Neck Length (inch) ℓ_2	OAL (inch) L	R (inch)
GSX204C-4D	○	2	4D	0.0625	1.588	0.1250	0.2500	0.2894	1.500	-
GSX206C-4D	○	2	4D	0.0938	2.381	0.1250	0.3750	0.4144	2.000	-
GSX208C-4D	○	2	4D	0.1250	3.175	0.1250	0.5000	-	2.000	-
GSX210C-4D	○	2	4D	0.1563	3.969	0.1875	0.6250	0.6841	2.000	-
GSX212C-4D	○	2	4D	0.1875	4.763	0.1875	0.7500	-	2.500	-
GSX214C-4D	○	2	4D	0.2188	5.558	0.2500	0.8752	0.954	2.500	-
GSX216C-4D	○	2	4D	0.2500	6.350	0.2500	1.0000	-	2.500	-
GSX218C-4D	○	2	4D	0.2813	7.145	0.3125	1.1252	1.204	3.000	-
GSX220C-4D	○	2	4D	0.3125	7.938	0.3125	1.2500	-	3.000	-
GSX224C-4D	○	2	4D	0.3750	9.525	0.3750	1.5000	-	3.500	-
GSX228C-4D	○	2	4D	0.4375	11.113	0.4375	1.7500	-	4.000	-
GSX232C-4D	○	2	4D	0.5000	12.700	0.5000	2.0000	-	4.000	-
GSX236C-4D	○	2	4D	0.5625	14.288	0.5625	2.2500	-	5.000	-
GSX240C-4D	○	2	4D	0.6250	15.875	0.6250	2.5000	-	5.000	-
GSX244C-4D	○	2	4D	0.6875	17.463	0.6875	2.7500	-	5.000	-
GSX248C-4D	○	2	4D	0.7500	19.050	0.7500	3.0000	-	5.500	-
GSX256C-4D	○	2	4D	0.8750	22.225	0.8750	3.5000	-	5.500	-
GSX264C-4D	○	2	4D	1.0000	25.400	1.0000	4.0000	-	6.000	-

○ - Items Available 4th Quarter 2015



■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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.



■ Endmill Identification (GSX MILL Series Only)

GSX 2 04 C - 4D

1	2	3	4	5
Series Code	# of Flutes	Diameter in 64ths (4/64 = 0.0625")	Cutting Edge S: Sharp Edge C: Gash Land	Cutting Edge Length

■ Recommended Cutting Conditions

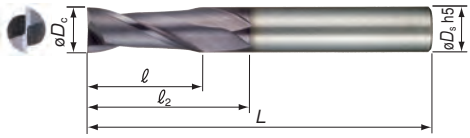
■ Side Milling

Work Material / Cond.		Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_C (in)		Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)
< 0.039		9,000	5.12	9,000	5.12	9,000	5.12	7,000	3.74	6,500	1.97	4,500	1.18	5,400	1.57	4,500	0.98
< 0.078		4,500	7.09	4,500	7.09	4,500	7.09	3,500	4.72	3,200	2.76	2,300	1.57	2,700	1.97	2,300	1.38
< 0.156		2,250	9.45	2,250	9.45	2,250	9.45	1,750	6.30	1,600	3.74	1,200	2.36	1,350	2.56	1,200	1.57
< 0.236		1,500	11.81	1,500	11.81	1,500	11.81	1,150	6.69	1,050	4.33	800	2.76	900	2.76	800	1.97
< 0.315		1,100	10.24	1,100	10.24	1,100	10.24	850	6.69	800	4.33	600	2.76	660	2.76	600	1.97
< 0.393		900	9.84	900	9.84	900	9.84	700	6.30	650	4.33	460	2.76	540	2.76	460	1.97
< 0.472		750	9.45	750	9.45	750	9.45	580	6.30	520	4.33	400	2.76	450	2.76	400	1.97
< 0.630		550	7.87	550	7.87	550	7.87	440	5.51	400	3.74	300	2.17	330	2.36	300	1.77
< 0.787		450	7.09	450	7.09	450	7.09	350	4.72	320	3.35	240	1.77	270	1.97	240	1.57
Standard Depth-of-cut	a_p	3.5D_c										3.0D_c					
	a_e	0.08D_c						0.04D_c									

GSX End Mill-INCH 2D Sharp Edge

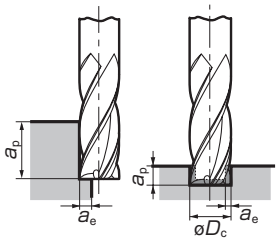
Item	Stock	Flutes	Length	Diam. (inch) φD_C	Diam. (mm) φD_C	Shank Diam. (inch) φD_S	Flute Length (inch) ℓ	Neck Length (inch) ℓ_2	OAL (inch) L	R (inch)
GSX204S-2D	○	2	2D	0.0625	1.588	0.1250	0.1250	0.1644	1.500	-
GSX206S-2D	○	2	2D	0.0938	2.381	0.1250	0.1875	0.2269	1.500	-
GSX208S-2D	○	2	2D	0.1250	3.175	0.1250	0.2500	-	2.000	-
GSX210S-2D	○	2	2D	0.1563	3.969	0.1875	0.3125	0.3716	2.000	-
GSX212S-2D	○	2	2D	0.1875	4.763	0.1875	0.3750	-	2.000	-
GSX214S-2D	○	2	2D	0.2188	5.558	0.2500	0.4376	0.516	2.000	-
GSX216S-2D	○	2	2D	0.2500	6.350	0.2500	0.5000	-	2.000	-
GSX218S-2D	○	2	2D	0.2813	7.145	0.3125	0.5626	0.641	2.500	-
GSX220S-2D	○	2	2D	0.3125	7.938	0.3125	0.6250	-	2.500	-
GSX224S-2D	○	2	2D	0.3750	9.525	0.3750	0.7500	-	3.000	-
GSX228S-2D	○	2	2D	0.4375	11.113	0.4375	0.8750	-	3.000	-
GSX232S-2D	○	2	2D	0.5000	12.700	0.5000	1.0000	-	3.000	-
GSX236S-2D	○	2	2D	0.5625	14.288	0.5625	1.1250	-	3.500	-
GSX240S-2D	○	2	2D	0.6250	15.875	0.6250	1.2500	-	3.500	-
GSX244S-2D	○	2	2D	0.6875	17.463	0.6875	1.3750	-	4.000	-
GSX248S-2D	○	2	2D	0.7500	19.050	0.7500	1.5000	-	4.000	-
GSX256S-2D	○	2	2D	0.8750	22.225	0.8750	1.7500	-	4.000	-
GSX264S-2D	○	2	2D	1.0000	25.400	1.0000	2.0000	-	4.000	-

○ - Items Available 4th Quarter 2015



■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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 groove milling.
6. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.



■ Endmill Identification (GSX MILL Series Only)

GSX 2 04 S - 2D

1	2	3	4	5
Series Code	# of Flutes	Diameter in 64ths (4/64 = 0.0625")	Cutting Edge S: Sharp Edge C: Gash Land	Cutting Edge Length

■ Recommended Cutting Conditions

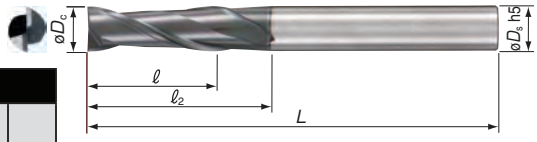
■ Side Milling

Work Material / Cond.		Structural Steel SS		Carbon Steel SC 150 to 250HB		Cast Iron FC		Alloy Steel SCM 25 to 35HRC		Tempered Steel, Hardened Steel NAK, HPM 35 to 45HRC		Hardened Steel 45 to 55HRC		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_C (in)		Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)
< 0.039		22,000	14.17	22,000	14.17	22,000	14.17	19,000	8.66	13,000	5.51	9,500	3.54	11,300	3.54	9,500	2.56
< 0.078		11,500	17.32	11,500	17.32	11,500	17.32	11,000	11.42	7,500	7.09	5,400	4.33	6,500	4.72	5,400	3.35
< 0.156		6,000	22.05	6,000	22.05	6,000	22.05	5,800	14.57	4,000	9.06	2,900	5.91	3,400	6.30	2,900	3.94
< 0.236		4,200	23.62	4,200	23.62	4,200	23.62	4,000	15.75	2,700	9.45	2,000	6.30	2,400	6.69	2,000	4.72
< 0.315		3,000	23.62	3,000	23.62	3,000	23.62	2,800	15.75	2,000	9.45	1,450	6.30	1,800	6.69	1,450	4.72
< 0.393		2,500	23.62	2,500	23.62	2,500	23.62	2,350	15.75	1,600	9.45	1,200	6.30	1,450	6.69	1,200	4.72
< 0.472		2,100	23.62	2,100	23.62	2,100	23.62	2,000	15.75	1,350	9.45	1,000	6.30	1,200	6.69	1,000	4.72
< 0.630		1,500	19.69	1,500	19.69	1,500	19.69	1,450	12.60	1,000	8.27	750	5.12	900	5.51	750	3.54
< 0.787		1,200	18.11	1,200	18.11	1,200	18.11	1,150	11.42	800	7.87	600	4.33	700	4.72	600	2.95
Standard Depth-of-cut	a_p	$2.0D_c$															
	a_e	$0.03D_c$										$0.01D_c$					

■ Groove Finishing

Work Material / Cond.		Structural Steel SS		Carbon Steel SC 150 to 250HB		Cast Iron FC		Alloy Steel SCM 25 to 35HRC		Tempered Steel, Hardened Steel NAK, HPM 35 to 45HRC		Hardened Steel 45 to 55HRC		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_C (in)		Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)
< 0.039		22,000	14.17	22,000	14.17	22,000	14.17	19,000	8.66	13,000	5.51	9,500	3.54	11,300	3.54	9,500	2.56
< 0.078		11,500	17.32	11,500	17.32	11,500	17.32	11,000	11.42	7,500	7.09	5,400	4.33	6,500	4.72	5,400	3.35
< 0.156		6,000	22.05	6,000	22.05	6,000	22.05	5,800	14.57	4,000	9.06	2,900	5.91	3,400	6.30	2,900	3.94
< 0.236		4,200	23.62	4,200	23.62	4,200	23.62	4,000	15.75	2,700	9.45	2,000	6.30	2,400	6.69	2,000	4.72
< 0.315		3,000	23.62	3,000	23.62	3,000	23.62	2,800	15.75	2,000	9.45	1,450	6.30	1,800	6.69	1,450	4.72
< 0.393		2,500	23.62	2,500	23.62	2,500	23.62	2,350	15.75	1,600	9.45	1,200	6.30	1,450	6.69	1,200	4.72
< 0.472		2,100	23.62	2,100	23.62	2,100	23.62	2,000	15.75	1,350	9.45	1,000	6.30	1,200	6.69	1,000	4.72
< 0.630		1,500	19.69	1,500	19.69	1,500	19.69	1,450	12.60	1,000	8.27	750	5.12	900	5.51	750	3.54
< 0.787		1,200	18.11	1,200	18.11	1,200	18.11	1,150	11.42	800	7.87	600	4.33	700	4.72	600	2.95
Standard Depth-of-cut	a_p	$1.5D_c$															
	a_e	Below $0.02D_c$															

GSX Series Solid Carbide Endmills



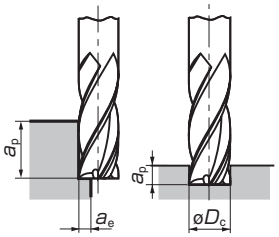
GSX End Mill-INCH 3D Sharp Edge

Item	Stock	Flutes	Length	Diam. (inch) φDc	Diam. (mm) φDc	Shank Diam. (inch) φDs	Flute Length (inch) ℓ	Neck Length (inch) ℓ2	OAL (inch) L	R (inch)
GSX204S-3D	○	2	3D	0.0625	1.588	0.1250	0.1875	0.2269	1.500	-
GSX206S-3D	○	2	3D	0.0938	2.381	0.1250	0.2813	0.3206	1.500	-
GSX208S-3D	○	2	3D	0.1250	3.175	0.1250	0.3750	-	2.000	-
GSX210S-3D	○	2	3D	0.1563	3.969	0.1875	0.4688	0.5278	2.000	-
GSX212S-3D	○	2	3D	0.1875	4.763	0.1875	0.5625	-	2.000	-
GSX214S-3D	○	2	3D	0.2188	5.558	0.2500	0.6564	0.735	2.000	-
GSX216S-3D	○	2	3D	0.2500	6.350	0.2500	0.7500	-	2.000	-
GSX218S-3D	○	2	3D	0.2813	7.145	0.3125	0.8439	0.923	3.000	-
GSX220S-3D	○	2	3D	0.3125	7.938	0.3125	0.9375	-	3.000	-
GSX224S-3D	○	2	3D	0.3750	9.525	0.3750	1.1250	-	3.500	-
GSX228S-3D	○	2	3D	0.4375	11.113	0.4375	1.3125	-	3.500	-
GSX232S-3D	○	2	3D	0.5000	12.700	0.5000	1.5000	-	3.500	-
GSX236S-3D	○	2	3D	0.5625	14.288	0.5625	1.6875	-	4.500	-
GSX240S-3D	○	2	3D	0.6250	15.875	0.6250	1.8750	-	4.500	-
GSX244S-3D	○	2	3D	0.6875	17.463	0.6875	2.0625	-	4.500	-
GSX248S-3D	○	2	3D	0.7500	19.050	0.7500	2.2500	-	5.000	-
GSX256S-3D	○	2	3D	0.8750	22.225	0.8750	2.6250	-	5.000	-
GSX264S-3D	○	2	3D	1.0000	25.400	1.0000	3.0000	-	5.500	-

○ - Items Available 4th Quarter 2015

■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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.



■ Endmill Identification (GSX MILL Series Only)

GSX 2 04 S - 3D

1	2	3	4	5
Series Code	# of Flutes	Diameter in 64ths (4/64 = 0.0625")	Cutting Edge S: Sharp Edge C: Gash Land	Cutting Edge Length

■ Recommended Cutting Conditions

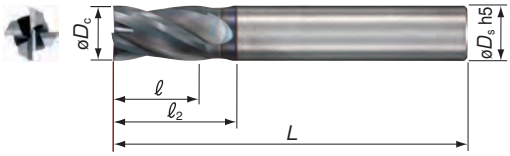
■ Side Milling

Work Material / Cond. / Dc (in)		Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
		Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)
< 0.039		18,500	9.84	18,500	9.84	18,500	9.84	17,000	5.91	11,500	3.94	8,000	2.56	9,400	2.56	8,000	1.77
< 0.078		9,400	9.84	9,400	9.84	9,400	9.84	8,500	7.87	6,700	5.12	4,000	2.56	4,600	3.54	4,000	2.36
< 0.156		4,500	13.78	4,500	13.78	4,500	13.78	4,300	9.84	3,500	8.27	2,000	4.33	2,300	4.33	2,000	2.76
< 0.236		3,100	15.75	3,100	15.75	3,100	15.75	2,800	11.81	2,400	8.66	1,300	4.72	1,500	4.72	1,300	3.54
< 0.315		2,300	14.96	2,300	14.96	2,300	14.96	2,100	11.81	1,800	8.66	950	4.72	1,100	4.72	900	3.54
< 0.393		1,800	13.78	1,800	13.78	1,800	13.78	1,700	11.81	1,400	8.66	700	4.72	900	4.72	800	3.54
< 0.472		1,500	13.78	1,500	13.78	1,500	13.78	1,400	11.81	1,200	8.66	650	4.33	750	4.72	650	3.54
< 0.630		1,100	11.81	1,100	11.81	1,100	11.81	1,000	9.45	900	7.48	480	3.54	550	3.94	490	2.76
< 0.787		900	11.02	900	11.02	900	11.02	850	8.27	700	6.69	400	3.15	440	3.54	400	2.36
Standard Depth-of-cut	a_p	2.5Dc								2.0Dc							
	a_e	Below ø3: 0.02Dc From ø3 to below ø8: 0.05Dc ø8 and above: 0.07Dc								0.01Dc							

■ Groove Milling

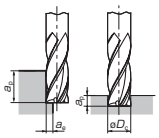
Work Material / Cond. / Dc (in)		Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
		Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)
< 0.039		18,500	9.84	18,500	9.84	18,500	9.84	17,000	5.91	11,500	3.94	8,000	2.56	9,400	2.56	8,000	1.77
< 0.078		9,400	9.84	9,400	9.84	9,400	9.84	8,500	7.87	6,700	5.12	4,000	2.56	4,600	3.54	4,000	2.36
< 0.156		4,500	13.78	4,500	13.78	4,500	13.78	4,300	9.84	3,500	8.27	2,000	4.33	2,300	4.33	2,000	2.76
< 0.236		3,100	15.75	3,100	15.75	3,100	15.75	2,800	11.81	2,400	8.66	1,300	4.72	1,500	4.72	1,300	3.54
< 0.315		2,300	14.96	2,300	14.96	2,300	14.96	2,100	11.81	1,800	8.66	950	4.72	1,100	4.72	900	3.54
< 0.393		1,800	13.78	1,800	13.78	1,800	13.78	1,700	11.81	1,400	8.66	700	4.72	900	4.72	800	3.54
< 0.472		1,500	13.78	1,500	13.78	1,500	13.78	1,400	11.81	1,200	8.66	650	4.33	750	4.72	650	3.54
< 0.630		1,100	11.81	1,100	11.81	1,100	11.81	1,000	9.45	900	7.48	480	3.54	550	3.94	490	2.76
< 0.787		900	11.02	900	11.02	900	11.02	850	8.27	700	6.69	400	3.15	440	3.54	400	2.36
Standard Depth-of-cut	a_p	0.02Dc Max.															

GSX Series Solid Carbide Endmills



■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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.



■ Endmill Identification (GSX Series Only)

GSX 4 04 C - 1.5D

1	2	3	4	5
Series Code	# of Flutes	Diameter in 64ths (4/64 = 0.0625")	Cutting Edge (S: Sharp Edge, C: Gash Land)	Cutting Edge Length

GSX End Mill- INCH 1.5D Gash Land

Item	Stock	Flutes	Length	Diam. (inch) φDc	Diam. (mm) φDc	Shank Diam. (inch) φDs	Flute Length (inch) ℓ	Neck Length (inch) ℓ2	OAL (inch) L	R (inch)
GSX404C-1.5D	○	4	1.5D	0.0625	1.588	0.1250	0.0938	0.1331	1.500	-
GSX406C-1.5D	○	4	1.5D	0.0938	2.381	0.1250	0.1406	0.1800	1.500	-
GSX408C-1.5D	○	4	1.5D	0.1250	3.175	0.1250	0.1875	-	2.000	-
GSX410C-1.5D	○	4	1.5D	0.1563	3.969	0.1875	0.2344	0.2934	2.000	-
GSX412C-1.5D	○	4	1.5D	0.1875	4.763	0.1875	0.2813	-	2.000	-
GSX414C-1.5D	○	4	1.5D	0.2188	5.558	0.2500	0.3282	0.407	2.000	-
GSX416C-1.5D	○	4	1.5D	0.2500	6.350	0.2500	0.3750	-	2.000	-
GSX418C-1.5D	○	4	1.5D	0.2813	7.145	0.3125	0.4220	0.501	2.500	-
GSX420C-1.5D	○	4	1.5D	0.3125	7.938	0.3125	0.4688	-	2.500	-
GSX424C-1.5D	○	4	1.5D	0.3750	9.525	0.3750	0.5625	-	3.000	-
GSX428C-1.5D	○	4	1.5D	0.4375	11.113	0.4375	0.6563	-	3.000	-
GSX432C-1.5D	○	4	1.5D	0.5000	12.700	0.5000	0.7500	-	3.000	-
GSX436C-1.5D	○	4	1.5D	0.5625	14.288	0.5625	0.8438	-	3.500	-
GSX440C-1.5D	○	4	1.5D	0.6250	15.875	0.6250	0.9375	-	3.500	-
GSX444C-1.5D	○	4	1.5D	0.6875	17.463	0.6875	1.0313	-	4.000	-
GSX448C-1.5D	○	4	1.5D	0.7500	19.050	0.7500	1.1250	-	4.000	-
GSX456C-1.5D	○	4	1.5D	0.8750	22.225	0.8750	1.3125	-	4.000	-
GSX464C-1.5D	○	4	1.5D	1.0000	25.400	1.0000	1.5000	-	4.000	-

○ - Items Available 4th Quarter 2015

■ Recommended Cutting Conditions

■ Side Milling

Work Material / Cond. / Dc (in)	Structural Steel SS		Carbon Steel SC 150 to 250HB		Cast Iron FC		Alloy Steel SCM 25 to 35HRC		Tempered Steel, Hardened Steel NAK, HPM 35 to 45HRC		Hardened Steel 45 to 55HRC		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
	Spindle Speed (min⁻¹)	Feed Rate (IPM)	Spindle Speed (min⁻¹)	Feed Rate (IPM)	Spindle Speed (min⁻¹)	Feed Rate (IPM)	Spindle Speed (min⁻¹)	Feed Rate (IPM)	Spindle Speed (min⁻¹)	Feed Rate (IPM)	Spindle Speed (min⁻¹)	Feed Rate (IPM)	Spindle Speed (min⁻¹)	Feed Rate (IPM)	Spindle Speed (min⁻¹)	Feed Rate (IPM)
< 0.039	24,000	18.50	24,000	18.50	24,000	18.50	21,000	11.42	14,500	7.09	10,500	4.72	12,600	4.72	10,500	3.35
< 0.078	12,800	22.44	12,800	22.44	12,800	22.44	12,000	14.96	8,300	9.06	6,000	5.91	7,200	6.30	6,000	4.33
< 0.156	6,800	28.74	6,800	28.74	6,800	28.74	6,400	19.29	4,400	11.81	3,200	7.87	3,800	8.27	3,200	5.12
< 0.236	4,600	30.71	4,600	30.71	4,600	30.71	4,300	20.47	3,000	12.60	2,200	8.27	2,650	8.66	2,200	5.91
< 0.315	3,400	30.71	3,400	30.71	3,400	30.71	3,200	20.47	2,200	12.60	1,600	8.27	2,000	8.66	1,600	5.91
< 0.393	2,800	30.71	2,800	30.71	2,800	30.71	2,600	20.47	1,800	12.60	1,300	8.27	1,500	8.66	1,300	5.91
< 0.472	2,300	30.71	2,300	30.71	2,300	30.71	2,200	20.47	1,500	12.60	1,100	8.27	1,300	8.66	1,100	5.91
< 0.630	1,700	25.59	1,700	25.59	1,700	25.59	1,600	16.54	1,100	11.02	800	6.69	1,000	7.09	800	4.72
< 0.787	1,350	23.62	1,350	23.62	1,350	23.62	1,300	14.96	900	10.24	650	5.91	800	6.30	650	3.94
Standard Depth-of-cut a_p	1.5Dc										1.0Dc					
Standard Depth-of-cut a_e	0.05Dc										0.02Dc					

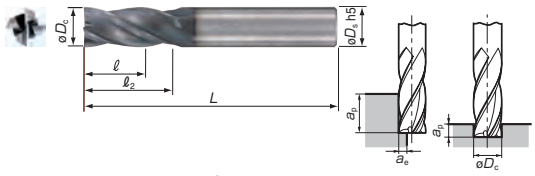
■ Side Milling (High Speed Machining Center)

Work Material / Cond. / Dc (in)	Structural Steel SS		Carbon Steel SC 150 to 250HB		Cast Iron FC		Alloy Steel SCM 25 to 35HRC		Tempered Steel, Hardened Steel NAK, HPM 35 to 45HRC		Hardened Steel 45 to 55HRC		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
	Spindle Speed (min⁻¹)	Feed Rate (IPM)	Spindle Speed (min⁻¹)	Feed Rate (IPM)	Spindle Speed (min⁻¹)	Feed Rate (IPM)	Spindle Speed (min⁻¹)	Feed Rate (IPM)	Spindle Speed (min⁻¹)	Feed Rate (IPM)	Spindle Speed (min⁻¹)	Feed Rate (IPM)	Spindle Speed (min⁻¹)	Feed Rate (IPM)	Spindle Speed (min⁻¹)	Feed Rate (IPM)
< 0.039	60,000	47.24	60,000	47.24	60,000	47.24	60,000	33.46	60,000	28.35	48,000	19.69	32,000	11.81	-	-
< 0.078	47,800	86.61	47,800	86.61	47,800	86.61	47,800	62.99	39,800	47.24	31,800	35.43	15,900	15.75	-	-
< 0.156	23,900	102.36	23,900	102.36	23,900	102.36	23,900	74.80	19,900	55.12	15,900	43.31	8,000	19.29	-	-
< 0.236	16,000	106.30	16,000	106.30	16,000	106.30	16,000	78.74	13,300	59.06	10,600	47.24	5,300	20.47	-	-
< 0.315	12,000	106.30	12,000	106.30	12,000	106.30	12,000	78.74	10,000	59.06	8,000	47.24	4,000	20.47	-	-
< 0.393	9,600	106.30	9,600	106.30	9,600	106.30	9,600	78.74	8,000	59.06	6,400	47.24	3,200	20.47	-	-
< 0.472	8,000	106.30	8,000	106.30	8,000	106.30	8,000	78.74	6,700	59.06	5,300	47.24	2,700	20.47	-	-
< 0.630	6,000	86.61	6,000	86.61	6,000	86.61	6,000	62.99	5,000	47.24	4,000	35.43	2,000	17.72	-	-
< 0.787	4,800	78.74	4,800	78.74	4,800	78.74	4,800	55.12	4,000	43.31	3,200	29.53	1,600	14.96	-	-
Standard Depth-of-cut a_p	1.5Dc										1.0Dc				-	
Standard Depth-of-cut a_e	0.05Dc										0.02Dc				-	

■ Groove Milling

Work Material / Cond. / Dc (in)	Structural Steel SS		Carbon Steel SC 150 to 250HB		Cast Iron FC		Alloy Steel SCM 25 to 35HRC		Tempered Steel, Hardened Steel NAK, HPM 35 to 45HRC		Hardened Steel 45 to 55HRC		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
	Spindle Speed (min⁻¹)	Feed Rate (IPM)	Spindle Speed (min⁻¹)	Feed Rate (IPM)	Spindle Speed (min⁻¹)	Feed Rate (IPM)	Spindle Speed (min⁻¹)	Feed Rate (IPM)	Spindle Speed (min⁻¹)	Feed Rate (IPM)	Spindle Speed (min⁻¹)	Feed Rate (IPM)	Spindle Speed (min⁻¹)	Feed Rate (IPM)	Spindle Speed (min⁻¹)	Feed Rate (IPM)
< 0.039	24,000	14.96	24,000	18.50	24,000	18.50	21,000	11.42	14,500	7.09	10,500	4.72	12,600	3.35	5,200	1.18
< 0.078	12,800	18.11	12,800	22.44	12,800	22.44	12,000	14.96	8,300	9.06	6,000	5.91	7,200	4.33	3,000	1.57
< 0.156	6,800	22.83	6,800	28.74	6,800	28.74	5,400	19.29	4,400	11.81	3,200	7.87	3,800	5.12	1,600	2.17
< 0.236	4,600	24.41	4,600	30.71	4,600	30.71	4,300	20.47	3,000	12.60	2,200	8.27	2,650	6.30	1,100	2.56
< 0.315	3,400	24.41	3,400	30.71	3,400	30.71	3,200	20.47	2,200	12.60	1,600	8.27	2,000	6.30	800	2.56
< 0.393	2,800	24.41	2,800	30.71	2,800	30.71	2,600	20.47	1,800	12.60	1,300	8.27	1,600	6.30	650	2.56
< 0.472	2,300	24.41	2,300	30.71	2,300	30.71	2,200	20.47	1,500	12.60	1,100	8.27	1,300	6.30	550	2.56
< 0.630	1,700	20.47	1,700	22.05	1,700	22.05	1,600	16.54	1,100	11.02	800	6.69	1,000	5.12	400	2.17
< 0.787	1,350	18.90	1,350	23.62	1,350	23.62	1,300	14.96	900	10.24	650	5.91	800	4.33	320	1.97
Standard Depth-of-cut a_p	0.2Dc		0.5Dc						0.2Dc		0.05Dc		0.2Dc			

GSX Series Solid Carbide Endmills



■ Endmill Identification (GSX Series Only)

GSX 4 04 C - 2D

1	2	3	4	5
Series Code	# of Flutes	Diameter in 64ths (4/64 = 0.0625")	Cutting Edge S: Sharp Edge C: Gash Land	Cutting Edge Length

■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high precision machines and holders.
2. Use air blow 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.

GSX End Mill- INCH 2D Gash Land

Item	Stock	Flutes	Length	Diam. (inch) φDc	Diam. (mm) φDc	Shank Diam. (inch) φDs	Flute Length (inch) ℓ	Neck Length (inch) ℓ2	OAL (inch) L	R (inch)
GSX404C-2D	○	4	2D	0.0625	1.588	0.1250	0.1250	0.1644	1.500	-
GSX406C-2D	○	4	2D	0.0938	2.381	0.1250	0.1875	0.2269	1.500	-
GSX408C-2D	○	4	2D	0.1250	3.175	0.1250	0.2500	-	2.000	-
GSX410C-2D	○	4	2D	0.1563	3.969	0.1875	0.3125	0.3716	2.000	-
GSX412C-2D	○	4	2D	0.1875	4.763	0.1875	0.3750	-	2.000	-
GSX414C-2D	○	4	2D	0.2188	5.558	0.2500	0.4376	0.516	2.000	-
GSX416C-2D	○	4	2D	0.2500	6.350	0.2500	0.5000	-	2.000	-
GSX418C-2D	○	4	2D	0.2813	7.145	0.3125	0.5626	0.641	2.500	-
GSX420C-2D	○	4	2D	0.3125	7.938	0.3125	0.6250	-	2.500	-
GSX424C-2D	○	4	2D	0.3750	9.525	0.3750	0.7500	-	3.000	-
GSX428C-2D	○	4	2D	0.4375	11.113	0.4375	0.8750	-	3.000	-
GSX432C-2D	○	4	2D	0.5000	12.700	0.5000	1.0000	-	3.000	-
GSX436C-2D	○	4	2D	0.5625	14.288	0.5625	1.1250	-	3.500	-
GSX440C-2D	○	4	2D	0.6250	15.875	0.6250	1.2500	-	3.500	-
GSX444C-2D	○	4	2D	0.6875	17.463	0.6875	1.3750	-	4.000	-
GSX448C-2D	○	4	2D	0.7500	19.050	0.7500	1.5000	-	4.000	-
GSX456C-2D	○	4	2D	0.8750	22.225	0.8750	1.7500	-	4.000	-
GSX464C-2D	○	4	2D	1.0000	25.400	1.0000	2.0000	-	4.000	-

○ - Items Available 4th Quarter 2015

Side Milling

Work Material / Cond. / D_C (in)	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)
< 0.039	24,000	18.50	24,000	18.50	24,000	18.50	21,000	11.42	14,500	7.09	10,500	4.72	12,600	4.72	10,500	3.35
< 0.078	12,800	22.44	12,800	22.44	12,800	22.44	12,000	14.96	8,300	9.06	6,000	5.91	7,200	6.30	6,000	4.33
< 0.156	6,800	28.74	6,800	28.74	6,800	28.74	6,400	19.29	4,400	11.81	3,200	7.87	3,800	8.27	3,200	5.12
< 0.236	4,600	30.71	4,600	30.71	4,600	30.71	4,300	20.47	3,000	12.60	2,200	8.27	2,650	8.66	2,200	5.91
< 0.315	3,400	30.71	3,400	30.71	3,400	30.71	3,200	20.47	2,200	12.60	1,600	8.27	2,000	8.66	1,600	5.91
< 0.393	2,800	30.71	2,800	30.71	2,800	30.71	2,600	20.47	1,800	12.60	1,300	8.27	1,500	8.66	1,300	5.91
< 0.472	2,300	30.71	2,300	30.71	2,300	30.71	2,200	20.47	1,500	12.60	1,100	8.27	1,300	8.66	1,100	5.91
< 0.630	1,700	25.59	1,700	25.59	1,700	25.59	1,600	16.54	1,100	11.02	800	6.69	1,000	7.09	800	4.72
< 0.787	1,350	23.62	1,350	23.62	1,350	23.62	1,300	14.96	900	10.24	650	5.91	800	6.30	650	3.94
< 1.000	1,000	18.90	1,000	18.90	1,000	18.90	1,000	11.81	700	7.87	500	4.72	640	4.72	500	3.15
Standard Depth-of-cut a_p	$1.5D_c$										$1.0D_c$					
Standard Depth-of-cut a_e	$0.05D_c$										$0.02D_c$					

Side Milling (High Speed Machining Center)

Work Material / Cond. / D_C (in)	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)
< 0.039	60,000	47.24	60,000	47.24	60,000	47.24	60,000	33.46	60,000	28.35	48,000	19.69	32,000	11.81	-	-
< 0.078	47,800	86.61	47,800	86.61	47,800	86.61	47,800	62.99	39,800	47.24	31,800	35.43	15,900	15.75	-	-
< 0.156	23,900	102.36	23,900	102.36	23,900	102.36	23,900	74.80	19,900	55.12	15,900	43.31	8,000	19.29	-	-
< 0.236	16,000	106.30	16,000	106.30	16,000	106.30	16,000	78.74	13,300	59.06	10,600	47.24	5,300	20.47	-	-
< 0.315	12,000	106.30	12,000	106.30	12,000	106.30	12,000	78.74	10,000	59.06	8,000	47.24	4,000	20.47	-	-
< 0.393	9,600	106.30	9,600	106.30	9,600	106.30	9,600	78.74	8,000	59.06	6,400	47.24	3,200	20.47	-	-
< 0.472	8,000	106.30	8,000	106.30	8,000	106.30	8,000	78.74	6,700	59.06	5,300	47.24	2,700	20.47	-	-
< 0.630	6,000	86.61	6,000	86.61	6,000	86.61	6,000	62.99	5,000	47.24	4,000	35.43	2,000	17.72	-	-
< 0.787	4,800	78.74	4,800	78.74	4,800	78.74	4,800	55.12	4,000	43.31	3,200	29.53	1,600	14.96	-	-
< 1.000	3,800	59.06	3,800	59.06	3,800	59.06	3,800	43.31	3,200	35.43	2,500	23.62	1,300	11.81	-	-
Standard Depth-of-cut a_p	$1.5D_c$										$1.0D_c$					
Standard Depth-of-cut a_e	$0.05D_c$										$0.02D_c$					

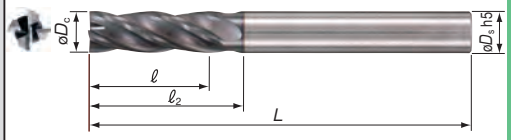
Groove Milling

Work Material / Cond. / D_C (in)	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)
< 0.039	24,000	14.96	24,000	18.50	24,000	18.50	21,000	11.42	14,500	7.09	10,500	4.72	12,600	3.35	5,200	1.18
< 0.078	12,800	18.11	12,800	22.44	12,800	22.44	12,000	14.96	8,300	9.06	6,000	5.91	7,200	4.33	3,000	1.57
< 0.156	6,800	22.83	6,800	28.74	6,800	28.74	5,400	19.29	4,400	11.81	3,200	7.87	3,800	5.12	1,600	2.17
< 0.236	4,600	24.41	4,600	30.71	4,600	30.71	4,300	20.47	3,000	12.60	2,200	8.27	2,650	6.30	1,100	2.56
< 0.315	3,400	24.41	3,400	30.71	3,400	30.71	3,200	20.47	2,200	12.60	1,600	8.27	2,000	6.30	800	2.56
< 0.393	2,800	24.41	2,800	30.71	2,800	30.71	2,600	20.47	1,800	12.60	1,300	8.27	1,600	6.30	650	2.56
< 0.472	2,300	24.41	2,300	30.71	2,300	30.71	2,200	20.47	1,500	12.60	1,100	8.27	1,300	6.30	550	2.56
< 0.630	1,700	20.47	1,700	22.05	1,700	22.05	1,600	16.54	1,100	11.02	800	6.69	1,000	5.12	400	2.17
< 0.787	1,350	18.90	1,350	23.62	1,350	23.62	1,300	14.96	900	10.24	650	5.91	800	4.33	320	1.97
< 1.000	1,000	14.96	1,000	17.72	1,000	17.72	1,000	11.81	700	7.87	500	4.72	640	3.15	250	1.57
Standard Depth-of-cut a_p	$0.2D_c$		$0.5D_c$						$0.2D_c$		$0.05D_c$		$0.2D_c$			

GSX End Mill-INCH 3DGash Land

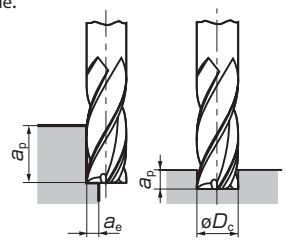
Item	Stock	Flutes	Length	Diam. (inch) φD_C	Diam. (mm) φD_C	Shank Diam. (inch) φD_S	Flute Length (inch) ℓ	Neck Length (inch) ℓ_2	OAL (inch) L	R (inch)
GSX404C-3D	○	4	3D	0.0625	1.588	0.1250	0.1875	0.2269	1.500	-
GSX406C-3D	○	4	3D	0.0938	2.381	0.1250	0.2813	0.3206	1.500	-
GSX408C-3D	○	4	3D	0.1250	3.175	0.1250	0.3750	-	2.000	-
GSX410C-3D	○	4	3D	0.1563	3.969	0.1875	0.4688	0.5278	2.000	-
GSX412C-3D	○	4	3D	0.1875	4.763	0.1875	0.5625	-	2.000	-
GSX414C-3D	○	4	3D	0.2188	5.558	0.2500	0.6564	0.735	2.000	-
GSX416C-3D	○	4	3D	0.2500	6.350	0.2500	0.7500	-	2.000	-
GSX418C-3D	○	4	3D	0.2813	7.145	0.3125	0.8439	0.923	3.000	-
GSX420C-3D	○	4	3D	0.3125	7.938	0.3125	0.9375	-	3.000	-
GSX424C-3D	○	4	3D	0.3750	9.525	0.3750	1.1250	-	3.500	-
GSX428C-3D	○	4	3D	0.4375	11.113	0.4375	1.3125	-	3.500	-
GSX432C-3D	○	4	3D	0.5000	12.700	0.5000	1.5000	-	3.500	-
GSX436C-3D	○	4	3D	0.5625	14.288	0.5625	1.6875	-	4.500	-
GSX440C-3D	○	4	3D	0.6250	15.875	0.6250	1.8750	-	4.500	-
GSX444C-3D	○	4	3D	0.6875	17.463	0.6875	2.0625	-	4.500	-
GSX448C-3D	○	4	3D	0.7500	19.050	0.7500	2.2500	-	5.000	-
GSX456C-3D	○	4	3D	0.8750	22.225	0.8750	2.6250	-	5.000	-
GSX464C-3D	○	4	3D	1.0000	25.400	1.0000	3.0000	-	5.500	-

○ - Items Available 4th Quarter 2015



■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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.



■ Endmill Identification (GSX MILL Series Only)

GSX 4 04 C - 3D

1	2	3	4	5
Series Code	# of Flutes	Diameter in 64ths (4/64 = 0.0625")	Cutting Edge S: Sharp Edge C: Gash Land	Cutting Edge Length

■ Recommended Cutting Conditions

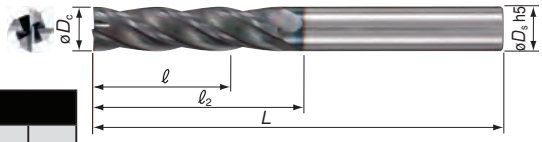
■ Side Milling

Work Material / Cond.	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_C (in)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)
< 0.039	21,000	14.17	21,000	14.17	21,000	14.17	19,000	8.66	13,000	5.51	9,000	3.54	10,500	3.54	9,000	2.56
< 0.078	10,500	14.17	10,500	14.17	10,500	14.17	9,600	11.42	7,500	7.09	4,500	4.33	5,200	4.72	4,500	3.35
< 0.156	5,200	19.69	5,200	19.69	5,200	19.69	4,800	14.57	4,000	11.02	2,250	5.91	2,600	6.30	2,250	3.94
< 0.236	3,500	22.05	3,500	22.05	3,500	22.05	3,200	15.75	2,700	11.81	1,500	6.30	1,700	6.69	1,500	4.72
< 0.315	2,600	20.47	2,600	20.47	2,600	20.47	2,400	15.75	2,000	11.81	1,100	6.30	1,300	6.69	1,100	4.72
< 0.393	2,100	19.69	2,100	19.69	2,100	19.69	1,900	15.75	1,600	11.81	900	6.30	1,000	6.30	900	4.72
< 0.472	1,750	19.69	1,750	19.69	1,750	19.69	1,600	15.75	1,350	11.81	750	5.91	850	6.30	750	4.72
< 0.630	1,300	16.54	1,300	16.54	1,300	16.54	1,200	12.99	1,000	10.24	550	4.72	650	5.51	550	3.94
< 0.787	1,050	14.96	1,050	14.96	1,050	14.96	950	11.42	800	9.06	450	4.33	500	4.72	450	3.54
Standard Depth-of-cut a_p	2.5D_c										2.0D_c					
Standard Depth-of-cut a_e	Below ø3: 0.05D_c From ø3 to below ø8: 0.1D_c ø8 and above: 0.15D_c								0.02D_c							

■ Groove Milling

Work Material / Cond.	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_C (in)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)
< 0.039	16,600	5.51	16,600	5.51	16,600	5.51	15,500	3.94	10,500	3.94	7,500	2.76	9,400	2.36	3,750	0.79
< 0.078	9,500	6.30	9,500	6.30	9,500	6.30	9,000	7.09	6,200	4.72	4,500	3.54	5,200	3.15	2,250	1.18
< 0.156	5,200	6.30	5,200	7.09	5,200	7.09	4,800	6.30	3,400	4.33	2,200	2.56	2,600	2.76	1,250	0.98
< 0.236	3,500	6.30	3,500	7.87	3,500	7.87	3,200	6.30	2,550	4.72	1,500	2.56	1,700	2.76	950	0.98
< 0.315	2,600	6.30	2,600	7.87	2,600	7.87	2,400	6.30	1,900	4.72	1,100	2.56	1,300	2.76	700	0.98
< 0.393	2,100	6.30	2,100	7.87	2,100	7.87	1,900	6.30	1,500	4.72	900	2.56	1,000	2.76	550	0.98
< 0.472	1,750	6.30	1,750	7.87	1,750	7.87	1,600	6.30	1,250	4.72	750	2.56	850	2.76	450	0.98
< 0.630	1,300	6.30	1,300	7.87	1,300	7.87	1,200	6.30	950	4.72	550	2.56	650	2.76	350	0.98
< 0.787	1,050	6.30	1,050	7.87	1,050	7.87	950	6.30	750	4.72	450	2.56	500	2.76	280	0.98
Standard Depth-of-cut a_p	0.1D_c		0.2D_c								0.05D_c		0.1D_c			

GSX Series Solid Carbide Endmills



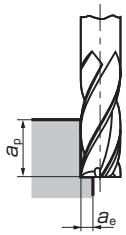
GSX End Mill-INCH 4D Gash Land

Item	Stock	Flutes	Length	Diam. (inch) φDc	Diam. (mm) φDc	Shank Diam. (inch) φDs	Flute Length (inch) ℓ	Neck Length (inch) ℓ2	OAL (inch) L	R (inch)
GSX404C-4D	○	4	4D	0.0625	1.588	0.1250	0.2500	0.2894	1.500	-
GSX406C-4D	○	4	4D	0.0938	2.381	0.1250	0.3750	0.4144	1.500	-
GSX408C-4D	○	4	4D	0.1250	3.175	0.1250	0.5000	-	2.000	-
GSX410C-4D	○	4	4D	0.1563	3.969	0.1875	0.6250	0.6841	2.000	-
GSX412C-4D	○	4	4D	0.1875	4.763	0.1875	0.7500	-	2.500	-
GSX414C-4D	○	4	4D	0.2188	5.558	0.2500	0.8752	0.954	2.500	-
GSX416C-4D	○	4	4D	0.2500	6.350	0.2500	1.0000	-	2.500	-
GSX418C-4D	○	4	4D	0.2813	7.145	0.3125	1.1252	1.204	3.000	-
GSX420C-4D	○	4	4D	0.3125	7.938	0.3125	1.2500	-	3.000	-
GSX424C-4D	○	4	4D	0.3750	9.525	0.3750	1.5000	-	3.500	-
GSX428C-4D	○	4	4D	0.4375	11.113	0.4375	1.7500	-	4.000	-
GSX432C-4D	○	4	4D	0.5000	12.700	0.5000	2.0000	-	4.000	-
GSX436C-4D	○	4	4D	0.5625	14.288	0.5625	2.2500	-	5.000	-
GSX440C-4D	○	4	4D	0.6250	15.875	0.6250	2.5000	-	5.000	-
GSX444C-4D	○	4	4D	0.6875	17.463	0.6875	2.7500	-	5.000	-
GSX448C-4D	○	4	4D	0.7500	19.050	0.7500	3.0000	-	5.500	-
GSX456C-4D	○	4	4D	0.8750	22.225	0.8750	3.5000	-	5.500	-
GSX464C-4D	○	4	4D	1.0000	25.400	1.0000	4.0000	-	6.000	-

○ - Items Available 4th Quarter 2015

■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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. This series is not recommended for grooving.
7. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.



■ Endmill Identification (GSX MILL Series Only)

GSX 4 04 C - 4D

1	2	3	4	5
Series Code	# of Flutes	Diameter in 64ths (4/64 = 0.0625")	Cutting Edge S: Sharp Edge C: Gash Land	Cutting Edge Length

■ Recommended Cutting Conditions

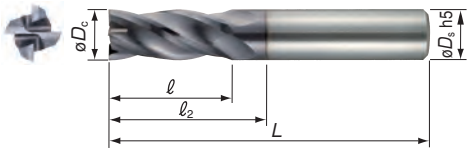
■ Side Milling

Work Material / Cond. / D_c mm	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)
< 0.039	9,000	5.51	9,000	5.51	9,000	5.51	7,000	3.15	6,500	2.36	4,500	1.57	5,400	1.57	4,500	1.57
< 0.078	4,500	5.51	4,500	5.51	4,500	5.51	3,500	3.94	3,200	3.15	2,300	2.17	2,700	2.17	2,300	1.57
< 0.156	2,250	7.87	2,250	7.87	2,250	7.87	1,750	4.72	1,600	3.94	1,200	2.36	1,350	1.97	1,200	1.38
< 0.236	1,500	9.84	1,500	9.84	1,500	9.84	1,150	6.30	1,050	5.51	800	2.56	900	1.77	800	1.38
< 0.315	1,100	8.66	1,100	8.66	1,100	8.66	850	6.30	800	5.12	600	2.56	660	1.77	600	1.38
< 0.393	900	8.27	900	8.27	900	8.27	700	5.51	650	4.72	460	2.56	540	1.77	460	1.38
< 0.472	750	7.87	750	7.87	750	7.87	580	5.51	520	4.33	400	2.56	450	1.77	400	1.38
< 0.630	550	6.69	550	6.69	550	6.69	440	4.72	400	3.74	300	2.17	330	1.77	300	1.38
< 0.787	450	5.91	450	5.91	450	5.91	350	3.94	320	3.15	240	1.97	270	1.77	240	1.38
Standard Depth-of-cut a_p	$3.5D_c$										$3.0D_c$					
Standard Depth-of-cut a_e	Below ø3: $0.04D_c$ From ø3 to below ø8: $0.08D_c$ ø8 and above: $0.1D_c$										$0.02D_c$					

GSX End Mill-INCH 2DSharp Edge

Item	Stock	Flutes	Length	Diam. (inch) φD_C	Diam. (mm) φD_C	Shank Diam. (inch) φD_S	Flute Length (inch) ℓ	Neck Length (inch) $ℓ_2$	OAL (inch) L	R (inch)
GSX404S-2D	O	4	2D	0.0625	1.588	0.1250	0.1250	0.1644	1.500	-
GSX406S-2D	O	4	2D	0.0938	2.381	0.1250	0.1875	0.2269	1.500	-
GSX408S-2D	O	4	2D	0.1250	3.175	0.1250	0.2500	-	2.000	-
GSX410S-2D	O	4	2D	0.1563	3.969	0.1875	0.3125	0.3716	2.000	-
GSX412S-2D	O	4	2D	0.1875	4.763	0.1875	0.3750	-	2.000	-
GSX414S-2D	O	4	2D	0.2188	5.558	0.2500	0.4376	0.516	2.000	-
GSX416S-2D	O	4	2D	0.2500	6.350	0.2500	0.5000	-	2.000	-
GSX418S-2D	O	4	2D	0.2813	7.145	0.3125	0.5626	0.641	2.500	-
GSX420S-2D	O	4	2D	0.3125	7.938	0.3125	0.6250	-	2.500	-
GSX424S-2D	O	4	2D	0.3750	9.525	0.3750	0.7500	-	3.000	-
GSX428S-2D	O	4	2D	0.4375	11.113	0.4375	0.8750	-	3.000	-
GSX432S-2D	O	4	2D	0.5000	12.700	0.5000	1.0000	-	3.000	-
GSX436S-2D	O	4	2D	0.5625	14.288	0.5625	1.1250	-	3.500	-
GSX440S-2D	O	4	2D	0.6250	15.875	0.6250	1.2500	-	3.500	-
GSX444S-2D	O	4	2D	0.6875	17.463	0.6875	1.3750	-	4.000	-
GSX448S-2D	O	4	2D	0.7500	19.050	0.7500	1.5000	-	4.000	-
GSX456S-2D	O	4	2D	0.8750	22.225	0.8750	1.7500	-	4.000	-
GSX464S-2D	O	4	2D	1.0000	25.400	1.0000	2.0000	-	4.000	-

O - Items Available 4th Quarter 2015



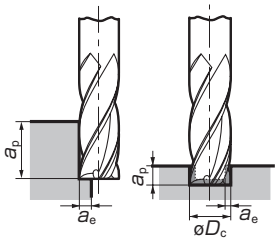
■ Endmill Identification (GSX Series Only)

GSX 4 04 S - 2D

1	2	3	4	5
Series Code	# of Flutes	Diameter in 64ths (4/64 = 0.0625")	Cutting Edge S: Sharp Edge C: Gash Land	Cutting Edge Length

■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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 groove milling.
6. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.



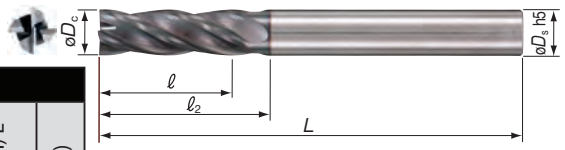
■ Side Milling

Work Material / Cond.	Structural Steel SS		Carbon Steel SC 150 to 250HB		Cast Iron FC		Alloy Steel SCM 25 to 35HRC		Tempered Steel, Hardened Steel NAK, HPM 35 to 45HRC		Hardened Steel 45 to 55HRC		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_C (in)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)
< 0.039	22,000	14.173	22,000	14.173	22,000	14.173	19,000	8.661	13,000	5.512	9,500	3.543	11,300	3.543	9,500	2.559
< 0.078	11,500	17.323	11,500	17.323	11,500	17.323	11,000	11.417	7,500	7.087	5,400	4.331	6,500	4.724	5,400	3.346
< 0.156	6,000	22.047	6,000	22.047	6,000	22.047	5,800	14.567	4,000	9.055	2,900	5.906	3,400	6.299	2,900	3.937
< 0.236	4,200	23.622	4,200	23.622	4,200	23.622	4,000	15.748	2,700	9.449	2,000	6.299	2,400	6.693	2,000	4.724
< 0.312	3,000	23.622	3,000	23.622	3,000	23.622	2,800	15.748	2,000	9.449	1,450	6.299	1,800	6.693	1,450	4.724
< 0.393	2,500	23.622	2,500	23.622	2,500	23.622	2,350	15.748	1,600	9.449	1,200	6.299	1,450	6.693	1,200	4.724
< 0.472	2,100	23.622	2,100	23.622	2,100	23.622	2,000	15.748	1,350	9.449	1,000	6.299	1,200	6.693	1,000	4.724
< 0.630	1,500	19.685	1,500	19.685	1,500	19.685	1,450	12.598	1,000	8.268	750	5.118	900	5.512	750	3.543
< 0.787	1,200	18.110	1,200	18.110	1,200	18.110	1,150	11.417	800	7.874	600	4.331	700	4.724	600	2.953
Standard Depth-of-cut a_p	$2.0D_c$															
Standard Depth-of-cut a_e	$0.03D_c$										$0.01D_c$					

■ Groove Finishing

Work Material / Cond.	Structural Steel SS		Carbon Steel SC 150 to 250HB		Cast Iron FC		Alloy Steel SCM 25 to 35HRC		Tempered Steel, Hardened Steel NAK, HPM 35 to 45HRC		Hardened Steel 45 to 55HRC		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_C (in)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)
< 0.039	22,000	14.173	22,000	14.173	22,000	14.173	19,000	8.661	13,000	5.512	9,500	3.543	11,300	3.543	9,500	2.559
< 0.078	11,500	17.323	11,500	17.323	11,500	17.323	11,000	11.417	7,500	7.087	5,400	4.331	6,500	4.724	5,400	3.346
< 0.156	6,000	22.047	6,000	22.047	6,000	22.047	5,800	14.567	4,000	9.055	2,900	5.906	3,400	6.299	2,900	3.937
< 0.236	4,200	23.622	4,200	23.622	4,200	23.622	4,000	15.748	2,700	9.449	2,000	6.299	2,400	6.693	2,000	4.724
< 0.312	3,000	23.622	3,000	23.622	3,000	23.622	2,800	15.748	2,000	9.449	1,450	6.299	1,800	6.693	1,450	4.724
< 0.393	2,500	23.622	2,500	23.622	2,500	23.622	2,350	15.748	1,600	9.449	1,200	6.299	1,450	6.693	1,200	4.724
< 0.472	2,100	23.622	2,100	23.622	2,100	23.622	2,000	15.748	1,350	9.449	1,000	6.299	1,200	6.693	1,000	4.724
< 0.630	1,500	19.685	1,500	19.685	1,500	19.685	1,450	12.598	1,000	8.268	750	5.118	900	5.512	750	3.543
< 0.787	1,200	18.110	1,200	18.110	1,200	18.110	1,150	11.417	800	7.874	600	4.331	700	4.724	600	2.953
Standard Depth-of-cut a_p	$1.5D_c$															
Standard Depth-of-cut a_e	Below $0.02D_c$															

GSX Series Solid Carbide Endmills



GSX End Mill-INCH 3D Sharp Edge

Item	Stock	Flutes	Length	Diam. (inch) φDc	Diam. (mm) φDc	Shank Diam. (inch) φDs	Flute Length (inch) ℓ	Neck Length (inch) ℓ2	OAL (inch) L	R (inch)
GSX404S-3D	○	4	3D	0.0625	1.588	0.1250	0.1875	0.2269	1.500	-
GSX406S-3D	○	4	3D	0.0938	2.381	0.1250	0.2813	0.3206	1.500	-
GSX408S-3D	○	4	3D	0.1250	3.175	0.1250	0.3750	-	2.000	-
GSX410S-3D	○	4	3D	0.1563	3.969	0.1875	0.4688	0.5278	2.000	-
GSX412S-3D	○	4	3D	0.1875	4.763	0.1875	0.5625	-	2.000	-
GSX414S-3D	○	4	3D	0.2188	5.558	0.2500	0.6564	0.735	2.000	-
GSX416S-3D	○	4	3D	0.2500	6.350	0.2500	0.7500	-	2.000	-
GSX418S-3D	○	4	3D	0.2813	7.145	0.3125	0.8439	0.923	3.000	-
GSX420S-3D	○	4	3D	0.3125	7.938	0.3125	0.9375	-	3.000	-
GSX424S-3D	○	4	3D	0.3750	9.525	0.3750	1.1250	-	3.500	-
GSX428S-3D	○	4	3D	0.4375	11.113	0.4375	1.3125	-	3.500	-
GSX432S-3D	○	4	3D	0.5000	12.700	0.5000	1.5000	-	3.500	-
GSX436S-3D	○	4	3D	0.5625	14.288	0.5625	1.6875	-	4.500	-
GSX440S-3D	○	4	3D	0.6250	15.875	0.6250	1.8750	-	4.500	-
GSX444S-3D	○	4	3D	0.6875	17.463	0.6875	2.0625	-	4.500	-
GSX448S-3D	○	4	3D	0.7500	19.050	0.7500	2.2500	-	5.000	-
GSX456S-3D	○	4	3D	0.8750	22.225	0.8750	2.6250	-	5.000	-
GSX464S-3D	○	4	3D	1.0000	25.400	1.0000	3.0000	-	5.500	-

○ - Items Available 4th Quarter 2015

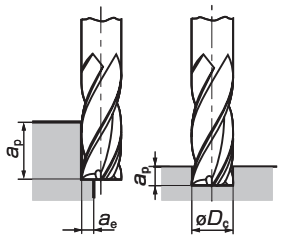
■ Endmill Identification (GSX Series Only)

GSX 4 04 S - 3D

1	2	3	4	5
Series Code	# of Flutes	Diameter in 64ths (4/64 = 0.0625")	Cutting Edge S: Sharp Edge C: Gash Land	Cutting Edge Length

■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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.

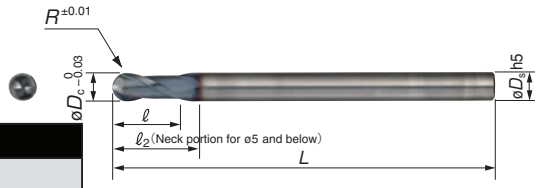


■ Side Milling

Work Material / Cond. / Dc (in)	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)
< 0.039	18,500	9.843	18,500	9.843	18,500	9.843	17,000	5.906	11,500	3.937	8,000	2.559	9,400	2.559	8,000	1.772
< 0.078	9,400	9.843	9,400	9.843	9,400	9.843	8,500	7.874	6,700	5.118	4,000	2.559	4,600	3.543	4,000	2.362
< 0.156	4,500	13.780	4,500	13.780	4,500	13.780	4,300	9.843	3,500	8.268	2,000	4.331	2,300	4.331	2,000	2.756
< 0.236	3,100	15.748	3,100	15.748	3,100	15.748	2,800	11.811	2,400	8.661	1,300	4.724	1,500	4.724	1,300	3.543
< 0.312	2,300	14.961	2,300	14.961	2,300	14.961	2,100	11.811	1,800	8.661	950	4.724	1,100	4.724	900	3.543
< 0.393	1,800	13.780	1,800	13.780	1,800	13.780	1,700	11.811	1,400	8.661	700	4.724	900	4.724	800	3.543
< 0.472	1,500	13.780	1,500	13.780	1,500	13.780	1,400	11.811	1,200	8.661	650	4.331	750	4.724	650	3.543
< 0.630	1,100	11.811	1,100	11.811	1,100	11.811	1,000	9.449	900	7.480	480	3.543	550	3.937	490	2.756
< 0.787	900	11.024	900	11.024	900	11.024	850	8.268	700	6.693	400	3.150	440	3.543	400	2.362
Standard Depth-of-cut a_p	2.5Dc								2.0Dc							
Standard Depth-of-cut a_e	Below ø3: 0.02Dc From ø3 to below ø8: 0.05Dc ø8 and above: 0.07Dc								0.01Dc							

■ Groove Milling

Work Material / Cond. / Dc (in)	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)	Spindle Speed (min-1)	Feed Rate (IPM)
< 0.039	18,500	9.843	18,500	9.843	18,500	9.843	17,000	5.906	11,500	3.937	8,000	2.559	9,400	2.559	8,000	1.772
< 0.078	9,400	9.843	9,400	9.843	9,400	9.843	8,500	7.874	6,700	5.118	4,000	2.559	4,600	3.543	4,000	2.362
< 0.156	4,500	13.780	4,500	13.780	4,500	13.780	4,300	9.843	3,500	8.268	2,000	4.331	2,300	4.331	2,000	2.756
< 0.236	3,100	15.748	3,100	15.748	3,100	15.748	2,800	11.811	2,400	8.661	1,300	4.724	1,500	4.724	1,300	3.543
< 0.312	2,300	14.961	2,300	14.961	2,300	14.961	2,100	11.811	1,800	8.661	950	4.724	1,100	4.724	900	3.543
< 0.393	1,800	13.780	1,800	13.780	1,800	13.780	1,700	11.811	1,400	8.661	700	4.724	900	4.724	800	3.543
< 0.472	1,500	13.780	1,500	13.780	1,500	13.780	1,400	11.811	1,200	8.661	650	4.331	750	4.724	650	3.543
< 0.630	1,100	11.811	1,100	11.811	1,100	11.811	1,000	9.449	900	7.480	480	3.543	550	3.937	490	2.756
< 0.787	900	11.024	900	11.024	900	11.024	850	8.268	700	6.693	400	3.150	440	3.543	400	2.362
Standard Depth-of-cut a_p	0.02Dc Max.															



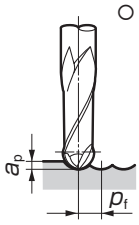
GSX End Mill-INCH Ballnose

Item	Stock	Flutes	Diam. (inch) φDc	Diam. (mm) φDc	Shank Diam. (inch) φDs	Flute Length (inch) ℓ	Neck Length (inch) ℓ2	OAL (inch) L	R (inch)
GSXB204	○	2	0.0625	1.588	0.1250	0.0938	0.1331	2.000	0.0313
GSXB206	○	2	0.0938	2.381	0.1250	0.1406	0.1800	2.500	0.0469
GSXB208	○	2	0.1250	3.175	0.1250	0.1875	-	2.500	0.0625
GSXB210	○	2	0.1563	3.969	0.1875	0.2344	0.2934	3.000	0.0781
GSXB212	○	2	0.1875	4.763	0.1875	0.2813	-	3.000	0.0938
GSXB214	○	2	0.2188	5.558	0.2500	0.3282	0.407	3.000	0.1094
GSXB216	○	2	0.2500	6.350	0.2500	0.3750	-	3.000	0.1250
GSXB218	○	2	0.2813	7.145	0.3125	0.4220	0.501	3.500	0.1407
GSXB220	○	2	0.3125	7.938	0.3125	0.4688	-	3.500	0.1563
GSXB224	○	2	0.3750	9.525	0.3750	0.5625	-	4.000	0.1875
GSXB228	○	2	0.4375	11.113	0.4375	0.6563	-	4.000	0.2188
GSXB232	○	2	0.5000	12.700	0.5000	0.7500	-	4.500	0.2500
GSXB236	○	2	0.5625	14.288	0.5625	0.8438	-	4.500	0.2813
GSXB240	○	2	0.6250	15.875	0.6250	0.9375	-	5.500	0.3125
GSXB244	○	2	0.6875	17.463	0.6875	1.0313	-	5.500	0.3438
GSXB248	○	2	0.7500	19.050	0.7500	1.1250	-	6.000	0.3750
GSXB256	○	2	0.8750	22.225	0.8750	1.3125	-	6.500	0.4375
GSXB264	○	2	1.0000	25.400	1.0000	1.5000	-	7.000	0.5000

○ - Items Available 4th Quarter 2015

■ 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.



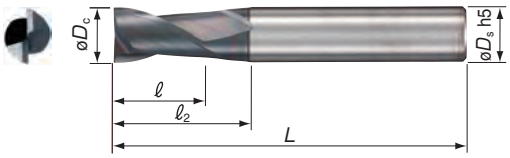
■ Radius Milling

Work Material / Cutting Conditions R (in)	Carbon Steel, Alloy Steel (Below 25HRC)		Carbon Steel, Alloy Steel (Below 50HRC)		Cast Iron Special Cast Iron		Stainless Steel Titanium Alloy	
	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)	Spindle Speed (min^{-1})	Feed Rate (IPM)
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
Standard Depth-of-cut a_p	0.02Dc		0.02Dc		0.02Dc		0.02Dc	
Standard Depth-of-cut p_f	0.05Dc		0.05Dc		0.05Dc		0.05Dc	

GSX End Mill-METRIC 1.5D Gash Land

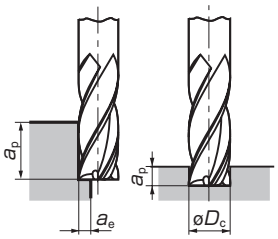
ITEM	Stock	Type	Flutes	Diam. (mm) φD_c	Shank Diam. (mm) φD_s	Flute Length (mm) ℓ	Neck Length (mm) ℓ_2	OAL (mm) L	Corner Radius (mm)
GSX20100C-1.5D	★	Square	2	1.0	4	1.5	2.5	40	-
GSX20150C-1.5D	★	Square	2	1.5	4	2.3	3.3	40	-
GSX20200C-1.5D	★	Square	2	2.0	4	3.0	4.0	40	-
GSX20250C-1.5D	★	Square	2	2.5	4	3.8	4.8	40	-
GSX20300C-1.5D	★	Square	2	3.0	6	4.5	6.0	45	-
GSX20350C-1.5D	★	Square	2	3.5	6	5.3	6.8	45	-
GSX20400C-1.5D	★	Square	2	4.0	6	6.0	7.5	45	-
GSX20450C-1.5D	★	Square	2	4.5	6	6.8	8.3	50	-
GSX20500C-1.5D	★	Square	2	5.0	6	7.5	9.5	50	-
GSX20550C-1.5D	★	Square	2	5.5	6	8.3	10.3	50	-
GSX20600C-1.5D	★	Square	2	6.0	6	9.0	-	50	-
GSX20700C-1.5D	★	Square	2	7.0	8	11.0	13.0	60	-
GSX20800C-1.5D	★	Square	2	8.0	8	12.0	-	60	-
GSX20900C-1.5D	★	Square	2	9.0	10	14.0	16.0	70	-
GSX21000C-1.5D	★	Square	2	10.0	10	15.0	-	70	-
GSX21200C-1.5D	★	Square	2	12.0	12	18.0	-	75	-

★ - World Wide Warehouse Item



■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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.



■ Endmill Identification (GSX MILL Series Only)

GSX 2 1000 C - 1.5D

1	2	3	4	5
Series Code	No. of Teeth	Diameter x 100 (10mm x 100 = 1000)	Cutting Edge (S: Sharp Edge, C: Gash Land)	Cutting Edge Length

■ Recommended Cutting Conditions

■ Side Milling

Work Material / Cond.	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_c (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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
Standard Depth-of-cut a_p	$1.5D_c$										$1.0D_c$					
Standard Depth-of-cut a_e	$0.05D_c$										$0.02D_c$					

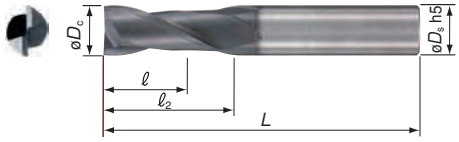
■ Groove Milling

Work Material / Cond.	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_c (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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
Standard Depth-of-cut a_p	$0.2D_c$		$0.5D_c$						$0.2D_c$		$0.05D_c$		$0.2D_c$			

GSX End Mill-METRIC 2D Gash Land

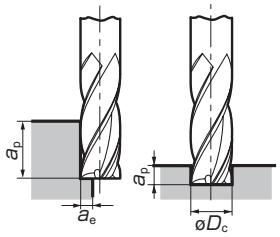
ITEM	Stock	Type	Flutes	Diam. (mm) φD_C	Shank Diam. (mm) φD_S	Flute Length (mm) ℓ	Neck Length (mm) ℓ_2	OAL (mm) L	Corner Radius (mm)
GSX20050C-2D	★	Square	2	0.5	4	1.0	1.4	40	-
GSX20100C-2D	★	Square	2	1.0	4	2.0	3.0	40	-
GSX20150C-2D	★	Square	2	1.5	4	3.0	4.0	40	-
GSX20200C-2D	★	Square	2	2.0	4	4.0	5.0	40	-
GSX20250C-2D	★	Square	2	2.5	4	5.0	6.0	40	-
GSX20300C-2D	★	Square	2	3.0	6	6.0	7.5	45	-
GSX20350C-2D	★	Square	2	3.5	6	7.0	8.5	45	-
GSX20400C-2D	★	Square	2	4.0	6	8.0	9.5	45	-
GSX20450C-2D	★	Square	2	4.5	6	9.0	10.5	50	-
GSX20500C-2D	★	Square	2	5.0	6	10.0	12.0	50	-
GSX20550C-2D	★	Square	2	5.5	6	11.0	13.0	50	-
GSX20600C-2D	★	Square	2	6.0	6	12.0	-	50	-
GSX20700C-2D	★	Square	2	7.0	8	14.0	16.0	60	-
GSX20800C-2D	★	Square	2	8.0	8	16.0	-	60	-
GSX20900C-2D	★	Square	2	9.0	10	18.0	20.0	70	-
GSX21000C-2D	★	Square	2	10.0	10	20.0	-	70	-
GSX21200C-2D	★	Square	2	12.0	12	24.0	-	75	-
GSX21600C-2D	★	Square	2	16.0	16	32.0	-	90	-
GSX22000C-2D	★	Square	2	20.0	20	40.0	-	100	-
GSX22500C-2D	★	Square	2	25.0	25	50.0	-	120	-

★ - World Wide Warehouse Item



■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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.



■ Endmill Identification (GSX MILL Series Only)

GSX 2 0050 C - 2D

1	2	3	4	5
Series Code	No. of Teeth	Diameter x100 (10mm x 100 = 1000)	Cutting Edge (S: Sharp Edge, C: Gash Land)	Cutting Edge Length

■ Recommended Cutting Conditions

■ Side Milling

Work Material / Cond.	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
$D_{c(mm)}$	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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
25.0	1,000	300	1,000	300	1,000	300	1,000	220	700	120	500	70	640	80	500	60
Standard Depth-of-cut a_p	$1.5D_c$										$1.0D_c$					
Standard Depth-of-cut a_e	$0.05D_c$										$0.02D_c$					

■ Groove Milling

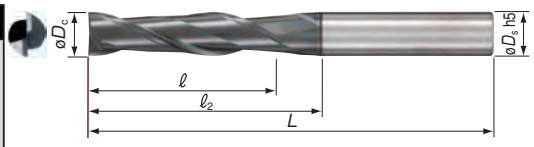
Work Material / Cond.	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
$D_{c\ (mm)}$	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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
25.0	1,000	240	1,000	300	1,000	300	1,000	220	700	120	500	70	640	55	250	25
Standard Depth-of-cut a_p	$0.2D_c$		$0.5D_c$						$0.2D_c$		$0.05D_c$		$0.2D_c$			

GSX Series Solid Carbide Endmills

GSX End Mill-METRIC 3D Gash Land

ITEM	Stock	Type	Flutes	Diam. (mm) φD_c	Shank Diam. (mm) φD_s	Flute Length (mm) ℓ	Neck Length (mm) ℓ_2	OAL (mm) L	Corner Radius (mm)
GSX20100C-3D	★	Square	2	1.0	4	3.0	4.0	40	-
GSX20150C-3D	★	Square	2	1.5	4	4.5	5.5	40	-
GSX20200C-3D	★	Square	2	2.0	4	6.0	7.0	40	-
GSX20250C-3D	★	Square	2	2.5	4	7.5	8.5	40	-
GSX20300C-3D	★	Square	2	3.0	6	9.0	10.5	50	-
GSX20400C-3D	★	Square	2	4.0	6	12.0	13.5	50	-
GSX20500C-3D	★	Square	2	5.0	6	15.0	17.0	50	-
GSX20600C-3D	★	Square	2	6.0	6	18.0	-	50	-
GSX20800C-3D	★	Square	2	8.0	8	24.0	-	70	-
GSX21000C-3D	★	Square	2	10.0	10	30.0	-	90	-
GSX21200C-3D	★	Square	2	12.0	12	36.0	-	90	-
GSX21600C-3D	★	Square	2	16.0	16	48.0	-	110	-

★ - World Wide Warehouse Item



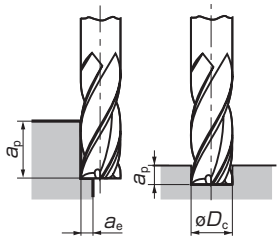
■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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.

■ Endmill Identification (GSX MILL Series Only)

GSX 2 0050 C - 3D

1	2	3	4	5
Series Code	No. of Teeth	Diameter x100 (10mm x 100 = 1000)	Cutting Edge	Cutting Edge Length
			S: Sharp Edge C: Gash Land	



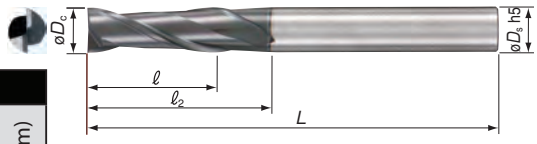
■ Recommended Cutting Conditions

■ Side Milling

Work Material / Cond.	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_c (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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	100	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
Standard Depth-of-cut a_p	2.5D_c								2.0D_c							
Standard Depth-of-cut a_e	Below ø3 0.05D_c ø3 and above 0.1D_c								0.02D_c							

■ Groove Milling

Work Material / Cond.	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_c (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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
Standard Depth-of-cut a_p	0.1D_c		0.2D_c								0.05D_c		0.1D_c			



GSX End Mill-METRIC 4D Gash Land

ITEM	Stock	Type	Flutes	Diam. (mm) φDc	Shank Diam. (mm) φDs	Flute Length (mm) ℓ	Neck Length (mm) ℓ2	OAL (mm) L	Corner Radius (mm)
GSX20100C-4D	★	Square	2	1.0	4	4.0	5.0	40	-
GSX20150C-4D	★	Square	2	1.5	4	6.0	7.0	40	-
GSX20200C-4D	★	Square	2	2.0	4	8.0	9.0	40	-
GSX20250C-4D	★	Square	2	2.5	4	10.0	11.0	50	-
GSX20300C-4D	★	Square	2	3.0	6	12.0	13.5	50	-
GSX20400C-4D	★	Square	2	4.0	6	16.0	17.5	50	-
GSX20500C-4D	★	Square	2	5.0	6	20.0	22.0	60	-
GSX20600C-4D	★	Square	2	6.0	6	24.0	-	60	-
GSX20800C-4D	★	Square	2	8.0	8	32.0	-	80	-
GSX21000C-4D	★	Square	2	10.0	10	40.0	-	90	-
GSX21200C-4D	★	Square	2	12.0	12	48.0	-	100	-

★ - World Wide Warehouse Item

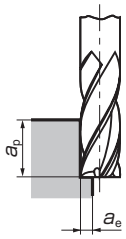
■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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.

■ Endmill Identification (GSX MILL Series Only)

GSX 2 0050 C - 4D

1	2	3	4	5
Series Code	No. of Teeth	Diameter x 100 (10mm x 100 = 1000)	Cutting Edge (S: Sharp Edge, C: Gash Land)	Cutting Edge Length



■ Side Milling

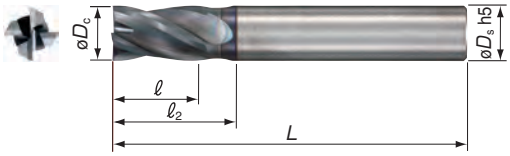
Work Material / Cond.		Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_c (mm)		Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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
Standard Depth-of-cut	a_p	$3.5D_c$										$3.0D_c$					
	a_e	$0.08D_c$						$0.04D_c$									

GSX Series Solid Carbide Endmills

GSX End Mill-METRIC 1.5D Gash Land

ITEM	Stock	Type	Flutes	Diam. (mm) φD_C	Shank Diam. (mm) φD_S	Flute Length (mm) ℓ	Neck Length (mm) ℓ_2	OAL (mm) L	Corner Radius (mm)
GSX40100C-1.5D	★	Square	4	1.0	4	1.5	2.5	40	-
GSX40150C-1.5D	★	Square	4	1.5	4	2.3	3.3	40	-
GSX40200C-1.5D	★	Square	4	2.0	4	3.0	4.0	40	-
GSX40250C-1.5D	★	Square	4	2.5	4	3.8	4.8	40	-
GSX40300C-1.5D	★	Square	4	3.0	6	4.5	6.0	45	-
GSX40350C-1.5D	★	Square	4	3.5	6	5.3	6.8	45	-
GSX40400C-1.5D	★	Square	4	4.0	6	6.0	7.5	45	-
GSX40450C-1.5D	★	Square	4	4.5	6	6.8	8.3	50	-
GSX40500C-1.5D	★	Square	4	5.0	6	7.5	9.5	50	-
GSX40550C-1.5D	★	Square	4	5.5	6	8.3	10.3	50	-
GSX40600C-1.5D	★	Square	4	6.0	6	9.0	-	50	-
GSX40700C-1.5D	★	Square	4	7.0	8	11.0	13.0	60	-
GSX40800C-1.5D	★	Square	4	8.0	8	12.0	-	60	-
GSX40900C-1.5D	★	Square	4	9.0	10	14.0	16.0	70	-
GSX41000C-1.5D	★	Square	4	10.0	10	15.0	-	70	-
GSX41200C-1.5D	★	Square	4	12.0	12	18.0	-	75	-

★ - World Wide Warehouse Item



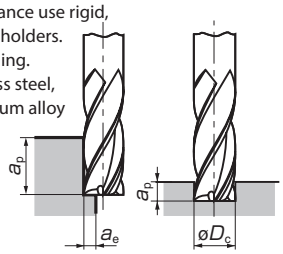
■ Endmill Identification (GSX MILL Series Only)

GSX 4 0100 C - 1.5D

1	2	3	4	5
Series Code	No. of Teeth	Diameter x 100	Cutting Edge	Cutting Edge Length

■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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.



■ Side Milling

Work Material / Cond.	Structural Steel SS		Carbon Steel SC 150 to 250HB		Cast Iron FC		Alloy Steel SCM 25 to 35HRC		Tempered Steel, Hardened Steel NAK, HPM 35 to 45HRC		Hardened Steel 45 to 55HRC		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_c (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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
Standard Depth-of-cut a_p	$1.5D_c$										$1.0D_c$					
Standard Depth-of-cut a_e	$0.05D_c$										$0.02D_c$					

■Side Milling (High Speed Machining Center)

Work Material / Cond.	Structural Steel SS		Carbon Steel SC 150 to 250HB		Cast Iron FC		Alloy Steel SCM 25 to 35HRC		Tempered Steel, Hardened Steel NAK, HPM 35 to 45HRC		Hardened Steel 45 to 55HRC		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_c (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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	-	-
Standard Depth-of-cut a_p	$1.5D_c$										$1.0D_c$				-	
Standard Depth-of-cut a_e	$0.05D_c$										$0.02D_c$				-	

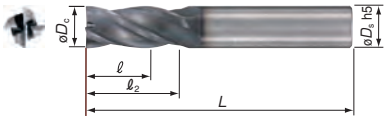
■ Groove Milling

Work Material / Cond.	Structural Steel SS		Carbon Steel SC 150 to 250HB		Cast Iron FC		Alloy Steel SCM 25 to 35HRC		Tempered Steel, Hardened Steel NAK, HPM 35 to 45HRC		Hardened Steel 45 to 55HRC		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_c (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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
Standard Depth-of-cut a_p	$0.2D_c$		$0.5D_c$						$0.2D_c$		$0.05D_c$		$0.2D_c$			

GSX End Mill-METRIC 2D Gash Land

ITEM	Stock	Type	Flutes	Diam. (mm) φD_c	Shank Diam. (mm) φD_s	Flute Length (mm) ℓ	Neck Length (mm) ℓ_2	OAL (mm) L	Corner Radius(mm)
GSX40100C-2D	★	Square	4	1.0	4	2.0	3.0	40	-
GSX40150C-2D	★	Square	4	1.5	4	3.0	4.0	40	-
GSX40200C-2D	★	Square	4	2.0	4	4.0	5.0	40	-
GSX40250C-2D	★	Square	4	2.5	4	5.0	6.0	40	-
GSX40300C-2D	★	Square	4	3.0	6	6.0	7.5	45	-
GSX40350C-2D	★	Square	4	3.5	6	7.0	8.5	45	-
GSX40400C-2D	★	Square	4	4.0	6	8.0	9.5	45	-
GSX40450C-2D	★	Square	4	4.5	6	9.0	10.5	50	-
GSX40500C-2D	★	Square	4	5.0	6	10.0	12.0	50	-
GSX40550C-2D	★	Square	4	5.5	6	11.0	13.0	50	-
GSX40600C-2D	★	Square	4	6.0	6	12.0	-	50	-
GSX40700C-2D	★	Square	4	7.0	8	14.0	16.0	60	-
GSX40800C-2D	★	Square	4	8.0	8	16.0	-	60	-
GSX40900C-2D	★	Square	4	9.0	10	18.0	20.0	70	-
GSX41000C-2D	★	Square	4	10.0	10	20.0	-	70	-
GSX41200C-2D	★	Square	4	12.0	12	24.0	-	75	-
GSX41600C-2D	★	Square	4	16.0	16	32.0	-	90	-
GSX42000C-2D	★	Square	4	20.0	20	40.0	-	100	-
GSX42500C-2D	★	Square	4	25.0	25	50.0	-	120	-

★ - World Wide Warehouse Item



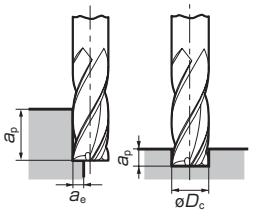
■ Endmill Identification (GSX MILL Series Only)

GSX 4 0100 C - 2D

1	2	3	4	5
Series Code	No. of Teeth	Diameter x 100 (10mm x 100 = 1000)	Cutting Edge	Cutting Edge Length

■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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.



■ Side Milling

Work Material / Cond. / D_c (mm)	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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
25.0	1,000	480	1,000	480	1,000	480	1,000	300	700	200	500	120	640	120	500	80
Standard Depth-of-cut a_p	$1.5D_c$										$1.0D_c$					
Standard Depth-of-cut a_e	$0.05D_c$										$0.02D_c$					

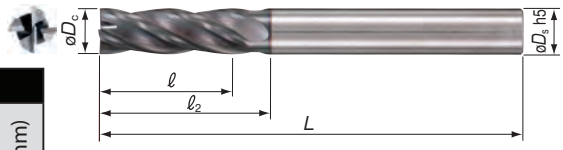
■ Side Milling (High Speed Machining Center)

Work Material / Cond. / D_c (mm)	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
	Spindle Speed min^{-1}	Feed Rate mm/min	Spindle Speed min^{-1}	Feed Rate mm/min	Spindle Speed min^{-1}	Feed Rate mm/min	Spindle Speed min^{-1}	Feed Rate mm/min	Spindle Speed min^{-1}	Feed Rate mm/min	Spindle Speed min^{-1}	Feed Rate mm/min	Spindle Speed min^{-1}	Feed Rate mm/min	Spindle Speed min^{-1}	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	Q	Q
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	Q	Q
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	Q	Q
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	Q	Q
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	Q	Q
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	Q	Q
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	Q	Q
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	Q	Q
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	Q	Q
25.0	3,800	1,500	3,800	1,500	3,800	1,500	3,800	1,100	3,200	900	2,500	600	1,300	300	Q	Q
Standard Depth-of-cut a_p	$1.5D_c$										$1.0D_c$					
Standard Depth-of-cut a_e	$0.05D_c$										$0.02D_c$					

■ Groove Milling

Work Material / Cond. / D_c (mm)	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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
25.0	1,000	380	1,000	450	1,000	450	1,000	300	700	200	500	120	640	80	250	40
Standard Depth-of-cut a_p	$0.2D_c$		$0.5D_c$						$0.2D_c$		$0.05D_c$		$0.2D_c$			

GSX Series Solid Carbide Endmills



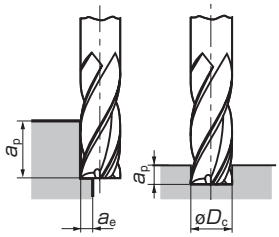
GSX End Mill-METRIC 3D Gash Land

ITEM	Stock	Type	Flutes	Diam. (mm) φDc	Shank Diam. (mm) φDs	Flute Length (mm) ℓ	Neck Length (mm) ℓ2	OAL (mm) L	Corner Radius (mm)
GSX40100C-3D	★	Square	4	1.0	4	3.0	4.0	40	-
GSX40150C-3D	★	Square	4	1.5	4	4.5	5.5	40	-
GSX40200C-3D	★	Square	4	2.0	4	6.0	7.0	40	-
GSX40250C-3D	★	Square	4	2.5	4	7.5	8.5	40	-
GSX40300C-3D	★	Square	4	3.0	6	9.0	10.5	50	-
GSX40400C-3D	★	Square	4	4.0	6	12.0	13.5	50	-
GSX40500C-3D	★	Square	4	5.0	6	15.0	17.0	50	-
GSX40600C-3D	★	Square	4	6.0	6	18.0	-	50	-
GSX40800C-3D	★	Square	4	8.0	8	24.0	-	70	-
GSX41000C-3D	★	Square	4	10.0	10	30.0	-	90	-
GSX41200C-3D	★	Square	4	12.0	12	36.0	-	90	-
GSX41600C-3D	★	Square	4	16.0	16	48.0	-	110	-

★ - World Wide Warehouse Item

■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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.



■ Endmill Identification (GSX MILL Series Only)

GSX 4 0100 C - 3D

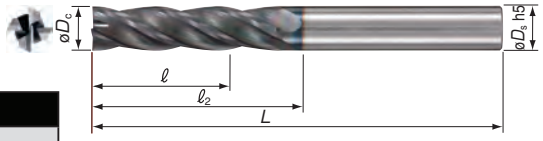
1	2	3	4	5
Series Code	No. of Teeth	Diameter x 100 (10mm x 100 = 1000)	Cutting Edge	Cutting Edge Length
			S: Sharp Edge C: Gash Land	

■ Side Milling

Work Material / Cond. / Dc (mm)	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
	Spindle Speed (min⁻¹)	Feed Rate (mm/min)	Spindle Speed (min⁻¹)	Feed Rate (mm/min)	Spindle Speed (min⁻¹)	Feed Rate (mm/min)	Spindle Speed (min⁻¹)	Feed Rate (mm/min)	Spindle Speed (min⁻¹)	Feed Rate (mm/min)	Spindle Speed (min⁻¹)	Feed Rate (mm/min)	Spindle Speed (min⁻¹)	Feed Rate (mm/min)	Spindle Speed (min⁻¹)	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
Standard Depth-of-cut a_p	$2.5D_c$										$2.0D_c$					
Standard Depth-of-cut a_e	Below ø3: $0.05D_c$ From ø3 to below ø8: $0.1Dc$ ø8 and above: $0.15D_c$								$0.02D_c$							

■ Groove Milling

Work Material / Cond. / Dc (mm)	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
	Spindle Speed (min⁻¹)	Feed Rate (mm/min)	Spindle Speed (min⁻¹)	Feed Rate (mm/min)	Spindle Speed (min⁻¹)	Feed Rate (mm/min)	Spindle Speed (min⁻¹)	Feed Rate (mm/min)	Spindle Speed (min⁻¹)	Feed Rate (mm/min)	Spindle Speed (min⁻¹)	Feed Rate (mm/min)	Spindle Speed (min⁻¹)	Feed Rate (mm/min)	Spindle Speed (min⁻¹)	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
Standard Depth-of-cut a_p	$0.1D_c$		$0.2D_c$								$0.05D_c$		$0.1D_c$			



GSX End Mill-METRIC 4D Gash Land

ITEM	Stock	Type	Flutes	Diam. (mm) φDc	Shank Diam. (mm) φDs	Flute Length (mm) ℓ	Neck Length (mm) ℓ2	OAL (mm) L	Corner Radius (mm)
GSX40100C-4D	★	Square	4	1.0	4	4.0	5.0	40	-
GSX40150C-4D	★	Square	4	1.5	4	6.0	7.0	40	-
GSX40200C-4D	★	Square	4	2.0	4	8.0	9.0	40	-
GSX40250C-4D	★	Square	4	2.5	4	10.0	11.0	50	-
GSX40300C-4D	★	Square	4	3.0	6	12.0	13.5	50	-
GSX40400C-4D	★	Square	4	4.0	6	16.0	17.5	50	-
GSX40500C-4D	★	Square	4	5.0	6	20.0	22.0	60	-
GSX40600C-4D	★	Square	4	6.0	6	24.0	-	60	-
GSX40800C-4D	★	Square	4	8.0	8	32.0	-	80	-
GSX41000C-4D	★	Square	4	10.0	10	40.0	-	90	-
GSX41200C-4D	★	Square	4	12.0	12	48.0	-	100	-
GSX41600C-4D	★	Square	4	16.0	16	64.0	-	120	-

★ - World Wide Warehouse Item

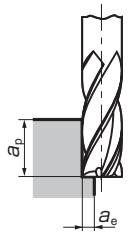
■ Endmill Identification (GSXMILL Series Only)

GSX 4 0100 C - 4D

1	2	3	4	5
Series Code	No. of Teeth	Diameter x 100 (10mm x 100 = 1000)	Cutting Edge (S: Sharp Edge, C: Gash Land)	Cutting Edge Length

■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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. This series is not recommended for grooving.
7. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.



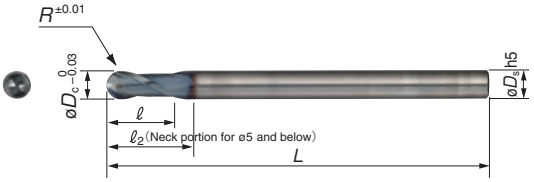
■ Side Milling

Work Material / Cond.		Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
Dc (mm)		Spindle Speed (min-1)	Feed Rate (mm/min)	Spindle Speed (min-1)	Feed Rate (mm/min)	Spindle Speed (min-1)	Feed Rate (mm/min)	Spindle Speed (min-1)	Feed Rate (mm/min)	Spindle Speed (min-1)	Feed Rate (mm/min)	Spindle Speed (min-1)	Feed Rate (mm/min)	Spindle Speed (min-1)	Feed Rate (mm/min)	Spindle Speed (min-1)	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
Standard Depth-of-cut	a_p	3.5Dc										3.0Dc					
	a_e	Below ø3: 0.04Dc From ø3 to below ø8: 0.08Dc ø8 and above: 0.1Dc										0.02Dc					

GSX Series Solid Carbide Endmills

GSX End Mill-METRIC BALLNOSE

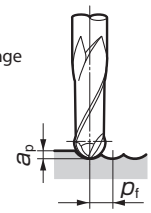
ITEM	Stock	Type	Flutes	Diam. (mm) φD_c	Shank Diam. (mm) φD_s	Flute Length (mm) ℓ	Neck Length (mm) ℓ_2	OAL (mm) L	Corner Radius (mm)
GSXB20020	○	Ballnose	2	0.4	4	0.6	0.8	50	0.20
GSXB20030	○	Ballnose	2	0.6	4	0.9	1.2	50	0.30
GSXB20050	○	Ballnose	2	1.0	4	1.5	2.0	50	0.50
GSXB20075	○	Ballnose	2	1.5	4	2.3	3.0	50	0.75
GSXB20100	○	Ballnose	2	2.0	6	3.0	4.0	60	1.00
GSXB20125	○	Ballnose	2	2.5	6	4.0	5.0	60	1.25
GSXB20150	○	Ballnose	2	3.0	6	4.5	6.0	60	1.50
GSXB20200	○	Ballnose	2	4.0	6	6.0	8.0	70	2.00
GSXB20250	○	Ballnose	2	5.0	6	7.5	10.0	80	2.50
GSXB20300	○	Ballnose	2	6.0	6	9.0	-	80	3.00
GSXB20350	○	Ballnose	2	7.0	8	11.0	20.0	90	3.50
GSXB20400	○	Ballnose	2	8.0	8	12.0	-	90	4.00
GSXB20500	○	Ballnose	2	10.0	10	15.0	-	100	5.00
GSXB20600	○	Ballnose	2	12.0	12	18.0	-	110	6.00
GSXB20700	○	Ballnose	2	14.0	16	21.0	38.0	110	7.00
GSXB20800	○	Ballnose	2	16.0	16	24.0	-	140	8.00
GSXB20900	○	Ballnose	2	18.0	20	27.0	50.0	140	9.00
GSXB21000	○	Ballnose	2	20.0	20	30.0	-	160	10.00



○ - Items Available 4th Quarter 2015

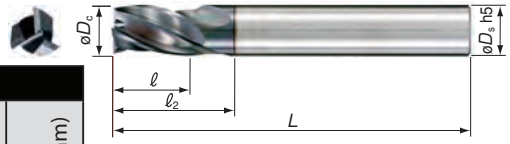
■ Recommended Cutting Conditions

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 (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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
Standard Depth-of-cut a_p	0.02D_c		0.02D_c		0.02D_c		0.02D_c	
Standard Depth-of-cut p_f	0.05D_c		0.05D_c		0.05D_c		0.05D_c	



GSX End Mill-METRIC 1.5D Gash Land

ITEM	Stock	Type	Flutes	Diam. (mm)	Shank Diam. (mm)	Flute Length (mm)	Neck Length (mm)	OAL (mm)	Corner Radius (mm)
GSX30100C-1.5D	★	Square	3	1.0	4	1.5	2.5	40	-
GSX30150C-1.5D	★	Square	3	1.5	4	2.3	3.3	40	-
GSX30200C-1.5D	★	Square	3	2.0	4	3.0	4.0	40	-
GSX30250C-1.5D	★	Square	3	2.5	4	3.8	4.8	40	-
GSX30300C-1.5D	★	Square	3	3.0	6	4.5	6.0	45	-
GSX30400C-1.5D	★	Square	3	4.0	6	6.0	7.5	45	-
GSX30500C-1.5D	★	Square	3	5.0	6	7.5	9.5	50	-
GSX30600C-1.5D	★	Square	3	6.0	6	9.0	-	50	-
GSX30700C-1.5D	★	Square	3	7.0	8	11.0	13.0	60	-
GSX30800C-1.5D	★	Square	3	8.0	8	12.0	-	60	-
GSX30900C-1.5D	★	Square	3	9.0	10	14.0	16.0	70	-
GSX31000C-1.5D	★	Square	3	10.0	10	15.0	-	70	-
GSX31200C-1.5D	★	Square	3	12.0	12	18.0	-	75	-

★ - World Wide Warehouse Item

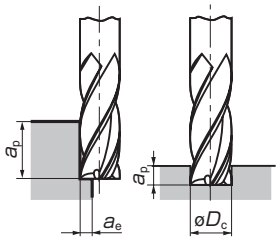
■ Endmill Identification (GSXMILL Series Only)

GSX 3 0100 C - 1.5D

1	2	3	4	5
Series Code	No. of Teeth	Diameter x 100	Cutting Edge	Cutting Edge Length

■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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.



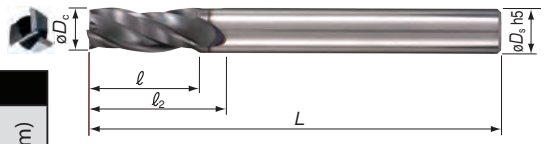
■ Side Milling

Work Material / Cond.		Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_c (mm)		Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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
Standard Depth-of-cut	a_p	$1.5D_c$										$1.0D_c$					
	a_e	$0.05D_c$										$0.02D_c$					

■ Groove Milling

Work Material / Cond.		Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_c (mm)		Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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
Standard Depth-of-cut	a_p	$0.2D_c$		$0.5D_c$						$0.2D_c$		$0.05D_c$		$0.2D_c$			

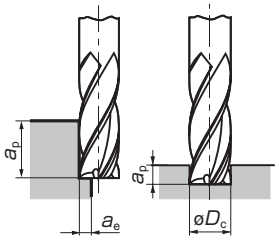
GSX Series Solid Carbide Endmills



GSX End Mill-METRIC 2D Gash Land

ITEM	Stock	Type	Flutes	Diam. (mm)	Shank Diam. (mm)	Flute Length (mm)	Neck Length (mm)	OAL (mm)	Corner Radius (mm)
GSX30100C-2D	★	Square	3	1.0	4	2.5	3.5	40	-
GSX30150C-2D	★	Square	3	1.5	4	3.8	4.8	40	-
GSX30200C-2D	★	Square	3	2.0	4	5.0	6.0	40	-
GSX30250C-2D	★	Square	3	2.5	4	6.3	7.3	40	-
GSX30300C-2D	★	Square	3	3.0	6	7.5	9.0	45	-
GSX30400C-2D	★	Square	3	4.0	6	11.0	12.5	45	-
GSX30500C-2D	★	Square	3	5.0	6	13.0	15.0	50	-
GSX30600C-2D	★	Square	3	6.0	6	13.0	-	50	-
GSX30700C-2D	★	Square	3	7.0	8	16.0	18.0	60	-
GSX30800C-2D	★	Square	3	8.0	8	19.0	-	60	-
GSX30900C-2D	★	Square	3	9.0	10	19.0	21.0	70	-
GSX31000C-2D	★	Square	3	10.0	10	22.0	-	70	-
GSX31200C-2D	★	Square	3	12.0	12	26.0	-	75	-

★ - World Wide Warehouse Item



■ Endmill Identification (GSXMILL Series Only)

GSX 3 0100 C - 2D

1	2	3	4	5
Series Code	No. of Teeth	Diameter x 100	Cutting Edge	Cutting Edge Length

■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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.

■ Side Milling

Work Material / Cond.	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_c (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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
Standard Depth-of-cut a_p	$1.5D_c$										$1.0D_c$					
Standard Depth-of-cut a_e	$0.05D_c$										$0.02D_c$					

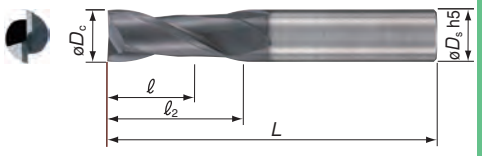
■ Groove Milling

Work Material / Cond.	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_c (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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
Standard Depth-of-cut a_p	$0.2D_c$		$0.5D_c$						$0.2D_c$		$0.05D_c$		$0.2D_c$			

GSX End Mill-METRIC 2D Sharp Edge

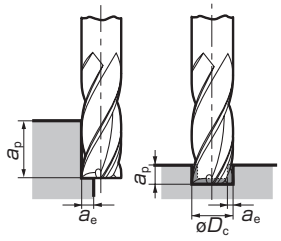
ITEM	Stock	Type	Flutes	Diam. (mm)	Shank Diam. (mm)	Flute Length (mm)	Neck Length (mm)	OAL (mm)	Corner Radius (mm)	Fig.
GSX20050S-2D	★	Square	2	0.5	4	1.3	1.7	40	-	
GSX20100S-2D	★	Square	2	1.0	4	2.5	3.5	40	-	
GSX20150S-2D	★	Square	2	1.5	4	3.8	4.8	40	-	
GSX20150S-2D-S3	★	Square	2	1.5	3	3.8	4.8	38	-	
GSX20200S-2D	★	Square	2	2.0	4	5.0	6.0	40	-	
GSX20200S-2D-S3	★	Square	2	2.0	3	5.0	6.0	38	-	
GSX20250S-2D	★	Square	2	2.5	4	6.3	7.3	40	-	
GSX20300S-2D	★	Square	2	3.0	6	7.5	9.0	45	-	
GSX20300S-2D-S3	★	Square	2	3.0	3	7.5	-	38	-	
GSX20350S-2D	★	Square	2	3.5	6	8.8	10.3	45	-	
GSX20400S-2D	★	Square	2	4.0	6	11.0	14.0	45	-	
GSX20400S-2D-S4	★	Square	2	4.0	4	11.0	-	45	-	
GSX20450S-2D	★	Square	2	4.5	6	11.3	12.8	50	-	
GSX20500S-2D	★	Square	2	5.0	6	13.0	19.6	50	-	
GSX20550S-2D	★	Square	2	5.5	6	13.0	19.6	50	-	
GSX20600S-2D	★	Square	2	6.0	6	13.0	-	50	-	
GSX20700S-2D	★	Square	2	7.0	8	16.0	21.1	60	-	
GSX20800S-2D	★	Square	2	8.0	8	19.0	-	60	-	
GSX20900S-2D	★	Square	2	9.0	10	19.0	24.1	70	-	
GSX21000S-2D	★	Square	2	10.0	10	22.0	-	70	-	
GSX21200S-2D	★	Square	2	12.0	12	26.0	-	75	-	
GSX21600S-2D	★	Square	2	16.0	16	32.0	-	90	-	
GSX22000S-2D	★	Square	2	20.0	20	40.0	-	100		

★ - World Wide Warehouse Item



■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow when dry machining.
3. Use wet machining for stainless steel, heat resistant alloy, and titanium alloy applications.
4. If chattering is a pr oblem, 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 groove milling.
6. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.



■ Endmill Identification (GSXMILL Series Only)

GSX 2 0150 S - 2D - S3

1	2	3	4	5	6
Series Code	No. of Teeth	Diameter x 100	Cutting Edge	Cutting Edge Length	Shank Diameter

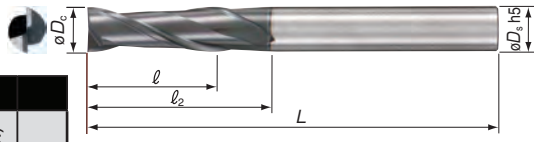
■ Side Milling

Work Material / Cond.	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_c (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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
Standard Depth-of-cut a_p	$2.0D_c$															
Standard Depth-of-cut a_e	$0.02D_c$										$0.01D_c$					

■ Groove Finishing

Work Material / Cond.	Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_c (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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
Standard Depth-of-cut a_p	$1.5D_c$															
Standard Depth-of-cut a_e	$0.02D_c$ Max.															

GSX Series Solid Carbide Endmills



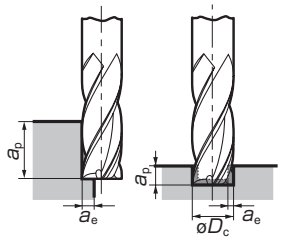
GSX End Mill-METRIC 3D Sharp Edge

ITEM	Stock	Type	Flutes	Diam. (mm)	Shank Diam. (mm)	Flute Length (mm)	Neck Length (mm)	OAL (mm)	Corner Radius (mm)	Fig.
GSX20050S-3D	★	Square	2	0.5	4	1.5	1.9	40	-	
GSX20100S-3D	★	Square	2	1.0	4	3.0	4.0	40	-	
GSX20150S-3D	★	Square	2	1.5	4	4.5	5.5	40	-	
GSX20200S-3D	★	Square	2	2.0	4	6.0	7.0	40	-	
GSX20250S-3D	★	Square	2	2.5	4	7.5	8.5	40	-	
GSX20300S-3D	★	Square	2	3.0	6	9.0	10.5	50	-	
GSX20400S-3D	★	Square	2	4.0	6	12.0	13.5	50	-	
GSX20500S-3D	★	Square	2	5.0	6	15.0	17.0	50	-	
GSX20600S-3D	★	Square	2	6.0	6	18.0	-	50	-	
GSX20800S-3D	★	Square	2	8.0	8	24.0	-	70	-	
GSX21000S-3D	★	Square	2	10.0	10	30.0	-	90	-	
GSX21200S-3D	★	Square	2	12.0	12	36.0	-	90	-	
GSX21600S-3D	★	Square	2	16.0	16	48.0	-	110	-	

★ - World Wide Warehouse Item

■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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.



■ Endmill Identification (GSXMILL Series Only)

GSX 2 0050 S - 3D

1	2	3	4	5
Series Code	No. of Teeth	Diameter x 100 (10mm x 100 = 1000)	Cutting Edge	Cutting Edge Length
			S: Sharp Edge C: Gash Land	

■ Side Milling

Work Material / Cond.		Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_c (mm)		Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)
1.0		14,000	140	14,000	140	14,000	140	13,200	100	8,900	50	6,300	30	8,000	35	6,300	25
2.0		8,100	180	8,100	180	8,100	180	7,600	150	5,300	90	3,700	45	4,400	50	3,800	40
4.0		4,400	240	4,400	240	4,400	240	4,000	150	2,900	110	1,900	55	2,200	65	1,900	50
6.0		2,900	260	2,900	260	2,900	260	2,700	180	2,100	130	1,200	65	1,400	75	1,200	60
8.0		2,200	230	2,200	230	2,200	230	2,000	180	1,600	130	900	65	1,100	75	900	60
10.0		1,800	220	1,800	220	1,800	220	1,600	170	1,300	130	750	65	850	75	750	60
12.0		1,500	200	1,500	200	1,500	200	1,300	170	1,000	130	630	65	700	75	600	60
16.0		1,100	170	1,100	170	1,100	170	1,000	150	800	110	450	55	550	65	450	50
20.0		850	160	850	160	850	160	800	130	600	100	350	50	400	55	350	45
Standard Depth-of-cut	a_p	$2.5D_c$								$2.0D_c$							
	a_e	Below ø3-$0.02D_c$, ø3 and above $0.05D_c$								$0.01D_c$							

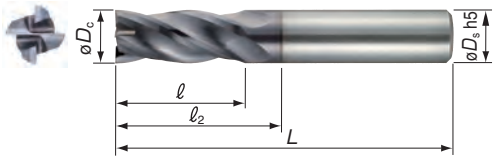
■ Groove Milling

Work Material / Cond.		Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_c (mm)		Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)
1.0		14,000	140	14,000	140	14,000	140	13,200	100	8,900	50	6,300	30	8,000	35	6,300	25
2.0		8,100	180	8,100	180	8,100	180	7,600	150	5,300	90	3,700	45	4,400	50	3,800	40
4.0		4,400	240	4,400	240	4,400	240	4,000	150	2,900	110	1,900	55	2,200	65	1,900	50
6.0		2,900	260	2,900	260	2,900	260	2,700	180	2,100	130	1,200	65	1,400	75	1,200	60
8.0		2,200	230	2,200	230	2,200	230	2,000	180	1,600	130	900	65	1,100	75	900	60
10.0		1,800	220	1,800	220	1,800	220	1,600	170	1,300	130	750	65	850	75	750	60
12.0		1,500	200	1,500	200	1,500	200	1,300	170	1,000	130	630	65	700	75	600	60
16.0		1,100	170	1,100	170	1,100	170	1,000	150	800	110	450	55	550	65	450	50
20.0		850	160	850	160	850	160	800	130	600	100	350	50	400	55	350	45
Standard Depth-of-cut	a_p	$0.02D_c$ Max.															

GSX End Mill-METRIC 2D Sharp Edge

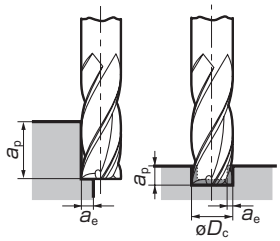
ITEM	Stock	Type	Flutes	Diam. (mm)	Shank Diam. (mm)	Flute Length (mm)	Neck Length (mm)	OAL (mm)	Corner Radius (mm)
GSX40100S-2D	★	Square	4	1.0	4	2.5	3.5	40	-
GSX40100S-2D-S3	★	Square	4	1.0	3	2.5	3.5	38	-
GSX40150S-2D	★	Square	4	1.5	4	3.8	4.8	40	-
GSX40200S-2D	★	Square	4	2.0	4	5.0	6.0	40	-
GSX40200S-2D-S3	★	Square	4	2.0	3	5.0	6.0	38	-
GSX40250S-2D	★	Square	4	2.5	4	6.3	7.3	40	-
GSX40300S-2D	★	Square	4	3.0	6	7.5	9.0	45	-
GSX40300S-2D-S3	★	Square	4	3.0	3	7.5	-	38	-
GSX40350S-2D	★	Square	4	3.5	6	8.8	10.0	45	-
GSX40400S-2D	★	Square	4	4.0	6	11.0	14.0	45	-
GSX40400S-2D-S4	★	Square	4	4.0	4	11.0	-	45	-
GSX40450S-2D	★	Square	4	4.5	6	11.3	12.8	50	-
GSX40500S-2D	★	Square	4	5.0	6	13.0	19.6	50	-
GSX40550S-2D	★	Square	4	5.5	6	13.0	19.6	50	-
GSX40600S-2D	★	Square	4	6.0	6	13.0	-	50	-
GSX40700S-2D	★	Square	4	7.0	8	16.0	21.1	60	-
GSX40800S-2D	★	Square	4	8.0	8	19.0	-	60	-
GSX40900S-2D	★	Square	4	9.0	10	19.0	24.1	70	-
GSX41000S-2D	★	Square	4	10.0	10	22.0	-	70	-
GSX41200S-2D	★	Square	4	12.0	12	26.0	-	75	-
GSX41600S-2D	★	Square	4	16.0	16	32.0	-	90	-
GSX42000S-2D	★	Square	4	20.0	20	40.0	-	100	-

★ - World Wide Warehouse Item



■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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 groove milling.
6. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.



■ Endmill Identification (GSXMILL Series Only)

GSX 4 0100 S - 2D - S3

1	2	3	4	5	6
Series Code	No. of Teeth	Diameter (10mm x 100 = 1000)	Cutting Edge	Cutting Edge Length	Shank Diameter

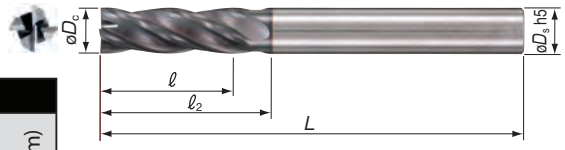
■ Side Milling

Work Material / Cond.	Structural Steel SS		Carbon Steel SC 150 to 250HB		Cast Iron FC		Alloy Steel SCM 25 to 35HRC		Tempered Steel, Hardened Steel NAK, HPM 35 to 45HRC		Hardened Steel 45 to 55HRC		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_c (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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
Standard Depth-of-cut a_p	$2.0D_c$															
Standard Depth-of-cut a_e	$0.03D_c$										$0.01D_c$					

■ Groove Finishing

Work Material / Cond.	Structural Steel SS		Carbon Steel SC 150 to 250HB		Cast Iron FC		Alloy Steel SCM 25 to 35HRC		Tempered Steel, Hardened Steel NAK, HPM 35 to 45HRC		Hardened Steel 45 to 55HRC		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_c (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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
Standard Depth-of-cut a_p	$1.5D_c$															
Standard Depth-of-cut a_e	Below $0.02D_c$															

GSX Series Solid Carbide Endmills



GSX End Mill-METRIC 3D Sharp Edge

ITEM	Stock	Type	Flutes	Diam. (mm)	Shank Diam. (mm)	Flute Length (mm)	Neck Length (mm)	OAL (mm)	Corner Radius (mm)
GSX40100S-3D	★	Square	4	1.0	4	3.0	4.0	40	-
GSX40200S-3D	★	Square	4	2.0	4	6.0	7.0	40	-
GSX40300S-3D	★	Square	4	3.0	6	9.0	10.5	50	-
GSX40400S-3D	★	Square	4	4.0	6	12.0	13.5	50	-
GSX40500S-3D	★	Square	4	5.0	6	15.0	17.0	50	-
GSX40600S-3D	★	Square	4	6.0	6	18.0	-	50	-
GSX40700S-3D	★	Square	4	7.0	8	21.0	23.0	70	-
GSX40800S-3D	★	Square	4	8.0	8	24.0	-	70	-
GSX41000S-3D	★	Square	4	10.0	10	30.0	-	90	-
GSX41200S-3D	★	Square	4	12.0	12	36.0	-	90	-
GSX41600S-3D	★	Square	4	16.0	16	48.0	-	110	-

★ - World Wide Warehouse Item

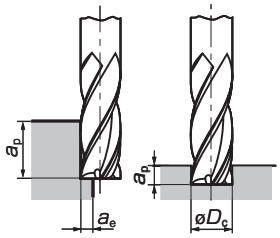
■ Endmill Identification (GSXMILL Series Only)

GSX 4 0100 S - 3D

1	2	3	4	5
Series Code	No. of Teeth	Diameter (10mm x 100 = 1000)	Cutting Edge	Cutting Edge Length

■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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.

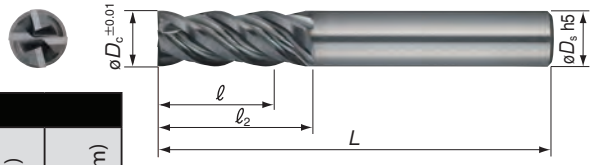


■ Side Milling

Work Material / Cond.		Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_c (mm)		Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)
1.0		18,500	250	18,500	250	18,500	250	17,000	150	11,500	100	8,000	65	9,400	65	8,000	45
2.0		9,400	250	9,400	250	9,400	250	8,500	200	6,700	130	4,000	65	4,600	90	4,000	60
4.0		4,500	350	4,500	350	4,500	350	4,300	250	3,500	210	2,000	110	2,300	110	2,000	70
6.0		3,100	400	3,100	400	3,100	400	2,800	300	2,400	220	1,300	120	1,500	120	1,300	90
8.0		2,300	380	2,300	380	2,300	380	2,100	300	1,800	220	950	120	1,100	120	900	90
10.0		1,800	350	1,800	350	1,800	350	1,700	300	1,400	220	700	120	900	120	800	90
12.0		1,500	350	1,500	350	1,500	350	1,400	300	1,200	220	650	110	750	120	650	90
16.0		1,100	300	1,100	300	1,100	300	1,000	240	900	190	480	90	550	100	490	70
20.0		900	280	900	280	900	280	850	210	700	170	400	80	440	90	400	60
Standard Depth-of-cut	a_p	2.5D_c								2.0D_c							
	a_e	Below ø3: 0.02D_c From ø3 to below ø8: 0.05Dc ø8 and above: 0.07D_c								0.01D_c							

■ Groove Milling

Work Material / Cond.		Structural Steel SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel Titanium Alloy	
D_c (mm)		Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)
1.0		18,500	250	18,500	250	18,500	250	17,000	150	11,500	100	8,000	65	9,400	65	8,000	45
2.0		9,400	250	9,400	250	9,400	250	8,500	200	6,700	130	4,000	65	4,600	90	4,000	60
4.0		4,500	350	4,500	350	4,500	350	4,300	250	3,500	210	2,000	110	2,300	110	2,000	70
6.0		3,100	400	3,100	400	3,100	400	2,800	300	2,400	220	1,300	120	1,500	120	1,300	90
8.0		2,300	380	2,300	380	2,300	380	2,100	300	1,800	220	950	120	1,100	120	900	90
10.0		1,800	350	1,800	350	1,800	350	1,700	300	1,400	220	700	120	900	120	800	90
12.0		1,500	350	1,500	350	1,500	350	1,400	300	1,200	220	650	110	750	120	650	90
16.0		1,100	300	1,100	300	1,100	300	1,000	240	900	190	480	90	550	100	490	70
20.0		900	280	900	280	900	280	850	210	700	170	400	80	440	90	400	60
Standard Depth-of-cut	a_p	0.02D_c Max.															



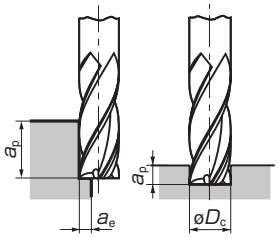
GSX End Mill-METRIC 2D Anti-vibration Type

ITEM	Stock	Type	Flutes	Diam. (mm)	Shank Diam. (mm)	Flute Length (mm)	Neck Length (mm)	OAL (mm)	Corner Radius (mm)
GSXVL4020-2.5D	★	Square	4	2.0	4	5.0	6.5	50	-
GSXVL4030-2.5D	★	Square	4	3.0	6	8.0	9.5	50	-
GSXVL4040-2.5D	★	Square	4	4.0	6	10.0	11.5	50	-
GSXVL4050-2.5D	★	Square	4	5.0	6	13.0	14.5	60	-
GSXVL4060-2.5D	★	Square	4	6.0	6	15.0	-	60	-
GSXVL4070-2.5D	★	Square	4	7.0	8	18.0	20.0	70	-
GSXVL4080-2.5D	★	Square	4	8.0	8	20.0	-	80	-
GSXVL4090-2.5D	★	Square	4	9.0	10	23.0	25.0	90	-
GSXVL4100-2.5D	★	Square	4	10.0	10	25.0	-	90	-
GSXVL4110-2.5D	★	Square	4	11.0	12	28.0	30.5	90	-
GSXVL4120-2.5D	★	Square	4	12.0	12	30.0	-	90	-
GSXVL4140-2.5D	★	Square	4	14.0	16	35.0	37.5	110	-
GSXVL4150-2.5D	★	Square	4	15.0	16	38.0	41.0	110	-
GSXVL4160-2.5D	★	Square	4	16.0	16	40.0	-	115	-
GSXVL4180-2.5D	★	Square	4	18.0	20	45.0	48.0	120	-
GSXVL4200-2.5D	★	Square	4	20.0	20	50.0	-	125	-
GSXVL4250-2.5D	★	Square	4	25.0	25	63.0	-	140	-

★ - World Wide Warehouse Item

■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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.



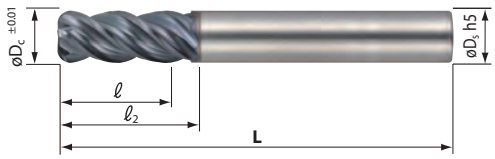
■ Side Milling

Work Material / Cond.	Carbon Steel Cast Iron SS, SC, FC (150 to 250HB)		Cast Iron (25 to 35HRC)		Tempered Steel Hardened Steel NAK HPM (40 to 50HRC)		Stainless Steel SUS304,SUS316		Titanium Alloy	
D_c (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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
Standard Depth-of-cut a_p	$1.5D_c$									
Standard Depth-of-cut a_e	$0.2D_c$				$0.05D_c$		$0.1D_c$		$0.05D_c$	

■ Groove Milling

Work Material / Cond.	Carbon Steel Cast Iron SS, SC, FC (150 to 250HB)		Cast Iron (25 to 35HRC)		Tempered Steel Hardened Steel NAK HPM (40 to 50HRC)		Stainless Steel SUS304,SUS316		Titanium Alloy	
D_c (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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
Standard Depth-of-cut a_p	$1.0D_c$				$0.2D_c$		$0.5D_c$		$0.2D_c$	

GSX Series Solid Carbide Endmills

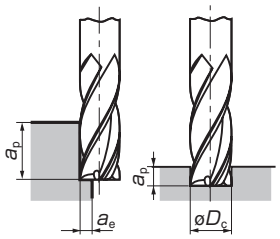


GSX End Mill-METRIC Anti-vibratrion Type									
ITEM	Stock	Type	Flutes	Diam. (mm)	Shank Diam. (mm)	Flute Length (mm)	Neck Length (mm)	OAL (mm)	Corner Radius (mm)
GSXVL4030-R02-2.5D	★	Radius	4	3.0	6	8.0	9.5	50	0.2
GSXVL4030-R05-2.5D	★	Radius	4	3.0	6	8.0	9.5	50	0.5
GSXVL4040-R02-2.5D	★	Radius	4	4.0	6	10.0	11.5	50	0.2
GSXVL4040-R05-2.5D	★	Radius	4	4.0	6	10.0	11.5	50	0.5
GSXVL4040-R10-2.5D	★	Radius	4	4.0	6	10.0	11.5	50	1.0
GSXVL4050-R02-2.5D	★	Radius	4	5.0	6	13.0	14.5	60	0.2
GSXVL4050-R05-2.5D	★	Radius	4	5.0	6	13.0	14.5	60	0.5
GSXVL4050-R10-2.5D	★	Radius	4	5.0	6	13.0	14.5	60	1.0
GSXVL4060-R03-2.5D	★	Radius	4	6.0	6	15.0	-	60	0.3
GSXVL4060-R05-2.5D	★	Radius	4	6.0	6	15.0	-	60	0.5
GSXVL4060-R10-2.5D	★	Radius	4	6.0	6	15.0	-	60	1.0
GSXVL4060-R15-2.5D	★	Radius	4	6.0	6	15.0	-	60	1.5
GSXVL4080-R03-2.5D	★	Radius	4	8.0	8	20.0	-	80	0.3
GSXVL4080-R05-2.5D	★	Radius	4	8.0	8	20.0	-	80	0.5
GSXVL4080-R10-2.5D	★	Radius	4	8.0	8	20.0	-	80	1.0
GSXVL4080-R15-2.5D	★	Radius	4	8.0	8	20.0	-	80	1.5
GSXVL4080-R20-2.5D	★	Radius	4	8.0	8	20.0	-	80	2.0
GSXVL4100-R03-2.5D	★	Radius	4	10.0	10	25.0	-	90	0.3
GSXVL4100-R05-2.5D	★	Radius	4	10.0	10	25.0	-	90	0.5
GSXVL4100-R10-2.5D	★	Radius	4	10.0	10	25.0	-	90	1.0
GSXVL4100-R15-2.5D	★	Radius	4	10.0	10	25.0	-	90	1.5
GSXVL4100-R20-2.5D	★	Radius	4	10.0	10	25.0	-	90	2.0
GSXVL4120-R05-2.5D	★	Radius	4	12.0	12	30.0	-	90	0.5
GSXVL4120-R10-2.5D	★	Radius	4	12.0	12	30.0	-	90	1.0
GSXVL4120-R15-2.5D	★	Radius	4	12.0	12	30.0	-	90	1.5
GSXVL4120-R20-2.5D	★	Radius	4	12.0	12	30.0	-	90	2.0
GSXVL4120-R30-2.5D	★	Radius	4	12.0	12	30.0	-	90	3.0
GSXVL4160-R10-2.5D	★	Radius	4	16.0	16	40.0	-	115	1.0
GSXVL4160-R15-2.5D	★	Radius	4	16.0	16	40.0	-	115	1.5
GSXVL4160-R20-2.5D	★	Radius	4	16.0	16	40.0	-	115	2.0
GSXVL4160-R30-2.5D	★	Radius	4	16.0	16	40.0	-	115	3.0
GSXVL4200-R10-2.5D	★	Radius	4	20.0	20	50.0	-	125	1.0
GSXVL4200-R15-2.5D	★	Radius	4	20.0	20	50.0	-	125	1.5
GSXVL4200-R20-2.5D	★	Radius	4	20.0	20	50.0	-	125	2.0
GSXVL4200-R30-2.5D	★	Radius	4	20.0	20	50.0	-	125	3.0
GSXVL4250-R10-2.5D	★	Radius	4	25.0	25	63.0	-	140	1.0
GSXVL4250-R15-2.5D	★	Radius	4	25.0	25	63.0	-	140	1.5
GSXVL4250-R20-2.5D	★	Radius	4	25.0	25	63.0	-	140	2.0
GSXVL4250-R30-2.5D	★	Radius	4	25.0	25	63.0	-	140	3.0

★ - World Wide Warehouse Item

■ Recommended Cutting Conditions

1. For stable machining performance use rigid, high-precision machines and holders.
2. Use air blow 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.



■ Side Milling

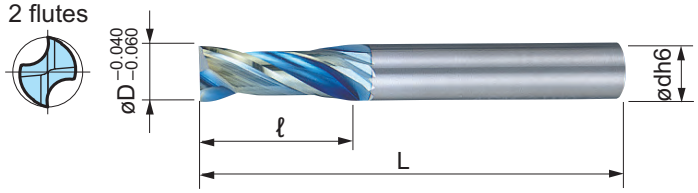
Work Material / Cond.	Carbon Steel , Cast Iron SS, SC, FC (150 to 250HB)		Cast Iron (25 to 35HRC)		Tempered Steel Hardened Steel NAK, HPM (40 to 50HRC)		Stainless Steel SUS304,SUS316		Titanium Alloy	
D_c (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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
Standard Depth-of-cut a_p	$1.5D_c$									
Standard Depth-of-cut a_e	$0.2D_c$				$0.05D_c$		$0.1D_c$		$0.05D_c$	

■ Groove Milling

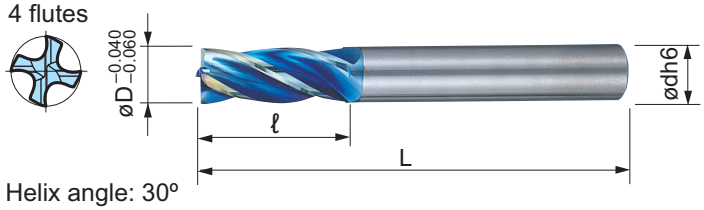
Work Material / Cond.	Carbon Steel , Cast Iron SS, SC, FC (150 to 250HB)		Cast Iron (25 to 35HRC)		Tempered Steel Hardened Steel NAK, HPM (40 to 50HRC)		Stainless Steel SUS304,SUS316		Titanium Alloy	
D_c (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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
Standard Depth-of-cut a_p	$1.0D_c$				$0.2D_c$		$0.5D_c$		$0.2D_c$	

DLC (Diamond Like Carbon) AURORA COAT Series for Non-ferrous Materials

2 flutes



4 flutes



Helix angle: 30°
Corner: Sharp edge
Dia. Range: ø2~16mm

Features & Benefits

- Very smooth AURORA COAT provides low adhesion and good surface finish in non-ferrous alloys.
- With lower cutting forces and rigidity, this series is suitable for low rigidity machines.
- Available in two and four flutes in both square and ballnose type endmills *(see page 84 for SNB Series Ballnose.)*

Two Flutes - METRIC

Catalog No.	Stock	Cutter Dia.d ø	Shank Dia.Dø	Flute Length ℓ	Overall Length L
ASM2020DL	★	2.0mm	4.0mm	6.0mm	40.0mm
ASM2030DL	★	3.0mm	6.0mm	10.0mm	45.0mm
ASM2040DL	★	4.0mm	6.0mm	12.0mm	45.0mm
ASM2050DL	★	5.0mm	6.0mm	15.0mm	50.0mm
ASM2060DL	★	6.0mm	6.0mm	15.0mm	50.0mm
ASM2080DL	★	8.0mm	8.0mm	18.0mm	60.0mm
ASM2100DL	★	10.0mm	10.0mm	22.0mm	71.0mm
ASM2120DL	★	12.0mm	12.0mm	25.0mm	75.0mm
ASM2160DL	★	16.0mm	16.0mm	32.0mm	90.0mm

★ - World Wide Warehouse Item Grade: DL1000

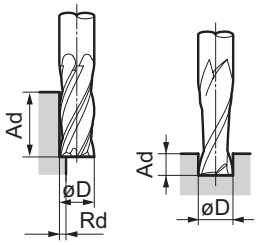
Four Flutes - METRIC

Catalog No.	Stock	Cutter Dia.d ø	Shank Dia.Dø	Flute Length ℓ	Overall Length L
ASM4020DL	★	2.0mm	4.0mm	6.0mm	40.0mm
ASM4030DL	★	3.0mm	6.0mm	10.0mm	45.0mm
ASM4040DL	★	4.0mm	6.0mm	12.0mm	45.0mm
ASM4050DL	★	5.0mm	6.0mm	15.0mm	50.0mm
ASM4060DL	★	6.0mm	6.0mm	15.0mm	50.0mm
ASM4080DL	★	8.0mm	8.0mm	18.0mm	60.0mm
ASM4100DL	★	10.0mm	10.0mm	22.0mm	71.0mm
ASM4120DL	★	12.0mm	12.0mm	25.0mm	75.0mm
ASM4160DL	★	16.0mm	16.0mm	32.0mm	90.0mm

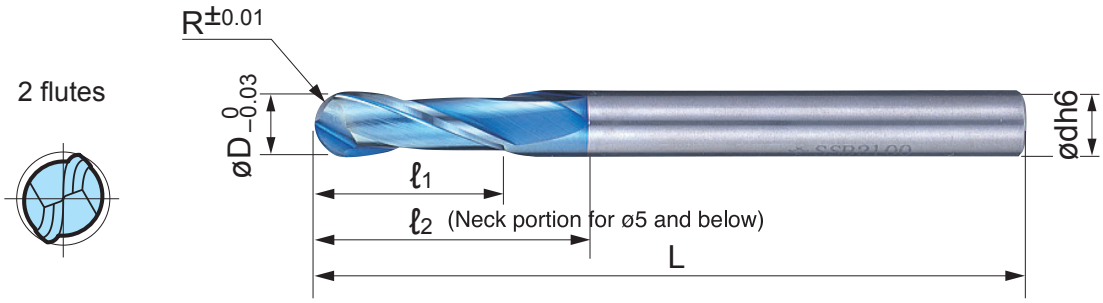
★ - World Wide Warehouse Item Grade: DL1000

Recommended Running Conditions

Radius mm		Aluminum Alloy							
		Wet (Emulsion)				Dry			
		Side Milling (4 flute)		Groove Milling (2 flute)		Side Milling (4 flute)		Groove Milling (2 flute)	
		RPM	Feed Rate mm/min. (ipt)	RPM	Feed Rate mm/min. (ipt)	RPM	Feed Rate mm/min. (ipt)	RPM	Feed Rate mm/min. (ipt)
2		40,000	1,400 (55)	28,000	280 (11)	40,000	980 (38)	28,000	200 (7)
3		32,000	2,000 (80)	22,000	400 (16)	32,000	1,400 (55)	22,000	280 (11)
4		26,000	2,600 (102)	18,000	520 (20)	26,000	1,800 (70)	18,000	360 (14)
5		20,000	2,600 (102)	14,000	520 (20)	20,000	1,800 (70)	14,000	360 (14)
6		17,000	2,700 (106)	12,000	540 (21)	17,000	1,900 (74)	12,000	370 (14)
8		13,000	2,700 (106)	9,000	540 (21)	13,000	1,900 (74)	9,000	370 (14)
10		11,000	2,800 (110)	7,200	560 (22)	11,000	2,000 (80)	7,200	390 (15)
12		8,500	2,800 (110)	6,000	560 (22)	8,500	2,000 (80)	6,000	390 (15)
16		6,400	2,800 (110)	4,500	560 (22)	6,400	2,000 (80)	4,500	390 (15)
D.O.C.	Ad	1.5D		1.0D		1.5D		0.5D	
	Pf	0.2D		1.0D		0.2D		1.0D	



- For groove milling of stainless steel, use 60% recommended RPM and 40% feed rate.
- If cutting noise and vibration occur, please reduce the cutting speed accordingly.



Helix angle :30°

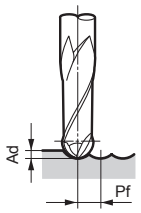
Two Flutes - METRIC							
Sumitomo Catalog No.	Stock	R	øD	ℓ1	ℓ2	L	ød
SNB2020DL	★	1.0mm	2.0mm	3.0mm	5.0mm	60mm	6.0mm
SNB2030DL	★	1.5mm	3.0mm	4.5mm	8.0mm	80mm	6.0mm
SNB2040DL	★	2.0mm	4.0mm	6.0mm	12.0mm	80mm	6.0mm
SNB2050DL	★	2.5mm	5.0mm	7.5mm	14.0mm	90mm	6.0mm
SNB2060DL	★	3.0mm	6.0mm	9.0mm	-	100mm	6.0mm
SNB2080DL	★	4.0mm	8.0mm	12.0mm	-	100mm	8.0mm
SNB2100DL	★	5.0mm	10.0mm	15.0mm	-	120mm	10.0mm
SNB2120DL	★	6.0mm	12.0mm	18.0mm	-	120mm	12.0mm
SNB2160DL	★	8.0mm	16.0mm	24.0mm	-	160mm	16.0mm

★ - World Wide Warehouse Item

Grade: DL1200

Recommended Running Conditions

Radius. mm		Aluminum Alloy			
		Wet (Emulsion)		Dry	
		RPM	Feed Rate mm/min. (ipt)	RPM	Feed Rate mm/min. (ipt)
2		48,000	1,500 (60)	48,000	1,000 (40)
3		38,000	2,100 (83)	38,000	1,500 (60)
4		31,000	2,800 (110)	31,000	2,000 (80)
5		24,000	2,800 (110)	24,000	2,000 (80)
6		20,000	2,800 (110)	20,000	2,000 (80)
8		15,000	2,800 (110)	15,000	2,000 (80)
10		13,000	3,000 (118)	13,000	2,100 (83)
12		10,000	3,000 (118)	10,000	2,100 (83)
16		7,700	3,000 (118)	7,700	2,100 (83)
D.O.C.	Ad	0.1D		0.1D	
	Pf	0.2D		0.2D	



- If cutting noise and vibration occur, please reduce the cutting speed accordingly.
- If the machine cannot reach recommended speed, use the maximum speed that can be achieved.

PCBN Milling

Pages 189 - 194

RM Type

High Speed SUMIBORON Mill for Cast Iron Roughing

Features & Benefits

- High speed, high efficiency milling of gray cast iron
- Solid CBN grade BNS800
- Cost effective 8 cornered regrindable insert
- Four corner insert design yields low tooling costs per part
- Simple design for direct insert mounting

Fig 1

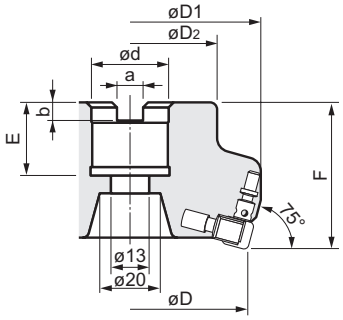
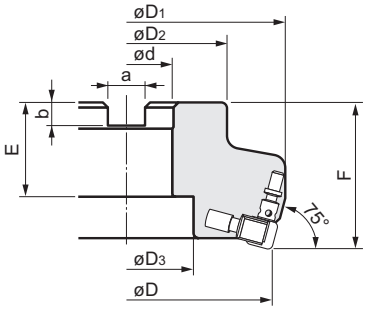


Fig 2

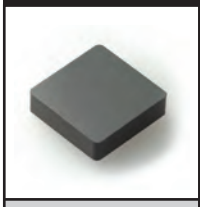


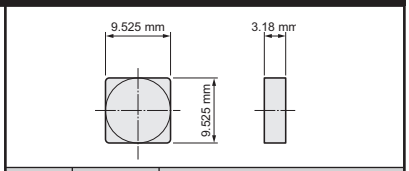
RM Mill Availability - METRIC

Sumitomo Cat. No.	Stock	Dimensions (*mm*)									No. of Teeth	Fig.
		D	D1	D2	D3	F	d	a	b	E		
RM3080R	•	80	90	60	-	50	25.40	9.5	6	25	6	1
RM3100R	•	100	110	70	46	50	31.75	12.7	8	32	8	2
RM3125R	•	125	135	80	59	63	38.10	15.9	10	38	10	2
RM3160R	•	160	170	100	80	63	50.80	19	11	38	12	2

• USA stocked item

Inserts

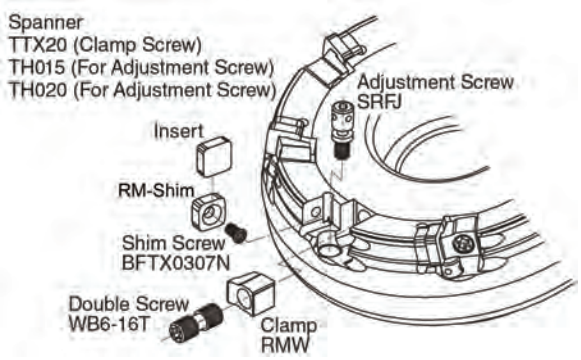




Sumitomo Cat. No.	Stock	Grade	Dimensions (Inches) I.C.	T	Cutting Edge
SNG322	•	BNS800	.375	.125	Standard
SNG323	•		.375	.125	Standard
SNEN090308-W	•		.375	.125	Wiper

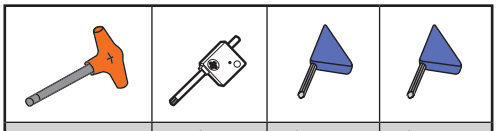
NOTES: 1) Do not use a mix of standard and wiper inserts on a single cutter setting.
2) Do not mix new and reground inserts on a single cutter setting.
3) Inserts can only be reground once (I.C. must be at least .360")

• USA stocked item



Hardware

Clamp	Double Screw	Shim	Shim Screw	Adjustment Screw
RMW	WB6-16T	RM-SHIM	BFTX0307N	SRFJ



Clamp Wrench	Shim Screw Wrench	Adjustment Screw Wrench	Adjustment Screw Wrench
TTX20	TRX10	TH015	TH020

SUMIBORON MILLS

FMU Type

Features & Benefits

- Removeable cartridges for easy insert run-out management.
- Uses BN700 with high CBN content, offering good wear and fracture resistance.
- Available in both shell and small diameter endmill types.
- High speed machining V=6500+ sfm
- Surface roughness Rz=3.2 (1Ra)

Fig 1

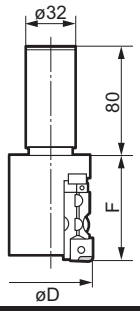


Fig 2

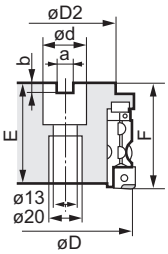
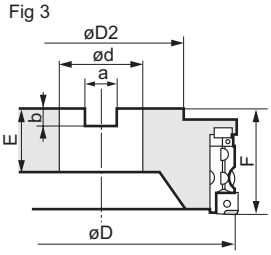


Fig 3

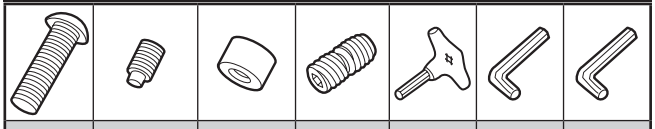


FMU Mill Availability - METRIC

Sumitomo Cat. No.	Stock	Dimensions (*mm*)								No. of Teeth	Fig.
		D	D1	D2	F	d	a	b	E		
FMU4040ER	★	37	40	-	63	-	-	-	-	2	1
FMU4050ER	★	47	50	-	63	-	-	-	-	3	1
FMU4063ER	★	60	63	60	63	25.40	9.5	6	25	4	2
FMU4080R	★	80	82.8	60	63	25.40	9.5	6	25	6	2
FMU4100R	★	100	102.8	75	63	31.75	12.7	8	38	8	3
FMU4125R	★	125	127.8	75	63	38.10	15.9	10	38	10	3
FMU4160R	★	160	162.8	100	63	50.80	19	11	38	12	3

★ Worldwide Warehouse item

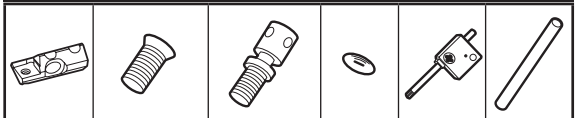
Hardware



Screw	Screw	Setting Clamp	Double Screw	Wrench	Wrench	Wrench
BH0620*	BTD0609	FMUE	WB5-10	TH040	LH030	LH025

* FMU4040ER/4050ER/4063ER use FMUUE type cartridge
* FMUU/FMUUE use similar screw (BFTX0509N), adjustment screw,(FMUJ) and O-ring (P3)

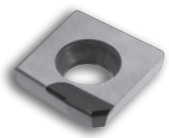
Hardware

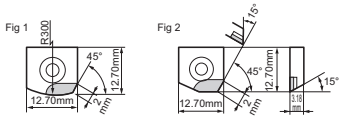


Cartridge	Screw	Adjustment Screw	O-Ring	Wrench	Wrench
FMUU*	BFTX0509N	FMUJ	P3	TRX20	1.8 x 45

* Screw for FMU4040ER/4050ER/4063ER is BH0615

Inserts

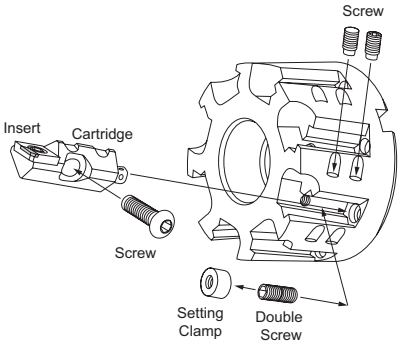




Sumitomo Cat. No.	Stock	Grade	Dimensions (in.) I.C.	Dimensions (in.) T	Fig.
SNEW1203ADTR	•	BN700	.500	.125	1
SNEW1203ADTR-S*	•		.500	.125	2

• USA stocked item

* Low cutting force insert



■ **Gauge**

Setting Gauge
FMU-SET

Gauge not included

FM Type

High Speed SUMIBORON Mill for Cast Iron Finishing

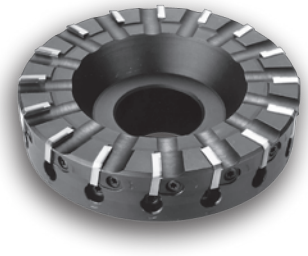


Fig 1

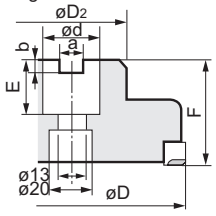
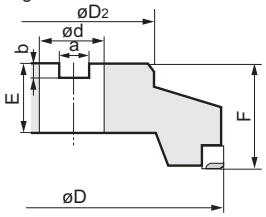


Fig 2

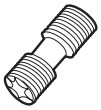


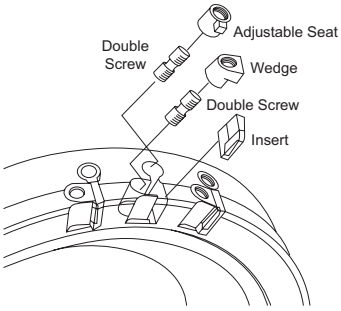
FM Mill Availability - METRIC

Sumitomo Cat. No.	Stock	Dimensions (*mm*)								No. of Teeth	Fig.
		D	D1	D2	F	d	a	b	E		
FM5080R	★	80	82.8	60	50	24.5	9.5	6	25	6	1
FM5100R	★	100	102.8	75	50	31.75	12.7	8	32	8	2
FM5125R	★	125	127.8	75	63	38.10	15.9	10	38	10	2
FM5160R	★	160	162.8	100	63	50.80	19	11	38	12	2

★ Worldwide Warehouse item

Hardware

 Wedge	 Adjustable Seat	 Adjustment Screw	 Double Screw	 Wrench	 Wrench	Applicable Cutter
FMW	FME	FMJ	WB7F-20TL	TT25	1.8 x 45	FM5080R
						FM5100R-FM5160R



Inserts

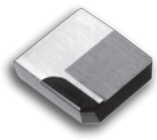


Fig 1

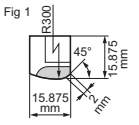
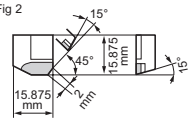


Fig 2

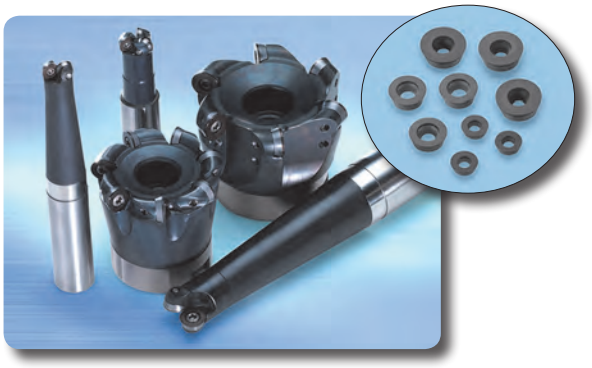


Sumitomo Cat. No.	Stock	Grade	Dimensions (in.)		Fig.
			I.C.	T	
SNEN1504ADTR	•	BN700	.625	.1875	1
SNEN1504ADTR-S*	•		.625	.1875	2

• USA stocked item * Low cutting force insert

SUMIBORON MILLS

BRC Type



Features & Benefits

- High speed, high efficiency milling of hardened mold material.
- Cost effective full-top CBN inserts, multiple corner usage
- Available in both shell and small diameter endmill types.
- Strong clamping with conical insert screw hole design.

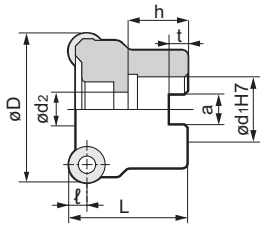


Fig 1

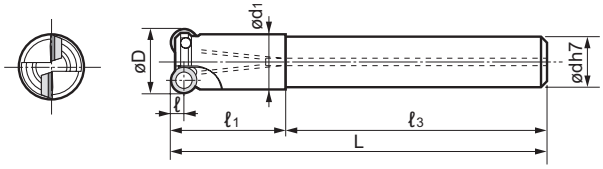


Fig 2

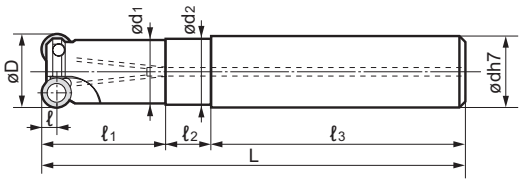
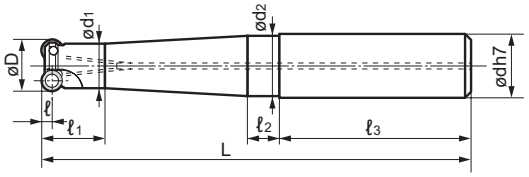


Fig 3



BRC Endmill Availability - METRIC

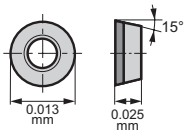
Sumitomo Cat. No.	Stock	Dimensions (mm)									# of teeth	Fig.	Group
		øD	ød	ød1	ød2	ℓ	ℓ1	ℓ2	ℓ3	L			
BRC071207ES10	★	12	10	11	-	3.5	23	-	52	75	2	1	A
BRC071207ES12	★	12	12	11	11.5	3.5	22	8	45	75	2	2	
BRC071208ES16	★	12	16	11	15.5	3.5	16	8	48	88	2	3	
BRC071210ES16	★	12	16	11	15.5	3.5	16	8	48	108	2	3	
BRC071212ES16	★	12	16	11	15.5	3.5	16	8	48	128	2	3	
BRC071507ES12	★	15	12	12.5	-	3.5	16	-	59	75	3	1	
BRC071507ES16	★	15	16	12.5	13	3.5	19	11	48	78	3	2	
BRC071508ES16	★	15	16	13.5	15.5	3.5	20	8	48	88	2	3	B
BRC071510ES16	★	15	16	13.5	15.5	3.5	20	8	48	108	2		
BRC071513ES20	★	15	20	13.5	19.5	3.5	22	8	50	130	2		
BRC071515ES20	★	15	20	13.5	19.5	3.5	22	8	50	150	2		
BRC071517ES25	★	15	25	13.5	24.5	3.5	22	8	56	176	2		
BRC102009ES20	★	20	20	17	19.5	5	20	8	50	90	2		C
BRC102011ES20	★	20	20	17	19.5	5	22	8	50	110	2		
BRC102012ES25	★	20	25	17	24.5	5	24	8	56	136	2		
BRC102015ES25	★	20	25	17	24.5	5	24	8	56	156	2		
BRC102017ES25	★	20	25	17	24.5	5	24	8	56	176	2		

BRC Shell Mill Availability - METRIC

Sumitomo Cat. No.	Stock	Dimensions (mm)								# of teeth	Group
		øD	ød1	ød2	ℓ	L	h	a	t		
BRC10042R	★	42	16	9	5	44	20	8	6	6	C
BRC10052R	★	52	22	11	5	50	30	10	7	7	
BRC12042R	★	42	16	9	6	42	20	8	6	5	D
BRC12052R	★	52	22	11	6	52	30	10	7	5	
BRC12066R	★	66	27	13	6	52	30	12	7	6	

★ - World Wide Warehouse Item

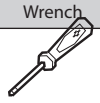
Inserts



Sumitomo Cat. No.	Stock		Dimensions (in)		Applicable Holder (Grp.)
	BN350	BN700	I.C.	T	
RDHX0701M0T	★	★	.276	.078	A
RDHX0702M0T	★	★	.276	.094	B
RDHX1003M0T	★	★	.394	.125	C
RDHX12T3M0T	★	★	.472	.156	D

★ - World Wide Warehouse Item

Hardware

Screw	Wrench	Applicable Holder (Grp)
		
BFTB025048	TRD07	A
BFTB02505	TRD07	B
BFTB035074	TRD15	C,D

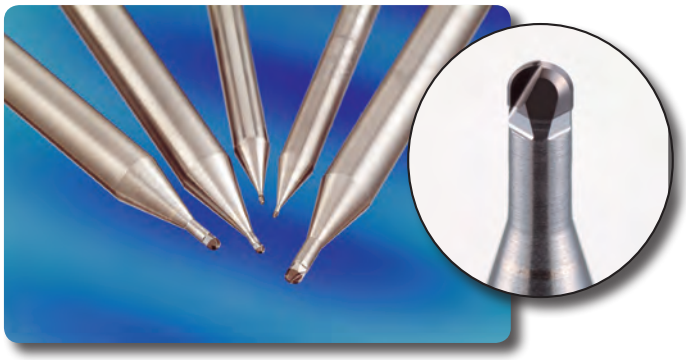
Recommended Running Conditions

Conditions	Steel			Cast Iron
	40~45HRC	47~55HRC	58~62HRC	-
	BN700		BN350	BN700
V (sfm)	655~2625	490~1310	260~655	980~4920
f (ipt)	.004~.016	.004~.012	.004~.008	.004~.016
d (in)	.020	.020	.020	.020

Mold Finish Master BNBP Type

High Speed, High Precision SUMIBORON Mill for Pre-Hardened/Hardened Steel

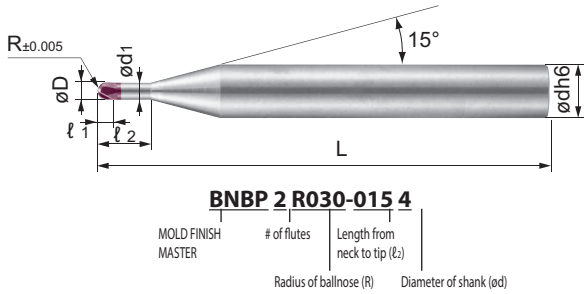
MOLD FINISH MASTER
SUMIBORON MOLD FINISH MASTER



Features & Benefits

- Longer tool life in high speed, high precision machining of pre-hardened and hardened steel (~HRC70.)
- Uses SUMIBORON BN350 for excellent chipping resistance.
- High precision radial cutting edge profile accuracy of ± 0.0002 in. (0.005mm.)
- Excellent surface finish with a polishing process that is greatly reduced compared to solid carbide endmills.

BNBP Endmill Availability - METRIC

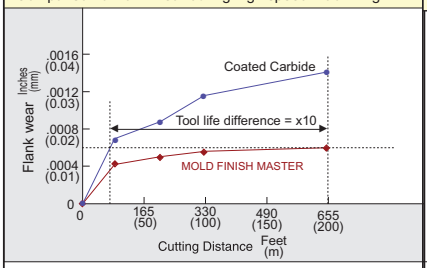


Size	Sumitomo Cat. No.	Stock	Dimensions (mm)						
		BN350	R	øD	L	ød1	ød	ℓ1	ℓ2
ø4 Shank	BNBP2R020-0124	●	0.20	0.4	50	0.37	4.0	0.3	1.2
	BNBP2R030-0154	●	0.30	0.6	50	0.57	4.0	0.4	1.5
	BNBP2R050-0254	●	0.50	1.0	50	0.97	4.0	0.6	2.5
	BNBP2R075-0404	●	0.75	1.5	50	1.47	4.0	0.9	4.0
	BNBP2R100-0554	●	1.00	2.0	50	1.97	4.0	1.4	5.5
ø6 Shank	BNBP2R020-0126	●	0.20	0.4	50	0.37	4.0	0.3	1.2
	BNBP2R030-0156	●	0.30	0.6	50	0.57	4.0	0.4	1.5
	BNBP2R050-0256	●	0.50	1.0	50	0.97	4.0	0.6	2.5
	BNBP2R075-0406	●	0.75	1.5	50	1.47	4.0	0.9	4.0
	BNBP2R100-0556	●	1.00	2.0	50	1.97	4.0	1.4	5.5

●: USA Stock Item

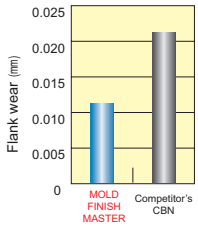
BNBP Performance

Comparison of flank wear during high speed machining

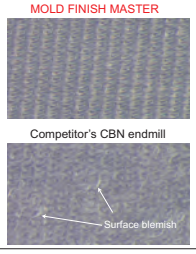


R1.0 Endmill Work: SKD11 (60HRC) N=40,000 min⁻¹ f=0.002 ipt (0.05mm/tooth) F=157 ipm (F=4,000mm/min) Ad=0.002 in. (0.05mm) Rd=0.002 in. (0.05mm) Oil mist

Wear amount at the ballnose tip



Machined surface



R1.0 Endmill Work: SKD11(60HRC)Milling length: 100m N=20,000 min⁻¹ f=0.05mm/tooth (F=2,000mm/min) Ad=0.05mm Rd=0.05mm, Air blow

Recommended Running Conditions

Ballnose Radius mm (in)	STAVAX, NAK80, SKD61 (~52HRC)				SDK11 (~62HRC)				SKH (~70HRC)			
	RPM	Feedrate mm/tooth (ipt)	D.O.C. Ad mm (in)	D.O.C. Rd mm (in)	RPM	Feedrate mm/tooth (ipt)	D.O.C. Ad mm (in)	D.O.C. Rd mm (in)	RPM	Feedrate mm/tooth (ipt)	D.O.C. Ad mm (in)	D.O.C. Rd mm (in)
R0.2 (.008)	20,000~ 50,000	.02 (.0008)	.03 (.001)	.03 (.001)	20,000~ 50,000	.02 (.0008)	.01 (.0004)	.02 (.008)	20,000~ 50,000	.015 (.0006)	.01 (.0004)	.02 (.0008)
R0.3 (.012)	20,000~ 50,000	.02 (.0008)	.03 (.001)	.03 (.001)	20,000~ 50,000	.02 (.0008)	.01 (.0004)	.02 (.0008)	20,000~ 50,000	.015 (.0006)	.01 (.0004)	.02 (.0008)
R0.5 (.020)	20,000~ 50,000	.03 (.001)	.05 (.002)	.05 (.002)	20,000~ 50,000	.03 (.001)	.03 (.001)	.04 (.002)	20,000~ 50,000	.02 (.0008)	.02 (.0008)	.03 (.001)
R0.75 (.030)	20,000~ 50,000	.04 (.002)	.08 (.003)	0.1 (.004)	20,000~ 50,000	.04 (.002)	.05 (.002)	.05 (.002)	20,000~ 50,000	.03 (.001)	.02 (.0008)	.05 (.002)
R1.0 (.040)	20,000~ 50,000	.05 (.002)	0.1 (.004)	0.1 (.004)	17,000~ 50,000	.05 (.002)	.05 (.002)	.05 (.002)	17,000~ 50,000	.03 (.001)	.03 (.001)	.05 (.002)

NOTES:
- For stable machining, a more rigid machine is recommended.
- Air blow or oil mist coolant is recommended.
- Shorten overhang as much as possible.

Drill Systems

Pages 195 - 239

Drill Selection

P Steel
M Stainless Steel
K Cast Iron
N Non-ferrous
S Exotic Materials
H Hardened Steel

Solid Carbide

MDW-GS Series p. 202-210

P M K H — 2XD 4XD

MDS-V/HV Series *

P M K S H — 2.5XD 3.5XD 4XD 5XD

MDW-HGS Series p. 211-222

P M K N S H — 3XD 5XD 8XD

Brazed

KDS-AV Series *

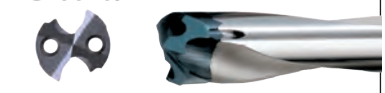
P K — 3XD 5XD

Indexable

WDX Series *

P M K N S — 2XD 4XD 3XD 5XD

SMD Series *



P M K N S H — 3XD 5XD 8XD

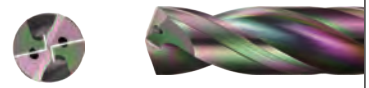
Deep Hole

XHV Series p. 234-238

P M K N H — 12XD 20XD

Precision

NHGS Series p.231



K N — 5XD

Mini Drills

MDSS Series p. 229-230

P M K N S H — 5XD

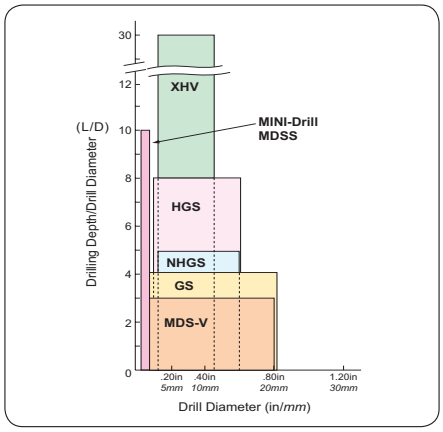
MDUS Series p. 228

P M N S — 8XD

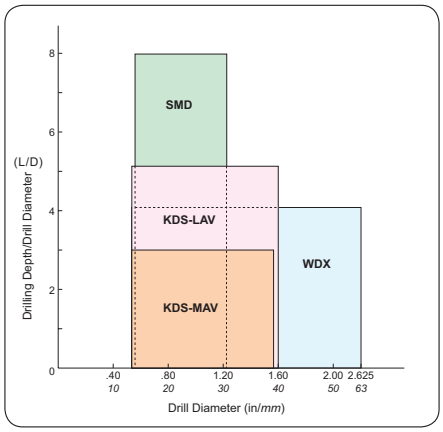
MLDH Series p. 226-227

P M K N S H — 5D 12D 20D 30D

■ Application Range - *Solid*



■ Application Range - *Indexable*



* Drill lineup available in 2015/2016 Sumitomo General Catalog

Drill Selection

P Steel **K** Cast Iron **S** Exotic Materials
M Stainless Steel **N** Non-ferrous **H** Hardened Steel

Type	Series	Coolant: Internal	Coolant: External	Coating/ Insert Grade	Dia. Min to Max (in / *mm*)	Drilling Depth	Catalog Number	P: Soft Steel	P: General Steel	H: 45HRC	H: 60HRC	M: Stainless Steel	S: Titanium Alloy	S: Inconel	K: Gray Cast Iron	K: Ductile Cast Iron	N: Aluminum Alloy	N: Copper Alloy
Solid	**GS**		●	DEX	.1110-.6250 *2.00-16.00*	2XD	MDW□□□□□GS2	✓	✓	●		●			✓	✓		
					.2010-.6250 *2.00-16.00*	4XD	MDW□□□□□GS4											
	HGS	●		DEX	.1094-.6250 *1.50-16.00*	3XD	MDW□□□□□HGS3	✓	✓	●		✓	✓	✓	✓	✓	▲	●
					.1250-.6250 *2.00-16.00*	5XD	MDW□□□□□HGS5											
					.1250-.6250 *2.00-16.00*	8XD	MDW□□□□□HGS8											
	MDS-V*		●	TiAlN	.1110-.7812 *2.80-19.50*	2.5XD	MDS□□□□V	✓	✓	●		●			✓	✓		
					.2460-.7812 *6.00-19.50*	3.5XD												
	MDS-HV*	●		TiAlN	.1094-.7812 *1.50-20.00*	4XD	MDS□□□□MHV MDS□□□□LHV	✓	✓	●		✓	●	●	✓	✓	▲	●
					.1250-.7812 *4.00-20.00*	5XD												
	XHV	●		DEX	.1250-.7500 *3.00-14.00*	12XD	MDW□□□□□XHV12	✓	✓	●		●			✓	✓	●	●
					.1250-.5310 *3.00-14.00*	20XD	MDW□□□□□XHV20											
	MLDH	●		PVD	.0315-.0788 *0.8-2.00*	30XD	MLDH□□□□L□□	✓	✓	●		✓			✓	✓	●	
	MDUS		●	Special	.0012-.0071 *0.030-0.180*	10XD	MDUS□□□□-30C	✓	✓			✓	●					✓
	MDSS		●	Special	.0080-.0394 *0.20-1.00*	10XD	MDSS□□□□	✓	✓	✓	●	✓	●	●	✓	✓	●	●
	NHGS*	●		DLC	*3.00-16.00*	5XD	MDW□□□□NHGS5								●	●	✓	✓
Indexable	**WDX***		●	ACP300	.5620-2.625 *13.00-68.00*	2XD	WDX□□□□D2S1□□	✓	✓			✓	●	●				
						3XD	WDX□□□□D3S1□□											
				ACK300		4XD	WDX□□□□D4S1□□								✓	✓		
	SMD* (MTL, MEL, MTL-C)	●		DEX	.4688-1.2125 *12.00-30.80*	3XD	SMDH□□□M	✓	✓	●		●			●	✓		●
					.4688-1.2125 *12.00-30.80*	5XD	SMDH□□□L	✓	●			✓	●	●	✓	✓	●	●
					.4688-1.2125 *13.50-30.80*	8XD	SMDH□□□D								✓	✓		
Brazed	**KDS***	●		TiAlN	.3750-1.1875 *10.00-30.00*	3XD	KDS□□□□MAV	✓	✓	●		●			●	✓	▲	●
					.3750-1.1875 *14.00-26.00*	5XD	KDS□□□□LAV											

✓: Best ●: Good ▲: Requires sharp edge * Drill lineup available in 2015/2016 Sumitomo General Catalog

■ Drill Identification

MDS 150 M HV
- MDS: Classification code
- 150: Drill dia. (φ15.0 mm)
- M: Length code (S,M,L,D)
- HV: Series name

MDW 01250 GS 2
- MDW: Classification code
- 01250: Drill dia. (φ.125 in)
- GS: Series name
- 2: Length code (2,5,8,15,20,25)

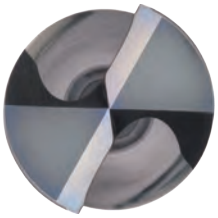
Solid Carbide Drills

Pages 199 - 223

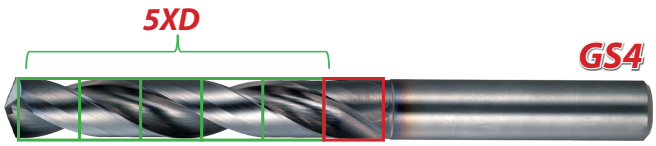
Super Drill for Super Alloys!

Longer flute lengths for deeper hole capability and more material available for regrinding.

Newly developed PVD DEX coating provides improved heat and wear resistance at increased speeds.

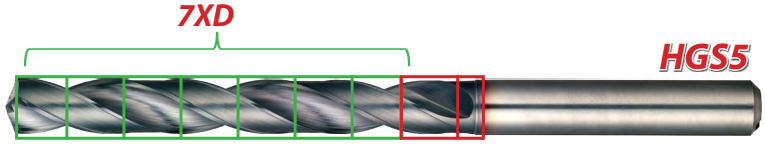


GS Series - *External Coolant*:
- GS2 (2XD) - Possible to drill to 3XD*
- GS4 (4XD) - Possible to drill to 5XD*

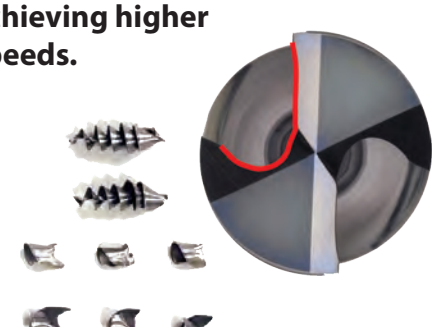


Unique thinning design promotes stable drilling performance.

HGS Series - *Internal Coolant*:
- HGS3 (3XD) - Possible to drill to 4XD*
- HGS5 (5XD) - Possible to drill to 7XD*
- HGS8 (8XD) - Possible to drill to 10XD*



J-Flute design offers a wide chip pocket, producing more compact chips while achieving higher speeds.



* Not all drills can achieve this depth and some drills may have even deeper capability. ***Always check for sufficient flute length.***

■ Features & Benefits

- **Long Tool Life**
  New cutting edge design and special DEX coating provide long tool life in a wide variety of work materials

- **Stable Chip Evacuation**
  New flute design and wide chip pocket allows for excellent chip management and evacuation

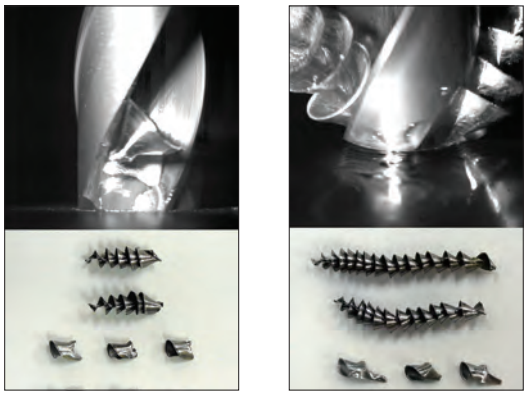
- **Quiet Cutting & Stable Cutting**
  Stable drilling with minimal vibration even in small machine applications

- **Environmentally Friendly**
  Compatible with MQL (Minimum Quantity Lubrication) Systems

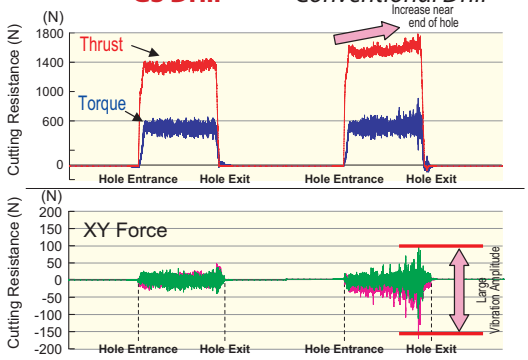
■ Performance

Chip Control Comparison	Performance Comparison

GS Drill *Conventional Drill*



GS Drill *Conventional Drill*

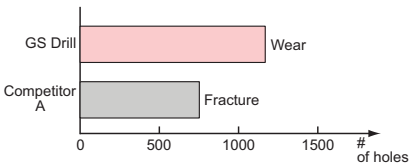


The GS Drill provides better stability throughout the drilling proccess.

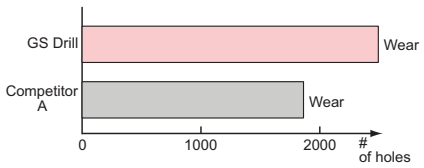
Tool: MDW0800GS4
Work Material: 1049 steel (200HB)
Cutting Conditions: V_c = 80m/min (262 sfm)
f = 0.25mm/rev (0.10 ipr)
H = 24mm (0.945 in)
External coolant (water soluble)

■ Application Examples

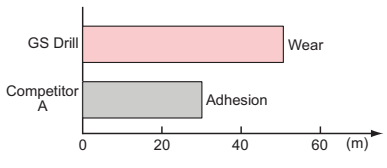
Automotive Component - 1043 Steel (250HB)
- Tool: MDW0970GS4
- Cutting Conditions:
  V_c = 80m/min (262 sfm) f = 0.25mm/rev (0.010 ipr) H = 25mm (0.945 in)
  External coolant (water soluble)



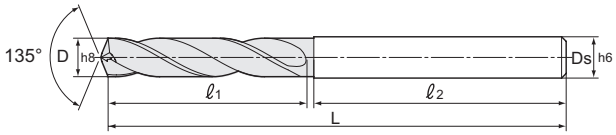
Machine Component - Boron Steel (30HRC)
- Tool: MDW0980GS2
- Cutting Conditions:
  V_c = 70m/min (230 sfm) f = 0.15mm/rev (0.006 ipr) H = 7mm (0.276 in)
  External coolant (water soluble)



Machine Component - 1018 Steel
- Tool: MDW0800HGS8
- Cutting Conditions:
  V_c = 80m/min (262 sfm) f = 0.25mm/rev (0.010 ipr) H = 64mm (2.520 in)
  External coolant (water soluble)



MDW-GS2 Series Solid Carbide Drills



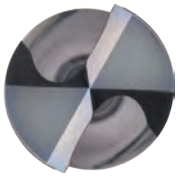
MDW-GS2 2XD drill for excellent chip management and long tool life (External coolant)

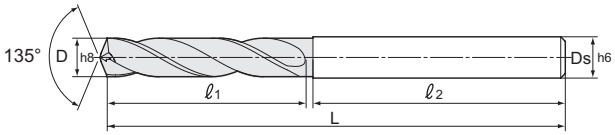
Catalog Number (inch/*metric*)	Stock	Fractional Wire & Letters	Diameter D (in)	Diameter D (*mm*)	Overall Length L (in/*mm*)	Flute Length ℓ1 (in/*mm*)	Shank Length ℓ2 (in/*mm*)	Shank Diameter Ds (in/*mm*)	Tap Size
MDW0200GS2	●		0.0787	*2.00*	*45.0*	*8.0*	*34.0*	*3.0*	
MDW0210GS2	●		0.0827	*2.10*	*45.0*	*10.0*	*32.0*	*3.0*	3-56
MDW0220GS2	●		0.0866	*2.20*	*45.0*	*10.0*	*32.0*	*3.0*	
MDW0230GS2	●		0.0906	*2.30*	*45.0*	*10.0*	*32.0*	*3.0*	
MDW00937GS2	●	3/32	0.0940	*2.38*	1.772	0.394	1.260	0.1250	
MDW0240GS2	●		0.0945	*2.40*	*45.0*	*10.0*	*32.0*	*3.0*	
MDW0250GS2	●		0.0984	*2.50*	*45.0*	*10.0*	*32.0*	*3.0*	
MDW0260GS2	●		0.1024	*2.60*	*45.0*	*13.0*	*30.0*	*3.0*	
MDW0270GS2	●		0.1063	*2.70*	*45.0*	*13.0*	*30.0*	*3.0*	6-32
MDW0280GS2	●		0.1102	*2.80*	*45.0*	*13.0*	*30.0*	*3.0*	
MDW01110GS2	●		0.1110	*2.82*	1.7717	0.5118	1.1811	0.1250	
MDW01130GS2	●		0.1130	*2.87*	1.7717	0.5118	1.1811	0.1250	6-40
MDW0290GS2	●		0.1142	*2.90*	*45.0*	*13.0*	*30.0*	*3.0*	3.5x.6
MDW01160GS2	●		0.1160	*2.95*	1.7717	0.5118	1.1811	0.1250	
MDW0300GS2	●		0.1181	*3.00*	*45.0*	*13.0*	*30.0*	*3.0*	
MDW01200GS2	●		0.1200	*3.05*	1.7717	0.5118	1.1811	0.1250	
MDW0310GS2	●		0.1220	*3.10*	*54.0*	*19.0*	*33.0*	*4.0*	
MDW01250GS2	●	1/8	0.1250	*3.18*	1.7717	0.5118	1.1811	0.1250	
MDW0320GS2	●		0.1260	*3.20*	*54.0*	*19.0*	*33.0*	*4.0*	
MDW01285GS2	●		0.1285	*3.26*	2.1260	0.7480	1.2992	0.1562	
MDW0330GS2	●		0.1299	*3.30*	*54.0*	*19.0*	*33.0*	*4.0*	M4x.7
MDW0340GS2	●		0.1339	*3.40*	*54.0*	*19.0*	*33.0*	*4.0*	
MDW01360GS2	●		0.1360	*3.45*	2.1260	0.7480	1.2992	0.1562	8-32/8-36
MDW0350GS2	●		0.1378	*3.50*	*54.0*	*19.0*	*33.0*	*4.0*	
MDW01405GS2	●		0.1405	*3.57*	2.1260	0.8268	1.2992	0.1562	
MDW01406GS2	●		0.1406	*3.57*	2.1260	0.8268	1.2992	0.1562	
MDW0360GS2	●		0.1417	*3.60*	*54.0*	*21.0*	*33.0*	*4.0*	
MDW01440GS2	●		0.1440	*3.66*	2.1260	0.8268	1.2992	0.1562	
MDW0370GS2	●		0.1457	*3.70*	*54.0*	*21.0*	*33.0*	*4.0*	M4.5x.7
MDW01470GS2	●		0.1470	*3.73*	2.1260	0.8268	1.2992	0.1562	
MDW01495GS2	●		0.1495	*3.797*	2.1260	0.8268	1.2992	0.1562	10-24
MDW0380GS2	●		0.1496	*3.80*	*54.0*	*21.0*	*33.0*	*4.0*	
MDW01520GS2	●		0.1520	*3.86*	2.1260	0.8268	1.2992	0.1562	
MDW0390GS2	●		0.1535	*3.90*	*54.0*	*21.0*	*33.0*	*4.0*	
MDW01540GS2	●		0.1540	*3.91*	2.1260	0.8268	1.2992	0.1562	
MDW01562GS2	●	5/32	0.1562	*3.97*	2.1260	0.8268	1.2992	0.1562	
MDW01570GS2	●		0.1570	*3.99*	2.4016	0.9055	1.4173	0.1875	
MDW0400GS2	●		0.1575	*4.00*	*54.0*	*21.0*	*33.0*	*4.0*	
MDW01590GS2	●	#21	0.1590	*4.04*	2.4016	0.9055	1.4173	0.1875	10-32
MDW01610GS2	●		0.1610	*4.09*	2.4016	0.9055	1.4173	0.1875	
MDW0410GS2	●		0.1614	*4.10*	*61.0*	*23.0*	*36.0*	*5.0*	
MDW0420GS2	●		0.1654	*4.20*	*61.0*	*23.0*	*36.0*	*5.0*	M5x.8
MDW01660GS2	●		0.1660	*4.22*	2.4016	0.9055	1.4173	0.1875	
MDW0430GS2	●		0.1693	*4.30*	*61.0*	*23.0*	*36.0*	*5.0*	
MDW01695GS2	●		0.1695	*4.31*	2.4016	0.9055	1.4173	0.1875	
MDW01719GS2	●	11/64	0.1719	*4.37*	2.4016	0.9055	1.4173	0.1875	
MDW01730GS2	●		0.1730	*4.39*	2.4016	0.9055	1.4173	0.1875	
MDW0440GS2	●		0.1732	*4.40*	*61.0*	*23.0*	*36.0*	*5.0*	
MDW01770GS2	●		0.1770	*4.49*	2.4016	0.9055	1.4173	0.1875	12-24

●=USA stocked item

Some drills can achieve greater depths. Always check for sufficient flute length. Note: Special diameters available upon request.

SERIES
MDW-GS2



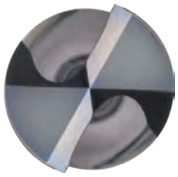


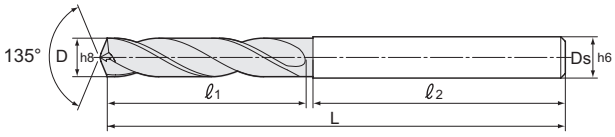
MDW-GS2 2XD drill for excellent chip management and long tool life (External coolant)

Catalog Number (inch/*metric*)	Stock	Fractional Wire & Letters	Diameter D (in)	Diameter D (*mm*)	Overall Length L (in/*mm*)	Flute Length ℓ1 (in/*mm*)	Shank Length ℓ2 (in/*mm*)	Shank Diameter Ds (in/*mm*)	Tap Size
MDW0450GS2	●		0.1772	*4.50*	*61.0*	*23.0*	*36.0*	*5.0*	
MDW01800GS2	●		0.1800	*4.57*	2.4016	0.9843	1.4173	0.1875	
MDW0460GS2	●		0.1811	*4.60*	*61.0*	*25.0*	*36.0*	*5.0*	
MDW01820GS2	●		0.1820	*4.62*	2.4016	0.9843	1.4173	0.1875	12-28
MDW01850GS2	●		0.1850	*4.70*	2.4016	0.9843	1.4173	0.1875	
MDW0470GS2	●		0.1850	*4.70*	*61.0*	*25.0*	*36.0*	*5.0*	
MDW01875GS2	●	3/16	0.1875	*4.76*	2.4016	0.9843	1.4173	0.1875	
MDW0480GS2	●		0.1890	*4.80*	*61.0*	*25.0*	*36.0*	*5.0*	
MDW01890GS2	●		0.1890	*4.80*	2.5591	0.9843	1.4961	0.2344	
MDW01910GS2	●		0.1910	*4.85*	2.5591	0.9843	1.4961	0.2344	
MDW0490GS2	●		0.1929	*4.90*	*61.0*	*25.0*	*36.0*	*5.0*	
MDW01935GS2	●		0.1935	*4.91*	2.5591	0.9843	1.4961	0.2344	
MDW01960GS2	●		0.1960	*4.98*	2.5591	0.9843	1.4961	0.2344	
MDW0500GS2	●		0.1969	*5.00*	*61.0*	*25.0*	*36.0*	*5.0*	M6x1
MDW0510GS2	●		0.2008	*5.10*	*65.0*	*25.0*	*38.0*	*6.0*	
MDW02010GS2	●	#7	0.2010	*5.11*	2.5591	0.9843	1.4961	0.2344	1/4-20
MDW02031GS2	●	13/64	0.2031	*5.16*	2.5591	0.9843	1.4961	0.2344	
MDW02040GS2	●		0.2040	*5.18*	2.5591	0.9843	1.4961	0.2344	
MDW0520GS2	●		0.2047	*5.20*	*65.0*	*25.0*	*38.0*	*6.0*	
MDW02055GS2	●		0.2055	*5.22*	2.5591	0.9843	1.4961	0.2344	
MDW0530GS2	●		0.2087	*5.30*	*65.0*	*25.0*	*38.0*	*6.0*	
MDW02090GS2	●		0.2090	*5.31*	2.5591	0.9843	1.4961	0.2344	
MDW0540GS2	●		0.2126	*5.40*	*65.0*	*25.0*	*38.0*	*6.0*	
MDW02130GS2	●	#3	0.2130	*5.41*	2.5591	0.9843	1.4961	0.2344	
MDW0550GS2	●		0.2165	*5.50*	*65.0*	*25.0*	*38.0*	*6.0*	
MDW02188GS2	●	7/32	0.2188	*5.56*	2.5591	1.0630	1.4961	0.2344	1/4-28
MDW0560GS2	●		0.2205	*5.60*	*65.0*	*27.0*	*38.0*	*6.0*	
MDW02210GS2	●	#2	0.2210	*5.61*	2.5591	1.0630	1.4961	0.2344	
MDW0570GS2	●		0.2244	*5.70*	*65.0*	*27.0*	*38.0*	*6.0*	
MDW02280GS2	●		0.2280	*5.79*	2.5591	1.0630	1.4961	0.2344	
MDW0580GS2	●		0.2283	*5.80*	*65.0*	*27.0*	*38.0*	*6.0*	
MDW0590GS2	●		0.2323	*5.90*	*65.0*	*27.0*	*38.0*	*6.0*	
MDW02340GS2	●		0.2340	*5.94*	2.5591	1.0630	1.4961	0.2344	
MDW02344GS2	●	15/64	0.2344	*5.95*	2.5591	1.0630	1.4961	0.2344	
MDW0600GS2	●		0.2362	*6.00*	*65.0*	*27.0*	*38.0*	*6.0*	M7x1
MDW02380GS2	●		0.2380	*6.05*	2.8740	1.2205	1.5748	0.2812	
MDW0610GS2	●		0.2402	*6.10*	*73.0*	*31.0*	*40.0*	*7.0*	
MDW02420GS2	●	#C	0.2420	*6.15*	2.8740	1.2205	1.5748	0.2812	
MDW0620GS2	●		0.2441	*6.20*	*73.0*	*31.0*	*40.0*	*7.0*	
MDW02460GS2	●		0.2460	*6.25*	2.8740	1.2205	1.5748	0.2812	
MDW0630GS2	●		0.2480	*6.30*	*73.0*	*31.0*	*40.0*	*7.0*	
MDW02500GS2	●	1/4	0.2500	*6.35*	2.8740	1.2205	1.5748	0.2812	
MDW0640GS2	●		0.2520	*6.40*	*73.0*	*31.0*	*40.0*	*7.0*	
MDW0650GS2	●		0.2559	*6.50*	*73.0*	*31.0*	*40.0*	*7.0*	
MDW02570GS2	●	#F	0.2570	*6.53*	2.8740	1.2992	1.5748	0.2812	5/16-18
MDW0660GS2	●		0.2598	*6.60*	*73.0*	*33.0*	*40.0*	*7.0*	
MDW02600GS2	●		0.2600	*6.604*	2.8740	1.2992	1.5748	0.2812	
MDW02610GS2	●		0.2610	*6.63*	2.8740	1.2992	1.5748	0.2812	

●=USA stocked item ★= Worldwide Warehouse item available in 10 business days
Some drills can achieve greater depths. Always check for sufficient flute length. Note: Special diameters available upon request.

MDW-GS2 Series Solid Carbide Drills



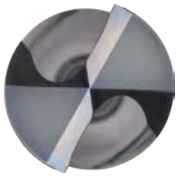


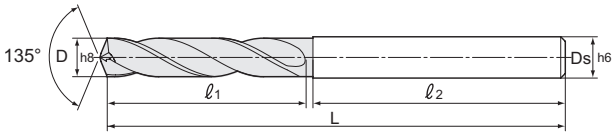
MDW-GS2 2XD drill for excellent chip management and long tool life (External coolant)

Catalog Number (inch/*metric*)	Stock	Fractional Wire & Letters	Diameter D (in)	Diameter D (*mm*)	Overall Length L (in/*mm*)	Flute Length ℓ1 (in/*mm*)	Shank Length ℓ2 (in/*mm*)	Shank Diameter Ds (in/*mm*)	Tap Size
MDW0670GS2	●		0.2638	*6.70*	*73.0*	*33.0*	*40.0*	*7.0*	
MDW02656GS2	●	17/64	0.2656	*6.75*	2.8740	1.2992	1.5748	0.2812	
MDW02660GS2	●	#H	0.2660	*6.76*	2.8740	1.2992	1.5748	0.2812	
MDW02677GS2	●		0.2677	*6.80*	2.8740	1.2992	1.5748	0.2812	
MDW0680GS2	●		0.2677	*6.80*	*73.0*	*33.0*	*40.0*	*7.0*	
MDW0690GS2	●		0.2717	*6.90*	*73.0*	*33.0*	*40.0*	*7.0*	
MDW02720GS2	●	#I	0.2720	*6.91*	2.8740	1.2992	1.5748	0.2812	5/16-24
MDW0700GS2	●		0.2756	*7.00*	*73.0*	*33.0*	*40.0*	*7.0*	
MDW02756GS2	●		0.2756	*7.00*	2.8740	1.2992	1.5748	0.2812	
MDW02770GS2	●	#J	0.2770	*7.04*	2.8740	1.2992	1.5748	0.2812	
MDW0710GS2	●		0.2795	*7.10*	*78.0*	*33.0*	*43.0*	*8.0*	
MDW02810GS2	●		0.2810	*7.14*	2.8740	1.2992	1.5748	0.2812	
MDW02812GS2	●	9/32	0.2812	*7.142*	2.8740	1.2992	1.5748	0.2812	
MDW0720GS2	●		0.2835	*7.20*	*78.0*	*33.0*	*43.0*	*8.0*	
MDW0730GS2	●		0.2874	*7.30*	*78.0*	*33.0*	*43.0*	*8.0*	
MDW02900GS2	●		0.2900	*7.37*	3.0709	1.2992	1.6929	0.3125	
MDW0740GS2	●		0.2913	*7.40*	*78.0*	*33.0*	*43.0*	*8.0*	
MDW02950GS2	●		0.2950	*7.49*	3.0709	1.2992	1.6929	0.3125	
MDW0750GS2	●		0.2953	*7.50*	*78.0*	*33.0*	*43.0*	*8.0*	
MDW02969GS2	●	19/64	0.2969	*7.54*	3.0709	1.4173	1.6535	0.3125	
MDW0760GS2	●		0.2992	*7.60*	*78.0*	*36.0*	*42.0*	*8.0*	
MDW03020GS2	●		0.3020	*7.67*	3.0709	1.4173	1.6535	0.3125	
MDW0770GS2	●		0.3031	*7.70*	*78.0*	*36.0*	*42.0*	*8.0*	
MDW0780GS2	●		0.3071	*7.80*	*78.0*	*36.0*	*42.0*	*8.0*	M9x1.25
MDW0790GS2	●		0.3110	*7.90*	*78.0*	*36.0*	*42.0*	*8.0*	
MDW03125GS2	●	5/16	0.3125	*7.94*	3.0709	1.4173	1.6535	0.3125	3/8-16
MDW0800GS2	●		0.3150	*8.00*	*78.0*	*36.0*	*42.0*	*8.0*	
MDW03160GS2	●		0.3160	*8.03*	3.2283	1.4173	1.7323	0.3594	
MDW0810GS2	●		0.3189	*8.10*	*82.0*	*36.0*	*44.0*	*9.0*	
MDW0820GS2	●		0.3228	*8.20*	*82.0*	*36.0*	*44.0*	*9.0*	
MDW03230GS2	●	#P	0.3230	*8.204*	3.2283	1.4173	1.7323	0.3594	
MDW0830GS2	●		0.3268	*8.30*	*82.0*	*36.0*	*44.0*	*9.0*	
MDW03281GS2	●	21/64	0.3281	*8.33*	3.2283	1.4173	1.7323	0.3594	
MDW03307GS2	●		0.3307	*8.40*	3.2283	1.4173	1.7323	0.3594	
MDW0840GS2	●		0.3307	*8.40*	*82.0*	*36.0*	*44.0*	*9.0*	
MDW03320GS2	●	#Q	0.3320	*8.43*	3.2283	1.4173	1.7323	0.3594	
MDW0850GS2	●		0.3346	*8.50*	*82.0*	*36.0*	*44.0*	*9.0*	M10x1.5
MDW0860GS2	●		0.3386	*8.60*	*82.0*	*38.0*	*44.0*	*9.0*	
MDW03386GS2	●		0.3386	*8.60*	3.2283	1.4961	1.7323	0.3594	
MDW03390GS2	●		0.3390	*8.61*	3.2283	1.4961	1.7323	0.3594	3/8-24
MDW0870GS2	●		0.3425	*8.70*	*82.0*	*38.0*	*44.0*	*9.0*	
MDW03438GS2	●	11/32	0.3438	*8.73*	3.2283	1.4961	1.7323	0.3594	
MDW0880GS2	●		0.3465	*8.80*	*82.0*	*38.0*	*44.0*	*9.0*	
MDW03475GS2	●		0.3475	*8.83*	3.2283	1.4961	1.7323	0.3594	
MDW03480GS2	●		0.3480	*8.84*	3.2283	1.4961	1.7323	0.3594	
MDW0890GS2	●		0.3504	*8.90*	*82.0*	*38.0*	*44.0*	*9.0*	
MDW0900GS2	●		0.3543	*9.00*	*82.0*	*38.0*	*44.0*	*9.0*	
MDW03580GS2	●		0.3580	*9.09*	3.2283	1.4961	1.7323	0.3594	

●=USA stocked item
Some drills can achieve greater depths. Always check for sufficient flute length. Note: Special diameters available upon request.

SERIES
MDW-GS2





MDW-GS2 2XD drill for excellent chip management and long tool life (External coolant)

Catalog Number (inch/*metric*)	Stock	Fractional Wire & Letters	Diameter D (in)	Diameter D (*mm*)	Overall Length L (in/*mm*)	Flute Length ℓ1 (in/*mm*)	Shank Length ℓ2 (in/*mm*)	Shank Diameter Ds (in/*mm*)	Tap Size
MDW0910GS2	●		0.3583	*9.10*	*87.0*	*38.0*	*47.0*	*10.0*	
MDW03594GS2	●	23/64	0.3594	*9.13*	3.2283	1.4961	1.7323	0.3594	
MDW0920GS2	●		0.3622	*9.20*	*87.0*	*38.0*	*47.0*	*10.0*	
MDW0930GS2	●		0.3661	*9.30*	*87.0*	*38.0*	*47.0*	*10.0*	
MDW03680GS2	●	#U	0.3680	*9.35*	3.4252	1.4961	1.8504	0.3906	7/16-14
MDW0940GS2	●		0.3701	*9.40*	*87.0*	*38.0*	*47.0*	*10.0*	
MDW0950GS2	●		0.3740	*9.50*	*87.0*	*38.0*	*47.0*	*10.0*	
MDW03750GS2	●	3/8	0.3750	*9.53*	3.4252	1.6142	1.8110	0.3906	
MDW03770GS2	●		0.3770	*9.58*	3.4252	1.6142	1.8110	0.3906	
MDW0960GS2	●		0.3780	*9.60*	*87.0*	*41.0*	*46.0*	*10.0*	
MDW03780GS2	●		0.3780	*9.60*	3.4252	1.6142	1.8110	0.3906	
MDW0970GS2	●		0.3819	*9.70*	*87.0*	*41.0*	*46.0*	*10.0*	
MDW0980GS2	●		0.3858	*9.80*	*87.0*	*41.0*	*46.0*	*10.0*	
MDW03860GS2	●		0.3860	*9.804*	3.4252	1.6142	1.8110	0.3906	
MDW0990GS2	●		0.3898	*9.90*	*87.0*	*41.0*	*46.0*	*10.0*	
MDW03906GS2	●	25/64	0.3906	*9.92*	3.4252	1.6142	1.8110	0.3906	7/16-20
MDW1000GS2	●		0.3937	*10.00*	*87.0*	*41.0*	*46.0*	*10.0*	
MDW03970GS2	●		0.3970	*10.08*	3.6614	1.6142	1.9685	0.4375	
MDW1010GS2	●		0.3976	*10.10*	*93.0*	*41.0*	*50.0*	*11.0*	
MDW1020GS2	●		0.4016	*10.20*	*93.0*	*41.0*	*50.0*	*11.0*	M12x1.75
MDW04040GS2	●		0.4040	*10.26*	3.6614	1.6142	1.9685	0.4375	
MDW1030GS2	●		0.4055	*10.30*	*93.0*	*41.0*	*50.0*	*11.0*	
MDW04062GS2	●	13/32	0.4062	*10.32*	3.6614	1.6142	1.9685	0.4375	
MDW1040GS2	●		0.4094	*10.40*	*93.0*	*41.0*	*50.0*	*11.0*	
MDW04130GS2	●		0.4130	*10.49*	3.6614	1.6142	1.9685	0.4375	
MDW1050GS2	●		0.4134	*10.50*	*93.0*	*41.0*	*50.0*	*11.0*	
MDW1060GS2	●		0.4173	*10.60*	*93.0*	*45.0*	*48.0*	*11.0*	
MDW1070GS2	●		0.4213	*10.70*	*93.0*	*45.0*	*48.0*	*11.0*	
MDW04219GS2	●	27/64	0.4219	*10.72*	3.6614	1.7717	1.8898	0.4375	1/2-13
MDW1080GS2	●		0.4252	*10.80*	*93.0*	*45.0*	*48.0*	*11.0*	
MDW1090GS2	●		0.4291	*10.90*	*93.0*	*45.0*	*48.0*	*11.0*	
MDW1100GS2	●		0.4331	*11.00*	*93.0*	*45.0*	*48.0*	*11.0*	
MDW1110GS2	●		0.4370	*11.10*	*100.0*	*45.0*	*53.0*	*12.0*	
MDW04375GS2	●	7/16	0.4375	*11.11*	3.6614	1.7717	1.8898	0.4375	
MDW1120GS2	●		0.4409	*11.20*	*100.0*	*45.0*	*53.0*	*12.0*	
MDW1130GS2	●		0.4449	*11.30*	*100.0*	*45.0*	*53.0*	*12.0*	
MDW1140GS2	●		0.4488	*11.40*	*100.0*	*45.0*	*53.0*	*12.0*	
MDW1150GS2	●		0.4528	*11.50*	*100.0*	*45.0*	*53.0*	*12.0*	
MDW04531GS2	●	29/64	0.4531	*11.51*	3.9370	1.8504	2.0866	0.4688	1/2-20
MDW1160GS2	●		0.4567	*11.60*	*100.0*	*47.0*	*53.0*	*12.0*	
MDW04570GS2	●		0.4570	*11.61*	3.9370	1.8504	2.0866	0.4688	
MDW1170GS2	●		0.4606	*11.70*	*100.0*	*47.0*	*53.0*	*12.0*	
MDW1180GS2	●		0.4646	*11.80*	*100.0*	*47.0*	*53.0*	*12.0*	
MDW1190GS2	●		0.4685	*11.90*	*100.0*	*47.0*	*53.0*	*12.0*	
MDW04688GS2	●	15/32	0.4688	*11.91*	3.9370	1.8504	2.0866	0.4688	
MDW1200GS2	●		0.4724	*12.00*	*100.0*	*47.0*	*53.0*	*12.0*	M14x2
MDW1210GS2	●		0.4764	*12.10*	*100.0*	*47.0*	*51.0*	*13.0*	
MDW1220GS2	●		0.4803	*12.20*	*100.0*	*47.0*	*51.0*	*13.0*	

●=USA stocked item
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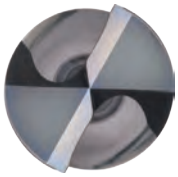
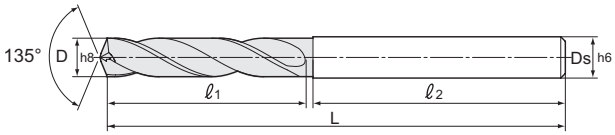
MDW-GS2 Series Solid Carbide Drills





MDW-GS2 2XD drill for excellent chip management and long tool life (External coolant)

Catalog Number (inch/*metric*)	Stock	Fractional Wire & Letters	Diameter D (in)	Diameter D (*mm*)	Overall Length L (in/*mm*)	Flute Length ℓ1 (in/*mm*)	Shank Length ℓ2 (in/*mm*)	Shank Diameter Ds (in/*mm*)	Tap Size
MDW1230GS2	●		0.4843	*12.30*	*100.0*	*47.0*	*51.0*	*13.0*	9/16-12
MDW04844GS2	●	31/64	0.4844	*12.304*	3.9370	1.8504	2.0079	0.5156	
MDW1240GS2	●		0.4882	*12.40*	*100.0*	*47.0*	*51.0*	*13.0*	
MDW1250GS2	●		0.4921	*12.50*	*100.0*	*47.0*	*51.0*	*13.0*	
MDW1260GS2	●		0.4961	*12.60*	*100.0*	*49.0*	*51.0*	*13.0*	
MDW1270GS2	●	1/2	0.5000	*12.70*	*100.0*	*49.0*	*51.0*	*13.0*	
MDW05000GS2	●	1/2	0.5000	*12.70*	3.9370	1.9291	2.0079	0.5156	
MDW1280GS2	●		0.5039	*12.80*	*100.0*	*49.0*	*51.0*	*13.0*	
MDW05050GS2	●		0.5050	*12.83*	3.9370	1.9291	2.0079	0.5156	
MDW1290GS2	●		0.5079	*12.90*	*100.0*	*49.0*	*51.0*	*13.0*	
MDW1300GS2	●		0.5118	*13.00*	*100.0*	*49.0*	*51.0*	*13.0*	
MDW05156GS2	●	33/64	0.5156	*13.09*	3.9370	1.9291	2.0079	0.5156	9/16-18
MDW1310GS2	●		0.5157	*13.10*	*105.0*	*50.0*	*53.0*	*14.0*	
MDW1320GS2	●		0.5197	*13.20*	*105.0*	*50.0*	*53.0*	*14.0*	
MDW1330GS2	●		0.5236	*13.30*	*105.0*	*50.0*	*53.0*	*14.0*	
MDW1340GS2	●		0.5276	*13.40*	*105.0*	*50.0*	*53.0*	*14.0*	
MDW05312GS2	●	17/32	0.5312	*13.49*	4.1339	1.9685	2.0866	0.5469	5/8-11
MDW1350GS2	●		0.5315	*13.50*	*105.0*	*50.0*	*53.0*	*14.0*	
MDW1360GS2	●		0.5354	*13.60*	*105.0*	*52.0*	*53.0*	*14.0*	
MDW1370GS2	●		0.5394	*13.70*	*105.0*	*52.0*	*53.0*	*14.0*	
MDW1380GS2	●		0.5433	*13.80*	*105.0*	*52.0*	*53.0*	*14.0*	
MDW05469GS2	●	35/64	0.5469	*13.89*	4.1339	2.0472	2.0866	0.5469	M16x2
MDW1390GS2	●		0.5472	*13.90*	*105.0*	*52.0*	*53.0*	*14.0*	
MDW1400GS2	●		0.5512	*14.00*	*105.0*	*52.0*	*53.0*	*14.0*	
MDW1410GS2	●		0.5551	*14.10*	*108.0*	*52.0*	*55.0*	*15.0*	
MDW1420GS2	●		0.5591	*14.20*	*108.0*	*52.0*	*55.0*	*15.0*	
MDW05625GS2	●	9/16	0.5625	*14.29*	4.2520	2.0472	2.1654	0.5937	
MDW1430GS2	●		0.5630	*14.30*	*108.0*	*52.0*	*55.0*	*15.0*	
MDW1440GS2	●		0.5669	*14.40*	*108.0*	*52.0*	*55.0*	*15.0*	
MDW1450GS2	●		0.5709	*14.50*	*108.0*	*52.0*	*55.0*	*15.0*	
MDW1460GS2	●		0.5748	*14.60*	*108.0*	*53.0*	*55.0*	*15.0*	
MDW05781GS2	●	37/64	0.5781	*14.68*	4.2520	2.0866	2.1654	0.5937	5/8-18
MDW1470GS2	●		0.5787	*14.70*	*108.0*	*53.0*	*55.0*	*15.0*	
MDW1480GS2	●		0.5827	*14.80*	*108.0*	*53.0*	*55.0*	*15.0*	
MDW1490GS2	●		0.5866	*14.90*	*108.0*	*53.0*	*55.0*	*15.0*	
MDW1500GS2	●		0.5906	*15.00*	*108.0*	*53.0*	*55.0*	*15.0*	
MDW05937GS2	●	19/32	0.5937	*15.08*	4.2520	2.0866	2.1654	0.5937	
MDW1510GS2	●		0.5945	*15.10*	*112.0*	*53.0*	*57.0*	*16.0*	
MDW1520GS2	●		0.5984	*15.20*	*112.0*	*53.0*	*57.0*	*16.0*	
MDW1530GS2	●		0.6024	*15.30*	*112.0*	*53.0*	*57.0*	*16.0*	
MDW1540GS2	●		0.6063	*15.40*	*112.0*	*53.0*	*57.0*	*16.0*	
MDW06094GS2	●	39/64	0.6094	*15.48*	4.4094	2.0866	2.2441	0.6250	11/16-12
MDW1550GS2	●		0.6102	*15.50*	*112.0*	*53.0*	*57.0*	*16.0*	M18x2.5
MDW1560GS2	●		0.6142	*15.60*	*112.0*	*55.0*	*57.0*	*16.0*	
MDW1570GS2	●		0.6181	*15.70*	*112.0*	*55.0*	*57.0*	*16.0*	
MDW1580GS2	●		0.6220	*15.80*	*112.0*	*55.0*	*57.0*	*16.0*	
MDW06250GS2	●	5/8	0.6250	*15.88*	4.4094	2.1654	2.2441	0.6250	11/16-16
MDW1590GS2	●		0.6260	*15.90*	*112.0*	*55.0*	*57.0*	*16.0*	
MDW1600GS2	●		0.6299	*16.00*	*112.0*	*55.0*	*57.0*	*16.0*	

●=USA stocked item
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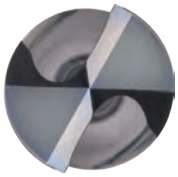
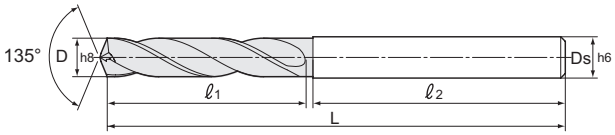
SERIES MDW-GS4





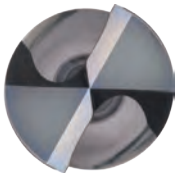
MDW-GS4 4XD drill for excellent chip management and long tool life (External coolant)

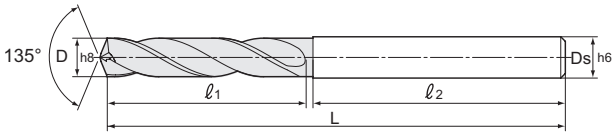
Catalog Number (inch/*metric*)	Stock	Fractional Wire & Letters	Diameter D (in)	Diameter D (*mm*)	Overall Length L (in/*mm*)	Flute Length ℓ1 (in/*mm*)	Shank Length ℓ2 (in/*mm*)	Shank Diameter Ds (in/*mm*)	Tap Size
MDW0200GS4	●		0.0787	*2.00*	*49.0*	*15.0*	*31.0*	*3.0*	
MDW0210GS4	●		0.0827	*2.10*	*49.0*	*17.0*	*30.0*	*3.0*	3-56
MDW0220GS4	●		0.0866	*2.20*	*49.0*	*17.0*	*30.0*	*3.0*	
MDW0230GS4	●		0.0906	*2.30*	*49.0*	*17.0*	*30.0*	*3.0*	
MDW00937GS4	●	3/32	0.0937	2.38	1.9291	0.6693	1.1811	0.125	
MDW0240GS4	●		0.0945	*2.40*	*49.0*	*17.0*	*30.0*	*3.0*	
MDW0250GS4	●		0.0984	*2.50*	*49.0*	*17.0*	*30.0*	*3.0*	
MDW0260GS4	●		0.1024	*2.60*	*49.0*	*19.0*	*30.0*	*3.0*	
MDW0270GS4	●		0.1063	*2.70*	*49.0*	*19.0*	*30.0*	*3.0*	6-32
MDW0280GS4	●		0.1102	*2.80*	*49.0*	*19.0*	*30.0*	*3.0*	
MDW0290GS4	●		0.1142	*2.90*	*49.0*	*19.0*	*30.0*	*3.0*	3.5x.6
MDW0300GS4	●		0.1181	*3.00*	*49.0*	*19.0*	*30.0*	*3.0*	
MDW0310GS4	●		0.1220	*3.10*	*60.0*	*24.0*	*34.0*	*4.0*	
MDW0320GS4	●		0.1260	*3.20*	*60.0*	*24.0*	*34.0*	*4.0*	
MDW0330GS4	●		0.1299	*3.30*	*60.0*	*24.0*	*34.0*	*4.0*	M4x.7
MDW0340GS4	●		0.1339	*3.40*	*60.0*	*24.0*	*34.0*	*4.0*	
MDW0350GS4	●		0.1378	*3.50*	*60.0*	*24.0*	*34.0*	*4.0*	
MDW0360GS4	●		0.1417	*3.60*	*60.0*	*27.0*	*33.0*	*4.0*	
MDW0370GS4	●		0.1457	*3.70*	*60.0*	*27.0*	*33.0*	*4.0*	M4.5x.7
MDW0380GS4	●		0.1496	*3.80*	*60.0*	*27.0*	*33.0*	*4.0*	
MDW0390GS4	●		0.1535	*3.90*	*60.0*	*27.0*	*33.0*	*4.0*	
MDW0400GS4	●		0.1575	*4.00*	*60.0*	*27.0*	*33.0*	*4.0*	
MDW0410GS4	●		0.1614	*4.10*	*76.0*	*31.0*	*43.0*	*5.0*	
MDW0420GS4	●		0.1654	*4.20*	*76.0*	*31.0*	*43.0*	*5.0*	M5x.8
MDW0430GS4	●		0.1693	*4.30*	*76.0*	*31.0*	*43.0*	*5.0*	
MDW0440GS4	●		0.1732	*4.40*	*76.0*	*31.0*	*43.0*	*5.0*	
MDW0450GS4	●		0.1772	*4.50*	*76.0*	*31.0*	*43.0*	*5.0*	
MDW0460GS4	●		0.1811	*4.60*	*76.0*	*38.0*	*38.0*	*5.0*	
MDW0470GS4	●		0.1850	*4.70*	*76.0*	*38.0*	*38.0*	*5.0*	
MDW0480GS4	●		0.1890	*4.80*	*76.0*	*38.0*	*38.0*	*5.0*	
MDW0490GS4	●		0.1929	*4.90*	*76.0*	*38.0*	*38.0*	*5.0*	
MDW0500GS4	●		0.1969	*5.00*	*76.0*	*38.0*	*38.0*	*5.0*	M6x1
MDW0510GS4	●		0.2008	*5.10*	*81.0*	*39.0*	*40.0*	*6.0*	
MDW02010GS4	●	#7	0.2010	*5.11*	3.1890	1.5354	1.5748	0.2344	1/4-20
MDW0520GS4	●		0.2047	*5.20*	*81.0*	*39.0*	*40.0*	*6.0*	
MDW0530GS4	●		0.2087	*5.30*	*81.0*	*39.0*	*40.0*	*6.0*	
MDW0540GS4	●		0.2126	*5.40*	*81.0*	*39.0*	*40.0*	*6.0*	
MDW0550GS4	●		0.2165	*5.50*	*81.0*	*39.0*	*40.0*	*6.0*	
MDW0560GS4	●		0.2205	*5.60*	*81.0*	*41.0*	*40.0*	*6.0*	
MDW0570GS4	●		0.2244	*5.70*	*81.0*	*41.0*	*40.0*	*6.0*	
MDW0580GS4	●		0.2283	*5.80*	*81.0*	*41.0*	*40.0*	*6.0*	
MDW0590GS4	●		0.2323	*5.90*	*81.0*	*41.0*	*40.0*	*6.0*	
MDW0600GS4	●		0.2362	*6.00*	*81.0*	*41.0*	*40.0*	*6.0*	M7x1
MDW0610GS4	●		0.2402	*6.10*	*83.0*	*42.0*	*40.0*	*7.0*	
MDW0620GS4	●		0.2441	*6.20*	*83.0*	*42.0*	*40.0*	*7.0*	
MDW02460GS4	●		0.2460	*6.25*	3.2677	1.6535	1.5748	0.2812	
MDW0630GS4	●		0.2480	*6.30*	*83.0*	*42.0*	*40.0*	*7.0*	
MDW02500GS4	●	1/4	0.2500	*6.35*	3.2677	1.6535	1.5748	0.2812	
MDW0640GS4	●		0.2520	*6.40*	*83.0*	*42.0*	*40.0*	*7.0*	
MDW0650GS4	●		0.2559	*6.50*	*83.0*	*42.0*	*40.0*	*7.0*	
MDW02570GS4	●	#F	0.2570	*6.53*	3.2677	1.6929	1.5748	0.2812	5/16-18
MDW0660GS4	●		0.2598	*6.60*	*83.0*	*43.0*	*40.0*	*7.0*	
MDW02610GS4	●		0.2610	*6.63*	3.2677	1.6929	1.5748	0.2812	
MDW0670GS4	●		0.2638	*6.70*	*83.0*	*43.0*	*40.0*	*7.0*	

●=USA stocked item

Some drills can achieve greater depths. Always check for sufficient flute length. Note: Special diameters available upon request.

MDW-GS4 Series Solid Carbide Drills





MDW-GS4 4XD drill for excellent chip management and long tool life (External coolant)

Catalog Number (inch/*metric*)	Stock	Fractional Wire & Letters	Diameter D (in)	Diameter D (*mm*)	Overall Length L (in/*mm*)	Flute Length ℓ1 (in/*mm*)	Shank Length ℓ2 (in/*mm*)	Shank Diameter Ds (in/*mm*)	Tap Size
MDW02656GS4	●	17/64	0.2656	*6.75*	3.2677	1.6929	1.5748	0.2812	
MDW02660GS4	●	#H	0.2660	*6.76*	3.2677	1.6929	1.5748	0.2812	
MDW0680GS4	●		0.2677	*6.80*	*83.0*	*43.0*	*40.0*	*7.0*	
MDW0690GS4	●		0.2717	*6.90*	*83.0*	*43.0*	*40.0*	*7.0*	
MDW02720GS4	●	#I	0.2720	*6.91*	3.2677	1.6929	1.5748	0.2812	5/16-24
MDW0700GS4	●		0.2756	*7.00*	*83.0*	*43.0*	*40.0*	*7.0*	
MDW02770GS4	●	#J	0.2770	*7.04*	3.2677	1.6929	1.5748	0.2812	
MDW0710GS4	●		0.2795	*7.10*	*90.0*	*45.0*	*43.0*	*8.0*	
MDW02810GS4	●		0.2810	*7.14*	3.2677	1.6929	1.5748	0.2812	
MDW02812GS4	●	9/32	0.2812	*7.142*	3.2677	1.6929	1.5748	0.2812	
MDW0720GS4	●		0.2835	*7.20*	*90.0*	*45.0*	*43.0*	*8.0*	
MDW0730GS4	●		0.2874	*7.30*	*90.0*	*45.0*	*43.0*	*8.0*	
MDW02900GS4	●		0.2900	*7.37*	3.5433	1.7717	1.6929	0.3125	
MDW0740GS4	●		0.2913	*7.40*	*90.0*	*45.0*	*43.0*	*8.0*	
MDW02950GS4	●		0.2950	*7.49*	3.5433	1.7717	1.6929	0.3125	
MDW0750GS4	●		0.2953	*7.50*	*90.0*	*45.0*	*43.0*	*8.0*	
MDW02969GS4	●	19/64	0.2969	*7.54*	3.5433	1.8898	1.6535	0.3125	
MDW0760GS4	●		0.2992	*7.60*	*90.0*	*48.0*	*42.0*	*8.0*	
MDW03020GS4	●		0.3020	*7.67*	3.5433	1.8898	1.6535	0.3125	
MDW0770GS4	●		0.3031	*7.70*	*90.0*	*48.0*	*42.0*	*8.0*	
MDW0780GS4	●		0.3071	*7.80*	*90.0*	*48.0*	*42.0*	*8.0*	M9x1.25
MDW0790GS4	●		0.3110	*7.90*	*90.0*	*48.0*	*42.0*	*8.0*	
MDW03125GS4	●	5/16	0.3125	*7.94*	3.5433	1.8898	1.6535	0.3125	3/8-16
MDW0800GS4	●		0.3150	*8.00*	*90.0*	*48.0*	*42.0*	*8.0*	
MDW03160GS4	●		0.3160	*8.03*	3.8583	2.0866	1.6929	0.3594	
MDW0810GS4	●		0.3189	*8.10*	*98.0*	*53.0*	*43.0*	*9.0*	
MDW0820GS4	●		0.3228	*8.20*	*98.0*	*53.0*	*43.0*	*9.0*	
MDW03230GS4	●	#P	0.3230	*8.204*	3.8583	2.0866	1.6929	0.3594	
MDW0830GS4	●		0.3268	*8.30*	*98.0*	*53.0*	*43.0*	*9.0*	
MDW03281GS4	●	21/64	0.3281	*8.33*	3.8583	2.0866	1.6929	0.3594	
MDW0840GS4	●		0.3307	*8.40*	*98.0*	*53.0*	*43.0*	*9.0*	
MDW03320GS4	●	#Q	0.3320	*8.43*	3.8583	2.0866	1.6929	0.3594	
MDW0850GS4	●		0.3346	*8.50*	*98.0*	*53.0*	*43.0*	*9.0*	M10x1.5
MDW0860GS4	●		0.3386	*8.60*	*98.0*	*55.0*	*43.0*	*9.0*	
MDW03390GS4	●		0.3390	*8.61*	3.8583	2.1654	1.6929	0.3594	3/8-24
MDW0870GS4	●		0.3425	*8.70*	*98.0*	*55.0*	*43.0*	*9.0*	
MDW03438GS4	●	11/32	0.3438	*8.73*	3.8583	2.1654	1.6929	0.3594	
MDW0880GS4	●		0.3465	*8.80*	*98.0*	*55.0*	*43.0*	*9.0*	
MDW03480GS4	●		0.3480	*8.84*	3.8583	2.1654	1.6929	0.3594	
MDW0890GS4	●		0.3504	*8.90*	*98.0*	*55.0*	*43.0*	*9.0*	
MDW0900GS4	●		0.3543	*9.00*	*98.0*	*55.0*	*43.0*	*9.0*	
MDW03580GS4	●		0.3580	*9.09*	3.8583	2.1654	1.6929	0.3594	
MDW0910GS4	●		0.3583	*9.10*	*105.0*	*58.0*	*45.0*	*10.0*	
MDW03594GS4	●	23/64	0.3594	*9.13*	3.8583	2.1654	1.6929	0.3594	
MDW0920GS4	●		0.3622	*9.20*	*105.0*	*58.0*	*45.0*	*10.0*	
MDW0930GS4	●		0.3661	*9.30*	*105.0*	*58.0*	*45.0*	*10.0*	
MDW03680GS4	●	#U	0.3680	*9.35*	4.1339	2.2835	1.7717	0.3906	7/16-14
MDW0940GS4	●		0.3701	*9.40*	*105.0*	*58.0*	*45.0*	*10.0*	
MDW0950GS4	●		0.3740	*9.50*	*105.0*	*58.0*	*45.0*	*10.0*	
MDW03750GS4	●	3/8	0.3750	*9.53*	4.1339	2.3622	1.7717	0.3906	
MDW03770GS4	●		0.3770	*9.58*	4.1339	2.3622	1.7717	0.3906	
MDW0960GS4	●		0.3780	*9.60*	*105.0*	*60.0*	*45.0*	*10.0*	

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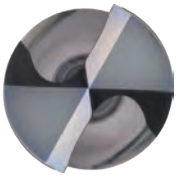
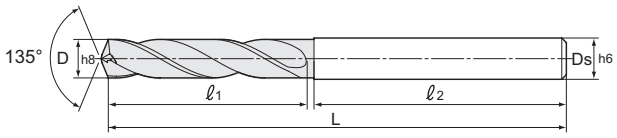
SERIES
MDW-GS4





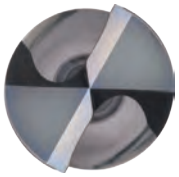
MDW-GS4 4XD drill for excellent chip management and long tool life (External coolant)

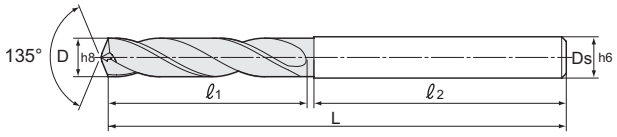
Catalog Number (inch/*metric*)	Stock	Fractional Wire & Letters	Diameter D (in)	Diameter D (*mm*)	Overall Length L (in/*mm*)	Flute Length ℓ1 (in/*mm*)	Shank Length ℓ2 (in/*mm*)	Shank Diameter Ds (in/*mm*)	Tap Size
MDW0970GS4	●		0.3819	*9.70*	*105.0*	*60.0*	*45.0*	*10.0*	
MDW0980GS4	●		0.3858	*9.80*	*105.0*	*60.0*	*45.0*	*10.0*	
MDW03860GS4	●		0.3860	*9.804*	4.1339	2.3622	1.7717	0.3906	
MDW0990GS4	●		0.3898	*9.90*	*105.0*	*60.0*	*45.0*	*10.0*	
MDW03906GS4	●	25/64	0.3906	*9.92*	4.1339	2.3622	1.7717	0.3906	7/16-20
MDW1000GS4	●		0.3937	*10.00*	*105.0*	*60.0*	*45.0*	*10.0*	
MDW03970GS4	●		0.3970	*10.08*	4.4882	2.5984	1.8110	0.4375	
MDW1010GS4	●		0.3976	*10.10*	*114.0*	*66.0*	*46.0*	*11.0*	
MDW1020GS4	●		0.4016	*10.20*	*114.0*	*66.0*	*46.0*	*11.0*	M12x1.75
MDW04040GS4	●		0.4040	*10.26*	4.4882	2.5984	1.8110	0.4375	
MDW1030GS4	●		0.4055	*10.30*	*114.0*	*66.0*	*46.0*	*11.0*	
MDW04062GS4	●	13/32	0.4062	*10.32*	4.4882	2.5984	1.8110	0.4375	
MDW1040GS4	●		0.4094	*10.40*	*114.0*	*66.0*	*46.0*	*11.0*	
MDW04130GS4	●		0.4130	*10.49*	4.4882	2.5984	1.8110	0.4375	
MDW1050GS4	●		0.4134	*10.50*	*114.0*	*66.0*	*46.0*	*11.0*	
MDW1060GS4	●		0.4173	*10.60*	*114.0*	*68.0*	*46.0*	*11.0*	
MDW1070GS4	●		0.4213	*10.70*	*114.0*	*68.0*	*46.0*	*11.0*	
MDW04219GS4	●	27/64	0.4219	*10.72*	4.4882	2.6772	1.8110	0.4375	1/2-13
MDW1080GS4	●		0.4252	*10.80*	*114.0*	*68.0*	*46.0*	*11.0*	
MDW1090GS4	●		0.4291	*10.90*	*114.0*	*68.0*	*46.0*	*11.0*	
MDW1100GS4	●		0.4331	*11.00*	*114.0*	*68.0*	*46.0*	*11.0*	
MDW1110GS4	●		0.4370	*11.10*	*121.0*	*71.0*	*48.0*	*12.0*	
MDW04375GS4	●	7/16	0.4375	*11.11*	4.4882	2.6772	1.8110	0.4375	
MDW1120GS4	●		0.4409	*11.20*	*121.0*	*71.0*	*48.0*	*12.0*	
MDW1130GS4	●		0.4449	*11.30*	*121.0*	*71.0*	*48.0*	*12.0*	
MDW1140GS4	●		0.4488	*11.40*	*121.0*	*71.0*	*48.0*	*12.0*	
MDW1150GS4	●		0.4528	*11.50*	*121.0*	*71.0*	*48.0*	*12.0*	
MDW04531GS4	●	29/64	0.4531	*11.51*	4.7638	2.8740	1.8898	0.4688	1/2-20
MDW1160GS4	●		0.4567	*11.60*	*121.0*	*73.0*	*48.0*	*12.0*	
MDW1170GS4	●		0.4606	*11.70*	*121.0*	*73.0*	*48.0*	*12.0*	
MDW1180GS4	●		0.4646	*11.80*	*121.0*	*73.0*	*48.0*	*12.0*	
MDW1190GS4	●		0.4685	*11.90*	*121.0*	*73.0*	*48.0*	*12.0*	
MDW04688GS4	●	15/32	0.4688	*11.91*	4.7638	2.8740	1.8898	0.4688	
MDW1200GS4	●		0.4724	*12.00*	*121.0*	*73.0*	*48.0*	*12.0*	M14x2
MDW1210GS4	●		0.4764	*12.10*	*137.0*	*76.0*	*59.0*	*13.0*	
MDW1220GS4	●		0.4803	*12.20*	*137.0*	*76.0*	*59.0*	*13.0*	
MDW1230GS4	●		0.4843	*12.30*	*137.0*	*76.0*	*59.0*	*13.0*	9/16-12
MDW04844GS4	●	31/64	0.4844	*12.308*	5.3937	2.9921	2.3228	0.5156	
MDW1240GS4	●		0.4882	*12.40*	*137.0*	*76.0*	*59.0*	*13.0*	
MDW1250GS4	●		0.4921	*12.50*	*137.0*	*76.0*	*59.0*	*13.0*	
MDW1260GS4	●		0.4961	*12.60*	*137.0*	*78.0*	*59.0*	*13.0*	
MDW1270GS4	●	1/2	0.5000	*12.70*	*137.0*	*78.0*	*59.0*	*13.0*	
MDW05000GS4	●	1/2	0.5000	*12.70*	5.3937	3.0709	2.3228	0.5156	
MDW1280GS4	●		0.5039	*12.80*	*137.0*	*78.0*	*59.0*	*13.0*	
MDW05050GS4	●		0.5050	*12.83*	5.3937	3.0709	2.3228	0.5156	
MDW1290GS4	●		0.5079	*12.90*	*137.0*	*78.0*	*59.0*	*13.0*	
MDW1300GS4	●		0.5118	*13.00*	*137.0*	*78.0*	*59.0*	*13.0*	
MDW05156GS4	●	33/64	0.5156	*13.09*	5.3937	3.0709	2.3228	0.5156	9/16-18
MDW1310GS4	●		0.5157	*13.10*	*147.0*	*84.0*	*61.0*	*14.0*	
MDW1320GS4	●		0.5197	*13.20*	*147.0*	*84.0*	*61.0*	*14.0*	
MDW1330GS4	●		0.5236	*13.30*	*147.0*	*84.0*	*61.0*	*14.0*	
MDW1340GS4	●		0.5276	*13.40*	*147.0*	*84.0*	*61.0*	*14.0*	

●=USA stocked item
Some drills can achieve greater depths. Always check for sufficient flute length. Note: Special diameters available upon request.

MDW-GS4 Series Solid Carbide Drills

Coolant Through Drills



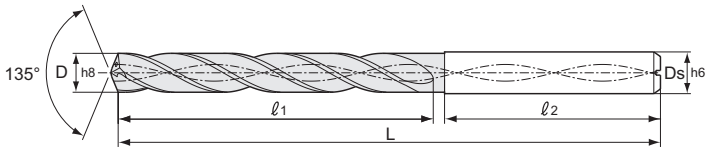


MDW-GS4 4XD drill for excellent chip management and long tool life (External coolant)

Catalog Number (inch/*metric*)	Stock	Fractional Wire & Letters	Diameter D (in)	Diameter D (*mm*)	Overall Length L (in/*mm*)	Flute Length ℓ_1 (in/*mm*)	Shank Length ℓ_2 (in/*mm*)	Shank Diameter D_S (in/*mm*)	Tap Size
MDW05312GS4	●	17/32	0.5312	*13.49*	5.7874	3.3071	2.4016	0.5469	5/8-11
MDW1350GS4	●		0.5315	*13.50*	*147.0*	*84.0*	*61.0*	*14.0*	
MDW1360GS4	●		0.5354	*13.60*	*147.0*	*86.0*	*61.0*	*14.0*	
MDW1370GS4	●		0.5394	*13.70*	*147.0*	*86.0*	*61.0*	*14.0*	
MDW1380GS4	●		0.5433	*13.80*	*147.0*	*86.0*	*61.0*	*14.0*	
MDW05469GS4	●	35/64	0.5469	*13.89*	5.7874	3.3858	2.4016	0.5469	M16x2
MDW1390GS4	●		0.5472	*13.90*	*147.0*	*86.0*	*61.0*	*14.0*	
MDW1400GS4	●		0.5512	*14.00*	*147.0*	*86.0*	*61.0*	*14.0*	
MDW1410GS4	●		0.5551	*14.10*	*153.0*	*89.0*	*62.0*	*15.0*	
MDW1420GS4	●		0.5591	*14.20*	*153.0*	*89.0*	*62.0*	*15.0*	
MDW05625GS4	●	9/16	0.5625	*14.29*	6.0236	3.5039	2.4409	0.5937	
MDW1430GS4	●		0.5630	*14.30*	*153.0*	*89.0*	*62.0*	*15.0*	
MDW1440GS4	●		0.5669	*14.40*	*153.0*	*89.0*	*62.0*	*15.0*	
MDW1450GS4	●		0.5709	*14.50*	*153.0*	*89.0*	*62.0*	*15.0*	
MDW1460GS4	●		0.5748	*14.60*	*153.0*	*91.0*	*62.0*	*15.0*	
MDW05781GS4	●	37/64	0.5781	*14.68*	6.0236	3.5827	2.4409	0.5937	5/8-18
MDW1470GS4	●		0.5787	*14.70*	*153.0*	*91.0*	*62.0*	*15.0*	
MDW1480GS4	●		0.5827	*14.80*	*153.0*	*91.0*	*62.0*	*15.0*	
MDW1490GS4	●		0.5866	*14.90*	*153.0*	*91.0*	*62.0*	*15.0*	
MDW1500GS4	●		0.5906	*15.00*	*153.0*	*91.0*	*62.0*	*15.0*	
MDW05937GS4	●	19/32	0.5937	*15.08*	6.0236	3.5827	2.4409	0.5937	
MDW1510GS4	●		0.5945	*15.10*	*160.0*	*94.0*	*64.0*	*16.0*	
MDW1520GS4	●		0.5984	*15.20*	*160.0*	*94.0*	*64.0*	*16.0*	
MDW1530GS4	●		0.6024	*15.30*	*160.0*	*94.0*	*64.0*	*16.0*	
MDW1540GS4	●		0.6063	*15.40*	*160.0*	*94.0*	*64.0*	*16.0*	
MDW06094GS4	●	39/64	0.6094	*15.48*	6.2992	3.7008	2.5197	0.6250	11/16-12
MDW1550GS4	●		0.6102	*15.50*	*160.0*	*94.0*	*64.0*	*16.0*	M18x2.5
MDW1560GS4	●		0.6142	*15.60*	*160.0*	*96.0*	*64.0*	*16.0*	
MDW1570GS4	●		0.6181	*15.70*	*160.0*	*96.0*	*64.0*	*16.0*	
MDW1580GS4	●		0.6220	*15.80*	*160.0*	*96.0*	*64.0*	*16.0*	
MDW06250GS4	●	5/8	0.6250	*15.88*	6.2992	3.7795	2.5197	0.6250	11/16-16
MDW1590GS4	●		0.6260	*15.90*	*160.0*	*96.0*	*64.0*	*16.0*	
MDW1600GS4	●		0.6299	*16.00*	*160.0*	*96.0*	*64.0*	*16.0*	

●=USA stocked item
Some drills can achieve greater depths. Always check for sufficient flute length. Note: Special diameters available upon request.

SERIES MDW-HGS3



MDW-HGS3 3XD drill for excellent chip management and long tool life (Internal coolant)

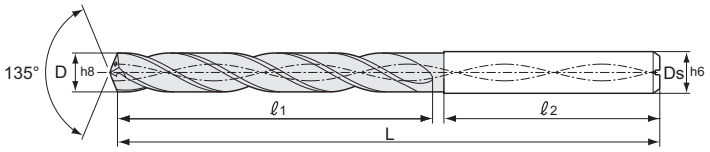
Catalog Number (inch/metric)	Stock	Fractional Wire & Letters	Diameter	Diameter D (mm)	Shank Diameter Ds (in/mm)	HGS3S	HGS3S Shank Diameter Ds	Overall Length L (in/mm)	Flute Length ℓ1 (in/mm)	Shank Length ℓ2 (in/mm)	Tap Size
MDW0150HGS3	●		0.059	1.50	3.0			63.0	10	50	
MDW0160HGS3	●		0.063	1.60	3.0			63.0	12	50	M2x.4
MDW0170HGS3	●		0.067	1.70	3.0			63.0	12	50	
MDW0180HGS3	●		0.071	1.80	3.0			63.0	12	50	
MDW0190HGS3	●		0.075	1.90	3.0			63.0	12	50	
MDW0200HGS3	●		0.079	2.00	3.0			63.0	12.5	48	
MDW0210HGS3	●		0.083	2.10	3.0			68.0	15	51	3-56
MDW0220HGS3	●		0.087	2.20	3.0			68.0	15	51	
MDW0230HGS3	●		0.091	2.30	3.0			68.0	15	51	
MDW00937HGS3	●	3/32	0.094	2.38	0.125	●	3.0	2.677	0.689	1.929	
MDW0240HGS3	●		0.095	2.40	3.0			68.0	15	51	
MDW0250HGS3	●		0.098	2.50	3.0			68.0	15.	51	
MDW0260HGS3	●		0.102	2.60	3.0			68.0	17.5	49	
MDW0270HGS3	●		0.106	2.70	3.0			68.0	17.5	49	6-32
MDW01094HGS3	●	7/64	0.109	2.78	0.125	●	3.0	2.677	0.689	1.929	
MDW0280HGS3	●		0.110	2.80	3.0			68.0	17.5	49	
MDW0290HGS3	●		0.114	2.90	3.0			68.0	17.5	49	3.5x.6
MDW0300HGS3	●		0.118	3.00	3.0	●	6.0	68.0	17.5	49	
MDW0310HGS3	●		0.122	3.10	4.0	●	6.0	72.0	20.0	50	
MDW01250HGS3	●	1/8	0.125	3.18	0.125	●	6.0	2.677	0.689	1.929	
MDW0320HGS3	●		0.126	3.20	4.0	●	6.0	72.0	20	50	
MDW0330HGS3	●		0.130	3.30	4.0	●	6.0	72.0	20	50	M4x.7
MDW0340HGS3	●		0.134	3.40	4.0	●	6.0	72.0	20	50	
MDW0350HGS3	●		0.138	3.50	4.0	●	6.0	72.0	20	50	
MDW0360HGS3	●		0.142	3.60	4.0	●	6.0	72.0	22.5	48	
MDW0370HGS3	●		0.146	3.70	4.0	●	6.0	72.0	22.5	48	M4.5x.7
MDW0380HGS3	●		0.150	3.80	4.0	●	6.0	72.0	22.5	48	
MDW0390HGS3	●		0.154	3.90	4.0	●	6.0	72.0	22.5	48	
MDW01562HGS3	●	5/32	0.156	3.97	0.156	●	6.0	2.835	0.886	1.890	
MDW0400HGS3	●		0.158	4.00	4.0	●	6.0	72.0	22.5	48	
MDW01590HGS3	●	#21	0.159	4.04	0.188	●	6.0	3.150	0.984	2.087	10-32
MDW0410HGS3	●		0.161	4.10	5.0	●	6.0	80.0	25	53	
MDW0420HGS3	●		0.165	4.20	5.0	●	6.0	80.0	25	53	M5x.8
MDW0430HGS3	●		0.169	4.30	5.0	●	6.0	80.0	25	53	
MDW01719HGS3	●	11/64	0.172	4.37	0.188	●	6.0	3.1	0.984	2.087	
MDW0440HGS3	●		0.173	4.40	5.0	●	6.0	80.0	25	53	
MDW0450HGS3	●		0.177	4.50	5.0	●	6.0	80.0	25	53	
MDW0460HGS3	●		0.181	4.60	5.0	●	6.0	80.0	27.5	51	
MDW0470HGS3	●		0.185	4.70	5.0	●	6.0	80.0	27.5	51	
MDW01875HGS3	●	3/16	0.188	4.76	0.188	●	6.0	3.1	1.083	2.008	
MDW0480HGS3	●		0.189	4.80	5.0	●	6.0	80.0	27.5	51	
MDW0490HGS3	●		0.193	4.90	5.0	●	6.0	80.0	27.5	51	
MDW0500HGS3	●		0.197	5.00	5.0	●	6.0	80.0	27.5	51	M6x1
MDW0510HGS3	●		0.201	5.10	6.0			82.0	27.5	53	
MDW02010HGS3	●	#7	0.201	5.11	0.234	●	6.0	3.228	1.083	2.087	1/4-2020
MDW02031HGS3	●	13/64	0.203	5.16	0.234	●	6.0	3.228	1.083	2.087	
MDW0520HGS3	●		0.205	5.20	6.0			82.0	27.5	53	
MDW0530HGS3	●		0.209	5.30	6.0			82.0	27.5	53	
MDW0540HGS3	●		0.213	5.40	6.0			82.0	27.5	53	
MDW02130HGS3	●	#3	0.213	5.41	0.234	●	6.0	3.228	1.083	2.087	
MDW0550HGS3	●		0.217	5.50	6.0			82.0	27.5	53	
MDW02188HGS3	●	7/32	0.219	5.56	0.234	●	6.0	3.228	1.181	2.047	1/4-2028

●=USA stocked item ★= Worldwide Warehouse item available in 10 business days
Some drills can achieve greater depths. Always check for sufficient flute length. Note: Special diameters available upon request.

Items labeled in purple represent Shrink Fit Shank Drills

MDW-HGS3 Series Solid Carbide Drills

Coolant Through Drills



MDW-HGS3 3XD drill for excellent chip management and long tool life (Internal coolant)

Catalog Number (inch/metric)	Stock	Fractional Wire & Letters	Diameter	Diameter D (mm)	Shank Diameter Ds (in/mm)	HGS3S	HGS3S Shank Diameter Ds	Overall Length L (in/mm)	Flute Length ℓ1 (in/mm)	Shank Length ℓ2 (in/mm)	Tap Size
MDW0560HGS3	●		0.221	5.6	6.0			82	30	52	
MDW02210HGS3	●	#2	0.221	5.61	0.234	●	6.0	3.228	1.181	2.047	
MDW0570HGS3	●		0.224	5.7	6.0			82	30	52	
MDW0580HGS3	●		0.228	5.8	6.0			82	30	52	
MDW0590HGS3	●		0.232	5.9	6.0			82	30	52	
MDW02344HGS3	●	15/64	0.234	5.95	0.234	●	6.0	3.228	1.181	2.047	
MDW0600HGS3	●		0.236	6	6.0			82	30	52	M7x1
MDW0610HGS3	●		0.240	6.1	7.0	●	8.0	88	32.5	53	
MDW02420HGS3	●	#C	0.242	6.15	0.281	●	8.0	3.465	1.280	2.087	
MDW0620HGS3	●		0.244	6.2	7.0	●	8.0	88	32.5	53	
MDW0630HGS3	●		0.248	6.3	7.0	●	8.0	88	32.5	53	
MDW02500HGS3	●	1/4	0.25	6.35	0.281	●	8.0	3.465	1.280	2.087	
MDW0640HGS3	●		0.252	6.4	7.0	●	8.0	88	32.5	53	
MDW0650HGS3	●		0.256	6.5	7.0	●	8.0	88	32.5	53	
MDW02570HGS3	●	#F	0.257	9.68	0.281	●	8.0	3.465	1.378	2.087	5/16-18
MDW0653HGS3	●		0.257	6.53	7.0	●	8.0	88	35	53	
MDW0660HGS3	●		0.260	6.6	7.0	●	8.0	88	35	53	
MDW0670HGS3	●		0.264	6.7	7.0	●	8.0	88	35	53	
MDW02656HGS3	●	17/64	0.266	6.75	0.281	●	8.0	3.465	1.378	2.087	
MDW02660HGS3	●		0.266	6.76	0.281	●	8.0	3.465	1.378	2.087	
MDW0680HGS3	●		0.268	6.8	7.0	●	8.0	88	35	53	
MDW0690HGS3	●		0.272	6.9	7.0	●	8.0	88	35	53	
MDW02720HGS3	●	#I	0.272	6.91	0.281	●	8.0	3.465	1.378	2.087	5/16-24
MDW0700HGS3	●		0.276	7	7.0	●	8.0	88	35	53	
MDW02770HGS3	●	#J	0.277	7.04	0.281	●	8.0	3.465	1.378	2.087	
MDW0710HGS3	●		0.280	7.1	8.0			94	37.5	54	
MDW02812HGS3	●	9/32	0.281	7.14	0.281	●	8.0	3.465	1.378	2.087	
MDW0720HGS3	●		0.284	7.2	8.0			94	37.5	54	
MDW0730HGS3	●		0.287	7.3	8.0			94	37.5	54	
MDW0740HGS3	●		0.291	7.4	8.0			94	37.5	54	
MDW0750HGS3	●		0.295	7.5	8.0			94	37.5	54	
MDW02969HGS3	●	19/64	0.297	7.54	0.313	●	8.0	3.701	1.575	2.126	
MDW0760HGS3	●		0.299	7.6	8.0			94	40	54	
MDW0770HGS3	●		0.303	7.7	8.0			94	40	54	
MDW0780HGS3	●		0.307	7.8	8.0			94	40	54	M9x1.25
MDW0790HGS3	●		0.311	7.9	8.0			94	40	54	
MDW03125HGS3	●	5/16	0.313	7.94	0.313	●	8.0	3.701	1.575	2.126	3/8-16
MDW0800HGS3	●		0.315	8	8.0			94	40	54	
MDW0810HGS3	●		0.319	8.1	9.0	●	10.0	100	42.5	55	
MDW0820HGS3	●		0.323	8.2	9.0	●	10.0	100	42.5	55	
MDW03230HGS3	●	#P	0.323	8.204	0.359	●	10.0	3.937	1.673	2.165	
MDW0830HGS3	●		0.327	8.3	9.0	●	10.0	100	42.5	55	
MDW03281HGS3	●	21/64	0.328	8.33	0.359	●	10.0	3.937	1.673	2.165	
MDW0840HGS3	●		0.331	8.4	9.0	●	10.0	100	42.5	55	
MDW03320HGS3	●	#Q	0.332	8.43	0.359	●	10.0	3.937	1.673	2.165	
MDW0850HGS3	●		0.335	8.5	9.0	●	10.0	100	42.5	55	M10x1.5
MDW0860HGS3	●		0.339	8.6	9.0	●	10.0	100	45	55	

●=USA stocked item ★ = Worldwide Warehouse item available in 10 business days
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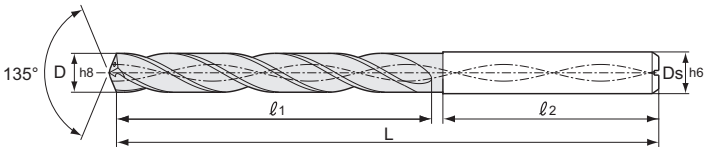
Items labeled in purple represent Shrink Fit Shank Drills

SERIES
MDW-HGS3



MDW-HGS3 3XD drill for excellent chip management and long tool life (Internal coolant)

Catalog Number (inch/metric)	Stock	Fractional Wire & Letters	Diameter	Diameter D (mm)	Shank Diameter Ds (in/mm)	HGS3S	HGS3S Shank Diameter Ds	Overall Length L (in/mm)	Flute Length ℓ1 (in/mm)	Shank Length ℓ2 (in/mm)	Tap Size
MDW0870HGS3	●		0.343	8.7	9.0	●	10.0	100	45	55	
MDW03438HGS3	●	11/32	0.344	8.73	0.359	●	10.0	3.937	1.772	2.165	
MDW0880HGS3	●		0.347	8.8	9.0	●	10.0	100	45	55	
MDW0890HGS3	●		0.350	8.9	9.0	●	10.0	100	45	55	
MDW0900HGS3	●		0.354	9	9.0	●	10.0	100	45	55	
MDW0910HGS3	●		0.358	9.1	10.0			106	47.5	56	
MDW03594HGS3	●	23/64	0.359	9.13	0.359	●	10.0	3.937	1.772	2.165	
MDW0920HGS3	●		0.362	9.2	10.0			106	47.5	56	
MDW0930HGS3	●		0.366	9.3	10.0			106	47.5	56	
MDW03680HGS3	●	#U	0.368	9.35	0.391	●	10.0	4.173	1.870	2.205	7/16-14
MDW0940HGS3	●		0.370	9.4	10.0			106	47.5	56	
MDW0950HGS3	●		0.374	9.5	10.0			106	47.5	56	
MDW03750HGS3	●	3/8	0.375	9.53	0.391	●	10.0	4.173	1.969	2.205	
MDW0960HGS3	●		0.378	9.6	10.0			106	50	56	
MDW0970HGS3	●		0.382	9.7	10.0			106	50	56	
MDW0980HGS3	●		0.386	9.8	10.0			106	50	56	
MDW0990HGS3	●		0.390	9.9	10.0			106	50	56	
MDW03906HGS3	●	25/64	0.391	9.92	0.391	●	10.0	4.173	1.969	2.205	7/16-20
MDW1000HGS3	●		0.394	10	10.0			106	50	56	
MDW1010HGS3	●		0.398	10.1	11.0	●	12.0	116	52.5	61	
MDW1020HGS3	●		0.402	10.2	11.0	●	12.0	116	52.5	61	M12x1.75
MDW1030HGS3	●		0.406	10.3	11.0	●	12.0	116	52.5	61	
MDW04062HGS3	●	13/32	0.406	10.32	0.438	●	12.0	4.567	2.067	2.402	
MDW1040HGS3	●		0.409	10.4	11.0	●	12.0	116	52.5	61	
MDW1050HGS3	●		0.413	10.5	11.0	●	12.0	116	52.5	61	
MDW1060HGS3	●		0.417	10.6	11.0	●	12.0	116	55	61	
MDW1070HGS3	●		0.421	10.7	11.0	●	12.0	116	55	61	
MDW04219HGS3	●	27/64	0.422	10.72	0.438	●	12.0	4.567	2.165	2.402	1/2-13
MDW1080HGS3	●		0.425	10.8	11.0	●	12.0	116	55	61	
MDW1090HGS3	●		0.429	10.9	11.0	●	12.0	116	55	61	
MDW1100HGS3	●		0.433	11	11.0	●	12.0	116	55	61	
MDW1110HGS3	●		0.437	11.1	12.0			122	57.5	62	
MDW04375HGS3	●	7/16	0.438	11.11	0.438	●	12.0	4.567	2.165	2.402	
MDW1120HGS3	●		0.441	11.2	12.0			122	57.5	62	
MDW1130HGS3	●		0.445	11.3	12.0			122	57.5	62	
MDW1140HGS3	●		0.449	11.4	12.0			122	57.5	62	
MDW1150HGS3	●		0.453	11.5	12.0			122	57.5	62	
MDW04531HGS3	●	29/64	0.453	11.51	0.469	●	12.0	4.803	2.362	2.441	1/2-20
MDW1160HGS3	●		0.457	11.6	12.0			122	60	62	
MDW1170HGS3	●		0.461	11.7	12.0			122	60	62	
MDW1180HGS3	●		0.465	11.8	12.0			122	60	62	
MDW1190HGS3	●		0.469	11.9	12.0			122	60	62	
MDW04688HGS3	●	15/32	0.469	11.91	0.469	●	12.0	4.803	2.362	2.441	
MDW1200HGS3	●		0.472	12	12.0			122	60	62	M14x2
MDW1210HGS3	●		0.476	12.1	13.0	●	14.0	128	62.5	63	
MDW1220HGS3	●		0.480	12.2	13.0	●	14.0	128	62.5	63	
MDW1230HGS3	●		0.484	12.3	13.0	●	14.0	128	62.5	63	9/16-12

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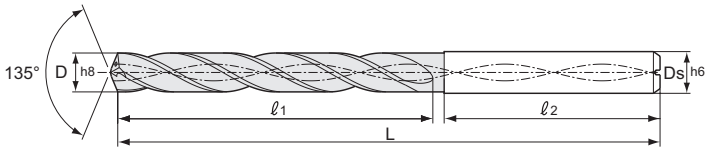
Some drills can achieve greater depths. Always check for sufficient flute length. Note: Special diameters available upon request.
Items labeled in purple represent Shrink Fit Shank Drills

MDW-HGS3 Series Solid Carbide Drills

Coolant Through Drills



MDW-HGS3 3XD drill for excellent chip management and long tool life (Internal coolant)

Catalog Number (inch/metric)	Stock	Fractional Wire & Letters	Diameter	Diameter D (mm)	Shank Diameter Ds (in/mm)	HGS3S	HGS3S Shank Diameter Ds	Overall Length L (in/mm)	Flute Length ℓ1 (in/ mm)	Shank Length ℓ2 (in/mm)	Tap Size
MDW04844HGS3	●	31/64	0.484	12.304	0.516	●	14.0	5.039	2.461	2.480	
MDW1240HGS3	●		0.488	12.4	13.0	●	14.0	128	62.5	63	
MDW1250HGS3	●		0.492	12.5	13.0	●	14.0	128	62.5	63	
MDW1260HGS3	●		0.496	12.6	13.0	●	14.0	128	65	63	
MDW1270HGS3	●	1/2	0.5	12.7	13.0	●	14.0	128	65	63	
MDW05000HGS3	●	1/2	0.5	12.7	0.516	●	14.0	5.039	2.559	2.480	
MDW1280HGS3	●		0.504	12.8	13.0	●	14.0	128	65	63	
MDW1290HGS3	●		0.508	12.9	13.0	●	14.0	128	65	63	
MDW1300HGS3	●		0.512	13	13.0	●	14.0	128	65	63	
MDW05156HGS3	●	33/64	0.516	13.09	0.516	●	14.0	5.039	2.559	2.480	9/16-18
MDW1310HGS3	●		0.516	13.1	14.0			134	67.5	64	
MDW1320HGS3	●		0.520	13.2	14.0			134	67.5	64	
MDW1330HGS3	●		0.524	13.3	14.0			134	67.5	64	
MDW1340HGS3	●		0.528	13.4	14.0			134	67.5	64	
MDW05312HGS3	●	17/32	0.531	13.49	0.547	●	14.0	5.276	2.658	2.520	5/8-11
MDW1350HGS3	●		0.532	13.5	14.0			134	67.5	64	
MDW1360HGS3	●		0.535	13.6	14.0			134	70	64	
MDW1370HGS3	●		0.539	13.7	14.0			134	70	64	
MDW1380HGS3	●		0.543	13.8	14.0			134	70	64	
MDW05469HGS3	●	35/64	0.547	13.89	0.547	●	14.0	5.276	2.756	2.520	M16x2
MDW1390HGS3	●		0.547	13.9	14.0			134	70	64	
MDW1400HGS3	●		0.551	14	14.0			134	70	64	
MDW1410HGS3	●		0.555	14.1	15.0	●	16.0	140	72.5	65	
MDW1420HGS3	●		0.559	14.2	15.0	●	16.0	140	72.5	65	
MDW05625HGS3	●	9/16	0.563	14.29	0.594	●	16.0	5.512	2.854	2.559	
MDW1430HGS3	●		0.563	14.3	15.0	●	16.0	140	72.5	65	
MDW1440HGS3	●		0.567	14.4	15.0	●	16.0	140	72.5	65	
MDW1450HGS3	●		0.571	14.5	15.0	●	16.0	140	72.5	65	
MDW1460HGS3	●		0.575	14.6	15.0	●	16.0	140	75	65	
MDW05781HGS3	●	37/64	0.578	14.68	0.594	●	16.0	5.512	2.953	2.559	5/8-18
MDW1470HGS3	●		0.579	14.7	15.0	●	16.0	140	75	65	
MDW1480HGS3	●		0.583	14.8	15.0	●	16.0	140	75	65	
MDW1490HGS3	●		0.587	14.9	15.0	●	16.0	140	75	65	
MDW1500HGS3	●		0.591	15	15.0	●	16.0	140	75	65	
MDW05937HGS3	●	19/32	0.594	15.08	0.594	●	16.0	5.512	2.953	2.559	
MDW1510HGS3	●		0.595	15.1	16.0			146	77.5	66	
MDW1520HGS3	●		0.598	15.2	16.0			146	77.5	66	
MDW1530HGS3	●		0.602	15.3	16.0			146	77.5	66	
MDW1540HGS3	●		0.606	15.4	16.0			146	77.5	66	
MDW06094HGS3	●	39/64	0.609	15.48	0.625	●	16.0	5.748	3.051	2.598	11/16-12
MDW1550HGS3	●		0.610	15.5	16.0			146	77.5	66	M18x2.5
MDW1560HGS3	●		0.614	15.6	16.0			146	80	66	
MDW1570HGS3	●		0.618	15.7	16.0			146	80	66	
MDW1580HGS3	●		0.622	15.8	16.0			146	80	66	
MDW06250HGS3	●	5/8	0.625	15.88	0.625	●	16.0	5.748	3.150	2.598	11/16-16
MDW1590HGS3	●		0.626	15.9	16.0			146	80	66	
MDW1600HGS3	●		0.630	16	16.0			146	80	66	
MDW1650HGS3	★		0.650	16.5	17.0			152	82.5	70	M18x1.5
MDW1700HGS3	★		0.669	17	17.0			152	85	70	
MDW1750HGS3	★		0.689	17.5	17.0			158	87.5	70	M20x2.5
MDW1800HGS3	★		0.709	18	18.0			158	90	70	
MDW1850HGS3	★		0.728	18.5	18.0			164	92.5	70	M20x1.5
MDW1900HGS3	★		0.748	19	19.0			164	95	70	
MDW1950HGS3	★		0.768	19.5	19.0			170	97.5	70	
MDW2000HGS3	★		0.787	20	20.0			170	100	70	

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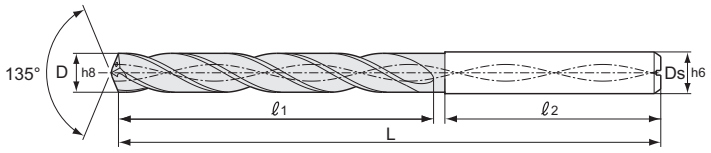
Items labeled in purple represent Shrink Fit Shank Drills

SERIES MDW-HGS5



MDW-HGS5 5XD drill for excellent chip management and long tool life (Internal coolant)

Catalog Number (inch/metric)	Stock	Fractional Wire & Letters	Diameter	Diameter D (*mm*)	Shank Diameter Ds (in/*mm*)	HGS5S	HGS5S Shank Diameter Ds	Overall Length L (in/*mm*	Flute Length ℓ1 (in/*mm*)	Shank Length ℓ2 (in/*mm*)	Tap Size
MDW0150HGS5	●		0.0591	*1.5*	*3.0*			*70*	*14*	*56*	
MDW0160HGS5	●		0.063	*1.6*	*3.0*			*70*	*19*	*51*	
MDW0170HGS5	●		0.067	*1.7*	*3.0*			*70*	*19*	*51*	
MDW0180HGS5	●		0.0709	*1.8*	*3.0*			*70*	*19*	*51*	
MDW0190HGS5	●		0.0748	*1.9*	*3.0*			*70*	*19*	*51*	
MDW0200HGS5	●		0.0787	*2*	*3.0*			*70*	*19*	*49*	
MDW0210HGS5	●		0.0827	*2.1*	*3.0*			*78*	*24*	*52*	
MDW0220HGS5	●		0.0866	*2.2*	*3.0*			*78*	*24*	*52*	
MDW0230HGS5	●		0.0906	*2.3*	*3.0*			*78*	*24*	*52*	
MDW00937HGS5	●	3/32	0.0937	*2.38*	0.125	●	3.0	3.0709	0.9449	1.8898	
MDW0240HGS5	●		0.0945	*2.4*	*3.0*			*78*	*24*	*52*	
MDW0250HGS5	●		0.0984	*2.5*	*3.0*			*78*	*24*	*52*	
MDW0260HGS5	●		0.1024	*2.6*	*3.0*			*78*	*28*	*48*	
MDW0270HGS5	●		0.1063	*2.7*	*3.0*			*78*	*28*	*48*	
MDW01094HGS5	●	7/64	0.1094	*2.78*	0.125	●	3.0	3.0709	1.1024	1.8898	
MDW0280HGS5	●		0.1102	*2.8*	*3.0*			*78*	*28*	*48*	
MDW0290HGS5	●		0.1142	*2.9*	*3.0*			*78*	*28*	*48*	
MDW0300HGS5	●		0.1181	*3*	*3.0*			*78*	*28*	*48*	
MDW0310HGS5	●		0.122	*3.1*	*4.0*	●	*6.0*	*86*	*32*	*52*	
MDW01250HGS5	●	1/8	0.125	*3.18*	0.125	●	3.0	3.0709	1.1024	1.8898	
MDW0320HGS5	●		0.126	*3.2*	*4.0*	●	*6.0*	*86*	*32*	*52*	
MDW0330HGS5	●		0.1299	*3.3*	*4.0*	●	*6.0*	*86*	*32*	*52*	
MDW0340HGS5	●		0.1339	*3.4*	*4.0*	●	*6.0*	*86*	*32*	*52*	
MDW0350HGS5	●		0.1378	*3.5*	*4.0*	●	*6.0*	*86*	*32*	*52*	
MDW01406HGS5	●		0.1406	*3.57*	0.1562	●	6.0	3.3858	1.4173	1.8898	
MDW0360HGS5	●		0.1417	*3.6*	*4.0*	●	*6.0*	*86*	*36*	*48*	
MDW0370HGS5	●		0.1457	*3.7*	*4.0*	●	*6.0*	*86*	*36*	*48*	
MDW0380HGS5	●		0.1496	*3.8*	*4.0*	●	*6.0*	*86*	*36*	*48*	
MDW0390HGS5	●		0.1535	*3.9*	*4.0*	●	*6.0*	*86*	*36*	*48*	
MDW01562HGS5	●	5/32	0.1562	*3.97*	0.1562	●	6.0	3.3858	1.4173	1.8898	
MDW0400HGS5	●		0.1575	*4*	*4.0*	●	*6.0*	*86*	*36*	*48*	
MDW01590HGS5	●	#21	0.159	*4.04*	0.1875	●	6.0	3.8583	1.5748	2.2047	
MDW0410HGS5	●		0.1614	*4.1*	*5.0*	●	*6.0*	*98*	*40*	*56*	
MDW0420HGS5	●		0.1654	*4.2*	*5.0*	●	*6.0*	*98*	*40*	*56*	
MDW0430HGS5	●		0.1693	*4.3*	*5.0*	●	*6.0*	*98*	*40*	*56*	
MDW01719HGS5	●	11/64	0.1719	*4.37*	0.1875	●	6.0	3.8583	1.5748	2.2047	
MDW0440HGS5	●		0.1732	*4.4*	*5.0*	●	*6.0*	*98*	*40*	*56*	
MDW0450HGS5	●		0.1772	*4.5*	*5.0*	●	*6.0*	*98*	*40*	*56*	
MDW0460HGS5	●		0.1811	*4.6*	*5.0*	●	*6.0*	*98*	*44*	*52*	
MDW0470HGS5	●		0.185	*4.7*	*5.0*	●	*6.0*	*98*	*44*	*52*	
MDW01875HGS5	●	3/16	0.1875	*4.76*	0.1875	●	6.0	3.8583	1.7323	2.0472	
MDW0480HGS5	●		0.189	*4.8*	*5.0*	●	*6.0*	*98*	*44*	*52*	
MDW0490HGS5	●		0.1929	*4.9*	*5.0*	●	*6.0*	*98*	*44*	*52*	
MDW0500HGS5	●		0.1969	*5*	*5.0*	●	*6.0*	*98*	*44*	*52*	
MDW0510HGS5	●		0.2008	*5.1*	*6.0*			*100*	*44*	*54*	
MDW02031HGS5	●	13/64	0.2031	*5.16*	0.2344	●	6.0	3.937	1.7323	2.126	
MDW0520HGS5	●		0.2047	*5.2*	*6.0*			*100*	*44*	*54*	
MDW0530HGS5	●		0.2087	*5.3*	*6.0*			*100*	*44*	*54*	
MDW0540HGS5	●		0.2126	*5.4*	*6.0*			*100*	*44*	*54*	
MDW02130HGS5	●	#3	0.213	*5.41*	0.2344	●	6.0	3.937	1.7323	2.126	
MDW0550HGS5	●		0.2165	*5.5*	*6.0*			*100*	*44*	*54*	
MDW02188HGS5	●	7/32	0.2188	*5.56*	0.2344	●	6.0	3.937	1.8898	2.0472	
MDW0560HGS5	●		0.2205	*5.6*	*6.0*			*100*	*48*	*52*	
MDW02210HGS5	●	#2	0.221	*5.61*	0.2344	●	6.0	3.937	1.8898	2.0472	
MDW0570HGS5	●		0.2244	*5.7*	*6.0*			*100*	*48*	*52*	
MDW0580HGS5	●		0.2283	*5.8*	*6.0*			*100*	*48*	*52*	

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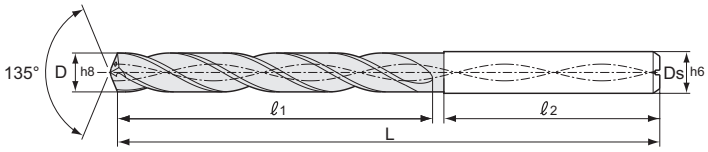
MDW-HGS5 Series Solid Carbide Drills
Coolant Through Drills

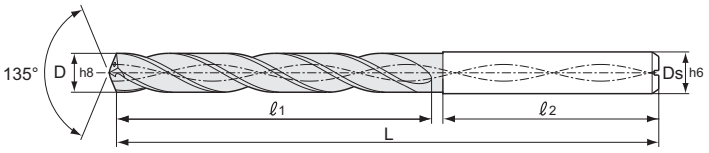


MDW-HGS5 5XD drill for excellent chip management and long tool life (Internal coolant)

Catalog Number (inch/*metric*)	Stock	Fractional Wire & Letters	Diameter	Diameter D (*mm*)	Shank Diameter Ds (in/*mm*)	HGS5S	HGS5S Shank Diameter Ds	Overall Length L (in/*mm*)	Flute Length ℓ1 (in/*mm*)	Shank Length ℓ2 (in/*mm*)	Tap Size
MDW0590HGS5	●		0.2323	*5.9*	*6.0*			*100*	*48*	*52*	
MDW02344HGS5	●	15/64	0.2344	*5.95*	0.2344	●	6.0	3.937	1.8898	2.0472	
MDW0600HGS5	●		0.2362	*6.0*	*6.0*			*100*	*48*	*52*	
MDW0610HGS5	●		0.2402	*6.1*	*7.0*	●	*8.0*	*109*	*52*	*53*	
MDW0620HGS5	●		0.2441	*6.2*	*7.0*	●	*8.0*	*109*	*52*	*53*	
MDW0630HGS5	●		0.248	*6.3*	*7.0*	●	*8.0*	*109*	*52*	*53*	
MDW02500HGS5	●	1/4	0.25	*6.35*	0.2812	●	8.0	4.2913	2.0472	2.0866	
MDW0640HGS5	●		0.252	*6.4*	*7.0*	●	*8.0*	*109*	*52*	*53*	
MDW0650HGS5	●		0.2559	*6.5*	*7.0*	●	*8.0*	*109*	*52*	*53*	
MDW02570HGS5	●	#F	0.257	*6.53*	0.2812	●	8.0	4.2913	2.2047	2.0866	
MDW0653HGS5	●		0.2571	*6.53*	*7.0*	●	*8.0*	*109*	*56*	*53*	
MDW0660HGS5	●		0.2598	*6.6*	*7.0*	●	*8.0*	*109*	*56*	*53*	
MDW0670HGS5	●		0.2638	*6.7*	*7.0*	●	*8.0*	*109*	*56*	*53*	
MDW02656HGS5	●	17/64	0.2656	*6.75*	0.2812	●	8.0	4.2913	2.2047	2.0866	
MDW02660HGS5	●	#H	0.266	*6.76*	0.2812	●	8.0	4.2913	2.2047	2.0866	
MDW0680HGS5	●		0.2677	*6.8*	*7.0*	●	*8.0*	*109*	*56*	*53*	
MDW0690HGS5	●		0.2717	*6.9*	*7.0*	●	*8.0*	*109*	*56*	*53*	
MDW02720HGS5	●	#I	0.272	*6.91*	0.2812	●	8.0	4.2913	2.2047	2.0866	
MDW0700HGS5	●		0.2756	*7*	*7.0*	●	*8.0*	*109*	*56*	*53*	
MDW02770HGS5	●	#J	0.277	*7.04*	0.2812	●	8.0	4.2913	2.2047	2.0866	
MDW0710HGS5	●		0.2795	*7.1*	*8.0*			*118*	*60*	*54*	
MDW02812HGS5	●	9/32	0.2812	*7.14*	0.2812	●	8.0	4.2913	2.2047	2.0866	
MDW0720HGS5	●		0.2835	*7.2*	*8.0*			*118*	*60*	*54*	
MDW0730HGS5	●		0.2874	*7.3*	*8.0*			*118*	*60*	*54*	
MDW0740HGS5	●		0.2913	*7.4*	*8.0*			*118*	*60*	*54*	
MDW0750HGS5	●		0.2953	*7.5*	*8.0*			*118*	*60*	*54*	
MDW02969HGS5	●	19/64	0.2969	*7.54*	0.3125	●	8.0	4.6457	2.5197	2.126	
MDW0760HGS5	●		0.2992	*7.6*	*8.0*			*118*	*64*	*54*	
MDW0770HGS5	●		0.3031	*7.7*	*8.0*			*118*	*64*	*54*	
MDW0780HGS5	●		0.3071	*7.8*	*8.0*			*118*	*64*	*54*	
MDW0790HGS5	●		0.311	*7.9*	*8.0*			*118*	*64*	*54*	
MDW03125HGS5	●	5/16	0.3125	*7.94*	0.3125	●	8.0	4.6457	2.5197	2.126	
MDW0800HGS5	●		0.315	*8*	*8.0*			*118*	*64*	*54*	
MDW0810HGS5	●		0.3189	*8.1*	*9.0*	●	*10.0*	*127*	*68*	*55*	
MDW0820HGS5	●		0.3228	*8.2*	*9.0*	●	*10.0*	*127*	*68*	*55*	
MDW03230HGS5	●	#P	0.323	*8.204*	0.3594	●	10.0	5	2.6772	2.1654	
MDW0830HGS5	●		0.3268	*8.3*	*9.0*	●	*10.0*	*127*	*68*	*55*	
MDW03281HGS5	●	21/64	0.3281	*8.33*	0.3594	●	10.0	5	2.6772	2.1654	
MDW0840HGS5	●		0.3307	*8.4*	*9.0*	●	*10.0*	*127*	*68*	*55*	
MDW03320HGS5	●	#Q	0.332	*8.43*	0.3594	●	10.0	5	2.6772	2.1654	
MDW0850HGS5	●		0.3346	*8.5*	*9.0*	●	*10.0*	*127*	*68*	*55*	
MDW0860HGS5	●		0.3386	*8.6*	*9.0*	●	*10.0*	*127*	*72*	*55*	
MDW0870HGS5	●		0.3425	*8.7*	*9.0*	●	*10.0*	*127*	*72*	*55*	
MDW03438HGS5	●	11/32	0.3438	*8.73*	0.3594	●	10.0	5	2.8346	2.1654	
MDW0880HGS5	●		0.3465	*8.8*	*9.0*	●	*10.0*	*127*	*72*	*55*	
MDW0890HGS5	●		0.3504	*8.9*	*9.0*	●	*10.0*	*127*	*72*	*55*	
MDW0900HGS5	●		0.3543	*9*	*9.0*	●	*10.0*	*127*	*72*	*55*	
MDW0910HGS5	●		0.3583	*9.1*	*10.0*			*136*	*76*	*56*	
MDW03594HGS5	●	23/64	0.3594	*9.13*	0.3594	●	10.0	5	2.8346	2.1654	
MDW0920HGS5	●		0.3622	*9.2*	*10.0*			*136*	*76*	*56*	
MDW0930HGS5	●		0.3661	*9.3*	*10.0*			*136*	*76*	*56*	
MDW03680HGS5	●	#U	0.368	*9.35*	0.3906	●	10.0	5.3543	2.9921	2.2047	

●=USA stocked item ★= Worldwide Warehouse item available in 10 business days
Some drills can achieve greater depths. Always check for sufficient flute length. Note: Special diameters available upon request.
Items labeled in purple represent Shrink Fit Shank Drills

SERIES
MDW-HGS5



MDW-HGS5 5XD drill for excellent chip management and long tool life (Internal coolant)

Catalog Number (inch/*metric*)	Stock	Fractional Wire & Letters	Diameter	Diameter D (*mm*)	Shank Diameter Ds (in/*mm*)	HGS5S	HGS5S Shank Diameter Ds	Overall Length L (in/*mm*)	Flute Length ℓ1 (in/*mm*)	Shank Length ℓ2(in/*mm*)	Tap Size
MDW0940HGS5	●		0.3701	*9.4*	*10.0*			*136*	*76*	*56*	
MDW0950HGS5	●		0.374	*9.5*	*10.0*			*136*	*76*	*56*	
MDW03750HGS5	●	3/8	0.375	*9.53*	0.3906	●	10.0	5.3543	3.1496	2.2047	
MDW0960HGS5	●		0.378	*9.6*	*10.0*			*136*	*80*	*56*	
MDW0970HGS5	●		0.3819	*9.7*	*10.0*			*136*	*80*	*56*	
MDW0980HGS5	●		0.3858	*9.8*	*10.0*			*136*	*80*	*56*	
MDW0990HGS5	●		0.3898	*9.9*	*10.0*			*136*	*80*	*56*	
MDW03906HGS5	●	25/64	0.3906	*9.92*	0.3906	●	10.0	5.3543	3.1496	2.2047	
MDW1000HGS5	●		0.3937	*10*	*10.0*			*136*	*80*	*56*	
MDW1010HGS5	●		0.3976	*10.1*	*11.0*	●	*12.0*	*149*	*84*	*61*	
MDW1020HGS5	●		0.4016	*10.2*	*11.0*	●	*12.0*	*149*	*84*	*61*	
MDW1030HGS5	●		0.4055	*10.3*	*11.0*	●	*12.0*	*149*	*84*	*61*	
MDW04062HGS5	●	13/32	0.4062	*10.32*	0.4375	●	12.0	5.8661	3.3071	2.4016	
MDW1040HGS5	●		0.4094	*10.4*	*11.0*	●	*12.0*	*149*	*84*	*61*	
MDW1050HGS5	●		0.4134	*10.5*	*11.0*	●	*12.0*	*149*	*84*	*61*	
MDW1060HGS5	●		0.4173	*10.6*	*11.0*	●	*12.0*	*149*	*88*	*61*	
MDW1070HGS5	●		0.4213	*10.7*	*11.0*	●	*12.0*	*149*	*88*	*61*	
MDW04219HGS5	●	27/64	0.4219	*10.72*	0.4375	●	12.0	5.8661	3.4646	2.4016	
MDW1080HGS5	●		0.4252	*10.8*	*11.0*	●	*12.0*	*149*	*88*	*61*	
MDW1090HGS5	●		0.4291	*10.9*	*11.0*	●	*12.0*	*149*	*88*	*61*	
MDW1100HGS5	●		0.4331	*11*	*11.0*	●	*12.0*	*149*	*88*	*61*	
MDW1110HGS5	●		0.437	*11.1*	*12.0*			*158*	*92*	*62*	
MDW04375HGS5	●	7/16	0.4375	*11.11*	0.4375	●	12.0	5.8661	3.4646	2.4016	
MDW1120HGS5	●		0.4409	*11.2*	*12.0*			*158*	*92*	*62*	
MDW1130HGS5	●		0.4449	*11.3*	*12.0*			*158*	*92*	*62*	
MDW1140HGS5	●		0.4488	*11.4*	*12.0*			*158*	*92*	*62*	
MDW1150HGS5	●		0.4528	*11.5*	*12.0*			*158*	*92*	*62*	
MDW04531HGS5	●	29/64	0.4531	*11.51*	0.4688	●	12.0	6.2205	3.7795	2.4409	
MDW1160HGS5	●		0.4567	*11.6*	*12.0*			*158*	*96*	*62*	
MDW1170HGS5	●		0.4606	*11.7*	*12.0*			*158*	*96*	*62*	
MDW1180HGS5	●		0.4646	*11.8*	*12.0*			*158*	*96*	*62*	
MDW1190HGS5	●		0.4685	*11.9*	*12.0*			*158*	*96*	*62*	
MDW04688HGS5	●	15/32	0.4688	*11.91*	0.4688	●	12.0	6.2205	3.7795	2.4409	
MDW1200HGS5	●		0.4724	*12*	*12.0*			*158*	*96*	*62*	
MDW1210HGS5	●		0.4764	*12.1*	*13.0*	●	*14.0*	*167*	*100*	*63*	
MDW1220HGS5	●		0.4803	*12.2*	*13.0*	●	*14.0*	*167*	*100*	*63*	
MDW1230HGS5	●		0.4843	*12.3*	*13.0*	●	*14.0*	*167*	*100*	*63*	
MDW04844HGS5	●	31/64	0.4844	*12.304*	0.5156	●	14.0	6.5748	3.937	2.4803	
MDW1240HGS5	●		0.4882	*12.4*	*13.0*	●	*14.0*	*167*	*100*	*63*	
MDW1250HGS5	●		0.4921	*12.5*	*13.0*	●	*14.0*	*167*	*100*	*63*	
MDW1260HGS5	●		0.4961	*12.6*	*13.0*	●	*14.0*	*167*	*104*	*63*	
MDW1270HGS5	●	*1/2*	0.5	*12.7*	*13.0*	●	*14.0*	*167*	*104*	*63*	
MDW05000HGS5	●	1/2	0.5	*12.7*	0.5156	●	14.0	6.5748	4.0945	2.4803	
MDW1280HGS5	●		0.5039	*12.8*	*13.0*	●	*14.0*	*167*	*104*	*63*	
MDW1283HGS5	●		0.5051	*12.83*	*13.0*	●	*14.0*	*167*	*104*	*63*	
MDW1290HGS5	●		0.5079	*12.9*	*13.0*	●	*14.0*	*167*	*104*	*63*	
MDW1300HGS5	●		0.5118	*13*	*13.0*	●	*14.0*	*167*	*104*	*63*	
MDW05156HGS5	●	33/64	0.5156	*13.09*	0.5156	●	14.0	6.5748	4.0945	2.4803	
MDW1310HGS5	●		0.5157	*13.1*	*14.0*			*176*	*108*	*64*	
MDW1320HGS5	●		0.5197	*13.2*	*14.0*			*176*	*108*	*64*	
MDW1330HGS5	●		0.5236	*13.3*	*14.0*			*176*	*108*	*64*	
MDW1340HGS5	●		0.5276	*13.4*	*14.0*			*176*	*108*	*64*	
MDW05312HGS5	●	17/32	0.5312	*13.49*	0.5469	●	14.0	6.9291	4.252	2.5197	
MDW1350HGS5	●		0.5315	*13.5*	*14.0*			*176*	*108*	*64*	

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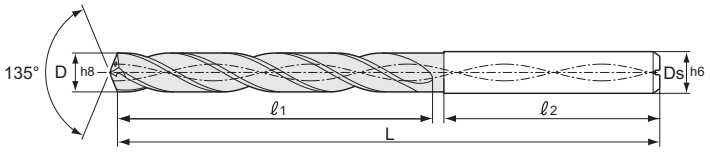
Items labeled in purple represent Shrink Fit Shank Drills

MDW-HGS5 Series Solid Carbide Drills

Coolant Through Drills



MDW-HGS5 5XD drill for excellent chip management and long tool life (Internal coolant)

Catalog Number (inch/*metric*)	Stock	Fractional Wire & Letters	Diameter	Diameter D (*mm*)	Shank Diameter Ds (in/*mm*)	HGS5S	HGS5S Shank Diameter Ds	Overall Length L (in/*mm*)	Flute Length ℓ1 (in/*mm*)	Shank Length ℓ2 (in/*mm*)	Tap Size
MDW1360HGS5	●		0.5354	*13.6*	*14.0*			*176*	*112*	*64*	
MDW1370HGS5	●		0.5394	*13.7*	*14.0*			*176*	*112*	*64*	
MDW1380HGS5	●		0.5433	*13.8*	*14.0*			*176*	*112*	*64*	
MDW05469HGS5	●	35/64	0.5469	*13.89*	0.5469	●	14.0	6.9291	4.4094	2.5197	
MDW1390HGS5	●		0.5472	*13.9*	*14.0*			*176*	*112*	*64*	
MDW1400HGS5	●		0.5512	*14*	*14.0*			*176*	*112*	*64*	
MDW1410HGS5	●		0.5551	*14.1*	*15.0*	●	*16.0*	*185*	*116*	*65*	
MDW1420HGS5	●		0.5591	*14.2*	*15.0*	●	*16.0*	*185*	*116*	*65*	
MDW05625HGS5	●	9/16	0.5625	*14.29*	0.5937	●	16.0	7.2835	4.5669	2.5591	
MDW1430HGS5	●		0.563	*14.3*	*15.0*	●	*16.0*	*185*	*116*	*65*	
MDW1440HGS5	●		0.5669	*14.4*	*15.0*	●	*16.0*	*185*	*116*	*65*	
MDW1450HGS5	●		0.5709	*14.5*	*15.0*	●	*16.0*	*185*	*116*	*65*	
MDW1460HGS5	●		0.5748	*14.6*	*15.0*	●	*16.0*	*185*	*120*	*65*	
MDW05781HGS5	●	37/64	0.5781	*14.68*	0.5937	●	16.0	7.2835	4.7244	2.5591	5/8-18
MDW1470HGS5	●		0.5787	*14.7*	*15.0*	●	*16.0*	*185*	*120*	*65*	
MDW1480HGS5	●		0.5827	*14.8*	*15.0*	●	*16.0*	*185*	*120*	*65*	
MDW1490HGS5	●		0.5866	*14.9*	*15.0*	●	*16.0*	*185*	*120*	*65*	
MDW1500HGS5	●		0.5906	*15*	*15.0*	●	*16.0*	*185*	*120*	*65*	
MDW05937HGS5	●	19/32	0.5937	*15.08*	0.5937	●	16.0	7.2835	4.7244	2.5591	
MDW1510HGS5	●		0.5945	*15.1*	*16.0*			*194*	*124*	*66*	
MDW1520HGS5	●		0.5984	*15.2*	*16.0*			*194*	*124*	*66*	
MDW1530HGS5	●		0.6024	*15.3*	*16.0*			*194*	*124*	*66*	
MDW1540HGS5	●		0.6063	*15.4*	*16.0*			*194*	*124*	*66*	
MDW06094HGS5	●	39/64	0.6094	*15.48*	0.625	●	16.0	7.6378	4.8819	2.5984	11/16-12
MDW1550HGS5	●		0.6102	*15.5*	*16.0*			*194*	*124*	*66*	*M18x2.5*
MDW1560HGS5	●		0.6142	*15.6*	*16.0*			*194*	*128*	*66*	
MDW1570HGS5	★		0.6181	*15.7*	*16.0*			*194*	*128*	*66*	
MDW1580HGS5	●		0.622	*15.8*	*16.0*			*194*	*128*	*66*	
MDW06250HGS5	●	5/8	0.625	*15.88*	0.625	●	16.0	7.6378	5.0394	2.5984	11/16-16
MDW1590HGS5	●		0.626	*15.9*	*16.0*			194	*128*	*66*	
MDW1600HGS5	●		0.6299	*16*	*16.0*			194	*128*	*66*	
MDW1650HGS5	★		0.6496	*16.5*	*17.0*			*203*	*136*	*67*	
MDW1700HGS5	★		0.6693	*17*	*17.0*			*203*	*136*	*67*	
MDW1750HGS5	★		0.689	*17.5*	*18.0*			*214*	*140*	*74*	
MDW1800HGS5	★		0.7087	*18*	*18.0*			*214*	*144*	*70*	
MDW1850HGS5	★		0.7284	*18.5*	*19.0*			*221*	*148*	*73*	
MDW1900HGS5	★		0.748	*19*	*19.0*			*221*	*152*	*69*	
MDW1950HGS5	★		0.7677	*19.5*	*20.0*			*230*	*156*	*74*	
MDW2000HGS5	★		0.7874	*20*	*20.0*			*230*	*160*	*70*	

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Items labeled in purple represent Shrink Fit Shank Drills

SERIES MDW-HGS8

h8 Manufacturing Tolerances

Tolerances of Diameters (in.)		Tolerances of Diameters (in.)		Tolerances of Diameters (in.)	
D ≤ .118	+0 -.00055	.236 < D ≤ .394	+0 -.00087	.709 < D ≤ .768	+0 -.00130
.118 < D ≤ .236	+0 -.00071	.394 < D ≤ .709	+0 -.00106		

MDW-HGS8 8XD drill for excellent chip management and long tool life (Internal coolant)

Catalog Number (inch/*metric*)	Stock	Fractional Wire & Letters	Diameter D (in)	Diameter D (*mm*)	Overall Length L (in/*mm*)	Flute Length ℓ_1 (in/*mm*)	Shank Length ℓ_2 (in/*mm*)	Shank Diameter D_s (in/*mm*)	Tap Size
MDW0150HGS8	●		0.0591	*1.50*	*70.0*	*18.5*		*3.00*	
MDW0200HGS8	●		0.0787	*2.00*	*76.00*	*24.00*	*50.00*	*3.00*	
MDW0210HGS8			0.0827	*2.10*	*81.00*	*27.50*	*52.00*	*3.00*	3-56
MDW0220HGS8			0.0866	*2.20*	*81.00*	*27.50*	*52.00*	*3.00*	
MDW0230HGS8			0.0906	*2.30*	*81.00*	*27.50*	*52.00*	*3.00*	
MDW00937HGS8	●	3/32	0.0937	2.38	3.1890	1.0827	2.0472	0.1250	
MDW0240HGS8			0.0945	*2.40*	*81.00*	*27.50*	*52.00*	*3.00*	
MDW0250HGS8	●		0.0984	*2.50*	*81.00*	*27.50*	*52.00*	*3.00*	
MDW0260HGS8			0.1024	*2.60*	*81.00*	*33.00*	*48.00*	*3.00*	
MDW0270HGS8			0.1063	*2.70*	*81.00*	*33.00*	*48.00*	*3.00*	6-32
MDW0280HGS8			0.1102	*2.80*	*81.00*	*33.00*	*48.00*	*3.00*	
MDW0290HGS8			0.1142	*2.90*	*81.00*	*33.00*	*48.00*	*3.00*	3.5x6
MDW0300HGS8	●		0.1181	*3.00*	*81.00*	*33.00*	*48.00*	*3.00*	
MDW0310HGS8			0.1220	*3.10*	*92.00*	*38.50*	*52.00*	*4.00*	
MDW01250HGS8	●	1/8	0.1250	*3.18*	3.1890	1.2992	1.8898	0.1250	
MDW0320HGS8			0.1260	*3.20*	*92.00*	*38.50*	*52.00*	*4.00*	
MDW0330HGS8	●		0.1299	*3.30*	*92.00*	*38.50*	*52.00*	*4.00*	M4x.7
MDW0340HGS8			0.1339	*3.40*	*92.00*	*38.50*	*52.00*	*4.00*	
MDW0350HGS8	●		0.1378	*3.50*	*92.00*	*38.50*	*52.00*	*4.00*	
MDW01406HGS8	●		0.1406	*3.57*	3.6220	1.7323	1.8898	0.1562	
MDW0360HGS8			0.1417	*3.60*	*92.00*	*44.00*	*48.00*	*4.00*	
MDW0370HGS8			0.1457	*3.70*	*92.00*	*44.00*	*48.00*	*4.00*	M4.5x.7
MDW0380HGS8	●		0.1496	*3.80*	*92.00*	*44.00*	*48.00*	*4.00*	
MDW0390HGS8			0.1535	*3.90*	*92.00*	*44.00*	*48.00*	*4.00*	
MDW01562HGS8	●	5/32	0.1562	*3.97*	3.6220	1.7323	1.8898	0.1562	
MDW0400HGS8	●		0.1575	*4.00*	*92.00*	*44.00*	*48.00*	*4.0*	
MDW01590HGS8	●	#21	0.1590	*4.04*	4.1339	1.9488	2.1260	0.1875	10-32
MDW0410HGS8			0.1614	*4.10*	*105.00*	*49.50*	*54.00*	*5.00*	
MDW0420HGS8	●		0.1654	*4.20*	*105.00*	*49.50*	*54.00*	*5.00*	M5x.8
MDW0430HGS8			0.1693	*4.30*	*105.00*	*49.50*	*54.00*	*5.00*	
MDW01719HGS8	●	11/64	0.1719	*4.37*	4.1339	1.9488	2.1260	0.1875	
MDW0440HGS8			0.1732	*4.40*	*105.00*	*49.50*	*54.00*	*5.00*	
MDW0450HGS8	●		0.1772	*4.50*	*105.00*	*49.50*	*54.00*	*5.00*	
MDW0460HGS8			0.1811	*4.60*	*105.00*	*55.00*	*50.00*	*5.00*	
MDW0470HGS8			0.1850	*4.70*	*105.00*	*55.00*	*50.00*	*5.00*	
MDW01875HGS8	●	3/16	0.1875	*4.76*	4.1339	2.1654	1.9685	0.1875	
MDW0480HGS8			0.1890	*4.80*	*105.00*	*55.00*	*50.00*	*5.00*	
MDW0490HGS8			0.1929	*4.90*	*105.00*	*55.00*	*50.00*	*5.00*	
MDW0500HGS8	●		0.1969	*5.00*	*105.00*	*55.00*	*50.00*	*5.00*	M6x1
MDW0510HGS8			0.2008	*5.10*	*118.00*	*60.50*	*56.00*	*6.00*	
MDW02010HGS8	●	#7	0.2010	*5.11*	4.6457	2.3819	2.2047	0.2344	1/4-20
MDW02031HGS8	●	13/64	0.2031	*5.16*	4.6457	2.3819	2.2047	0.2344	
MDW0520HGS8			0.2047	*5.20*	*118.00*	*60.50*	*56.00*	*6.00*	
MDW0530HGS8			0.2087	*5.30*	*118.00*	*60.50*	*56.00*	*6.00*	
MDW0540HGS8			0.2126	*5.40*	*118.00*	*60.50*	*56.00*	*6.00*	
MDW02130HGS8	●	#3	0.2130	*5.41*	4.6457	2.3819	2.2047	0.2344	
MDW0550HGS8	●		0.2165	*5.50*	*118.00*	*60.50*	*56.00*	*6.00*	
MDW02188HGS8	●	7/32	0.2188	*5.56*	4.6457	2.5984	2.0472	0.2344	1/4-28
MDW0560HGS8	●		0.2205	*5.60*	*118.00*	*66.00*	*52.00*	*6.00*	

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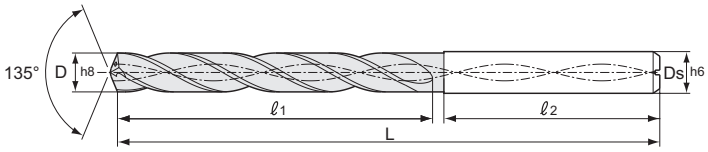
MDW-HGS8 Series Solid Carbide
Coolant Through Drills



MDW-HGS8 8XD drill for excellent chip management and long tool life (Internal coolant)

Catalog Number (inch/*metric*)	Stock	Fractional Wire & Letters	Diameter D (in)	Diameter D (*mm*)	Overall Length L (in/*mm*)	Flute Length ℓ1 (in/*mm*)	Shank Length ℓ2 (in/*mm*)	Shank Diameter Ds (in/*mm*)	Tap Size
MDW02210HGS8	●	#2	0.2210	*5.61*	4.6457	2.5984	2.0472	0.2344	
MDW0570HGS8			0.2244	*5.70*	*118.00*	*66.00*	*52.00*	*6.0*	
MDW0580HGS8			0.2283	*5.80*	*118.00*	*66.00*	*52.00*	*6.0*	
MDW0590HGS8			0.2323	*5.90*	*118.00*	*66.00*	*52.00*	*6.0*	
MDW02344HGS8	●	15/64	0.2344	*5.95*	4.6457	2.5984	2.0472	0.2344	
MDW0600HGS8	●		0.2362	*6.00*	*118.00*	*66.00*	*52.00*	*6.00*	M7x1
MDW0610HGS8			0.2402	*6.10*	*130.00*	*71.50*	*53.00*	*7.00*	
MDW0620HGS8			0.2441	*6.20*	*130.00*	*71.50*	*53.00*	*7.00*	
MDW0630HGS8			0.2480	*6.30*	*130.00*	*71.50*	*53.00*	*7.00*	
MDW02500HGS8	●	1/4	0.2500	*6.35*	5.1181	2.8150	2.0866	0.2812	
MDW0640HGS8			0.2520	*6.40*	*130.00*	*71.50*	*53.00*	*7.00*	
MDW0650HGS8	●		0.2559	*6.50*	*130.00*	*71.50*	*53.00*	*7.00*	
MDW02570HGS8	●	#F	0.2570	*6.53*	5.1181	3.0315	2.0866	0.2812	5/16-18
MDW0653HGS8			0.2571	*6.53*	*130.00*	*77.00*	*53.00*	*7.00*	
MDW0660HGS8			0.2598	*6.60*	*130.00*	*77.00*	*53.00*	*7.00*	
MDW0670HGS8			0.2638	*6.70*	*130.00*	*77.00*	*53.00*	*7.00*	
MDW02656HGS8	●	17/64	0.2656	*6.75*	5.1181	3.0315	2.0866	0.2812	
MDW02660HGS8	●	#H	0.2660	*6.76*	5.1181	3.0315	2.0866	0.2812	
MDW0680HGS8	●		0.2677	*6.80*	*130.00*	*77.00*	*53.00*	*7.00*	
MDW0690HGS8			0.2717	*6.90*	*130.00*	*77.00*	*53.00*	*7.00*	
MDW02720HGS8	●	#I	0.2720	*6.91*	5.1181	3.0315	2.0866	0.2812	5/16-24
MDW0700HGS8	●		0.2756	*7.00*	*130.00*	*77.00*	*53.00*	*7.00*	
MDW02770HGS8	●	#J	0.2770	*7.04*	5.1181	3.0315	2.0866	0.2812	
MDW0710HGS8			0.2795	*7.10*	*142.00*	*82.50*	*54.00*	*8.00*	
MDW02812HGS8	●	9/32	0.2812	*7.14*	5.1181	3.0315	2.0866	0.2812	
MDW0720HGS8			0.2835	*7.20*	*142.00*	*82.50*	*54.00*	*8.00*	
MDW0730HGS8			0.2874	*7.30*	*142.00*	*82.50*	*54.00*	*8.00*	
MDW0740HGS8			0.2913	*7.40*	*142.00*	*82.50*	*54.00*	*8.00*	
MDW0750HGS8	●		0.2953	*7.50*	*142.00*	*82.50*	*54.00*	*8.00*	
MDW02969HGS8	●	19/64	0.2969	*7.54*	5.5906	3.4646	2.1260	0.3125	
MDW0760HGS8			0.2992	*7.60*	*142.00*	*88.00*	*54.00*	*8.00*	
MDW0770HGS8			0.3031	*7.70*	*142.00*	*88.00*	*54.00*	*8.00*	
MDW0780HGS8			0.3071	*7.80*	*142.00*	*88.00*	*54.00*	*8.00*	M9x1.25
MDW0790HGS8			0.3110	*7.90*	*142.00*	*88.00*	*54.00*	*8.00*	
MDW03125HGS8	●	5/16	0.3125	*7.94*	5.5906	3.4646	2.1260	0.3125	3/8-16
MDW0800HGS8	●		0.3150	*8.00*	*142.00*	*88.00*	*54.00*	*8.00*	
MDW0810HGS8			0.3189	*8.10*	*154.00*	*93.50*	*55.00*	*9.00*	
MDW0820HGS8			0.3228	*8.20*	*154.00*	*93.50*	*55.00*	*9.00*	
MDW03230HGS8	●	#P	0.3230	*8.20*	6.0630	3.6811	2.1654	0.3594	
MDW0830HGS8			0.3268	*8.30*	*154.00*	*93.50*	*55.00*	*9.00*	
MDW03281HGS8	●	21/64	0.3281	*8.33*	6.0630	3.6811	2.1654	0.3594	
MDW0840HGS8			0.3307	*8.40*	*154.00*	*93.50*	*55.00*	*9.00*	
MDW03320HGS8	●	#Q	0.3320	*8.43*	6.0630	3.6811	2.1654	0.3594	
MDW0850HGS8	●		0.3346	*8.50*	*154.00*	*93.50*	*55.00*	*9.00*	M10x1.5
MDW0860HGS8			0.3386	*8.60*	*154.00*	*99.00*	*55.00*	*9.00*	
MDW0870HGS8			0.3425	*8.70*	*154.00*	*99.00*	*55.00*	*9.00*	
MDW03438HGS8	●	11/32	0.3438	*8.73*	6.0630	3.8976	2.1654	0.3594	

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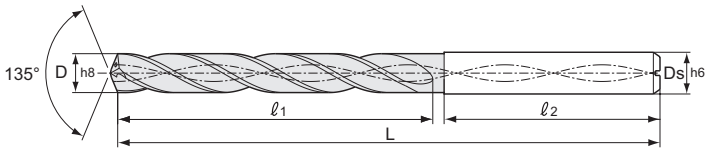
(continued on next page)

SERIES
MDW-HGS8



MDW-HGS8 8XD drill for excellent chip management and long tool life (Internal coolant)

Catalog Number (inch/*metric*)	Stock	Fractional Wire & Letters	Diameter D (in)	Diameter D (*mm*)	Overall Length L (in/*mm*)	Flute Length ℓ1 (in/*mm*)	Shank Length ℓ2 (in/*mm*)	Shank Diameter Ds (in/*mm*)	Tap Size
MDW0880HGS8			0.3465	*8.80*	*154.00*	*99.00*	*55.00*	*9.00*	
MDW0890HGS8			0.3504	*8.90*	*154.00*	*99.00*	*55.00*	*9.00*	
MDW0900HGS8	●		0.3543	*9.00*	*154.00*	*99.00*	*55.00*	*9.00*	
MDW0910HGS8			0.3583	*9.10*	*166.00*	*104.50*	*56.00*	*10.00*	
MDW03594HGS8	●	23/64	0.3594	*9.13*	6.0630	3.8976	2.1654	0.3594	
MDW0920HGS8			0.3622	*9.20*	*166.00*	*104.50*	*56.00*	*10.00*	
MDW0930HGS8			0.3661	*9.30*	*166.00*	*104.50*	*56.00*	*10.00*	
MDW03680HGS8	●	#U	0.3680	*9.35*	6.5354	4.1142	2.2047	0.3906	7/16-14
MDW0940HGS8			0.3701	*9.40*	*166.00*	*104.50*	*56.00*	*10.00*	
MDW0950HGS8	●		0.3740	*9.50*	*166.00*	*104.50*	*56.00*	*10.00*	
MDW03750HGS8	●	3/8	0.3750	*9.53*	6.5354	4.3307	2.2047	0.3906	
MDW0960HGS8			0.3780	*9.60*	*166.00*	*110.00*	*56.00*	*10.00*	
MDW0970HGS8			0.3819	*9.70*	*166.00*	*110.00*	*56.00*	*10.00*	
MDW0980HGS8			0.3858	*9.80*	*166.00*	*110.00*	*56.00*	*10.00*	
MDW0990HGS8			0.3898	*9.90*	*166.00*	*110.00*	*56.00*	*10.00*	
MDW03906HGS8	●	25/64	0.3906	*9.92*	6.5354	4.3307	2.2047	0.3906	
MDW1000HGS8	●		0.3937	*10.00*	*166.00*	*110.00*	*56.00*	*10.00*	
MDW1010HGS8			0.3976	*10.10*	*182.00*	*115.50*	*61.00*	*11.00*	
MDW1020HGS8			0.4016	*10.20*	*182.00*	*115.50*	*61.00*	*11.00*	M12x1.75
MDW1030HGS8	●		0.4055	*10.30*	*182.00*	*115.50*	*61.00*	*11.00*	
MDW04062HGS8	●	13/32	0.4062	*10.32*	7.1654	4.5472	2.4016	0.4375	
MDW1040HGS8			0.4094	*10.40*	*182.00*	*115.50*	*61.00*	*11.00*	
MDW1050HGS8	●		0.4134	*10.50*	*182.00*	*115.50*	*61.00*	*11.00*	
MDW1060HGS8			0.4173	*10.60*	*182.00*	*121.00*	*61.00*	*11.00*	
MDW1070HGS8			0.4213	*10.70*	*182.00*	*121.00*	*61.00*	*11.00*	
MDW04219HGS8	●	27/64	0.4219	*10.72*	7.1654	4.7638	2.4016	0.4375	1/2-13
MDW1080HGS8			0.4252	*10.80*	*182.00*	*121.00*	*61.00*	*11.00*	
MDW1090HGS8			0.4291	*10.90*	*182.00*	*121.00*	*61.00*	*11.00*	
MDW1100HGS8	●		0.4331	*11.00*	*182.00*	*121.00*	*61.00*	*11.00*	
MDW1110HGS8			0.4370	*11.10*	*194.00*	*126.50*	*62.0*	*12.00*	
MDW04375HGS8	●	7/16	0.4375	*11.11*	7.1654	4.7638	2.4016	0.4375	
MDW1120HGS8			0.4409	*11.20*	*194.00*	*126.50*	*62.00*	*12.00*	
MDW1130HGS8			0.4449	*11.30*	*194.00*	*126.50*	*62.00*	*12.00*	
MDW1140HGS8			0.4488	*11.40*	*194.00*	*126.50*	*62.00*	*12.00*	
MDW1150HGS8	●		0.4528	*11.50*	*194.00*	*126.50*	*62.00*	*12.00*	
MDW04531HGS8	●	29/64	0.4531	*11.51*	7.6378	5.1969	2.4409	0.4688	1/2-20
MDW1160HGS8			0.4567	*11.60*	*194.00*	*132.00*	*62.00*	*12.00*	
MDW1170HGS8			0.4606	*11.70*	*194.00*	*132.00*	*62.00*	*12.00*	
MDW1180HGS8			0.4646	*11.80*	*194.00*	*132.00*	*62.00*	*12.00*	
MDW1190HGS8			0.4685	*11.90*	*194.00*	*132.00*	*62.00*	*12.00*	
MDW04688HGS8	●	15/32	0.4688	*11.91*	7.6378	5.1969	2.4409	0.4688	
MDW1200HGS8	●		0.4724	*12.00*	*194.00*	*132.00*	*62.00*	*12.00*	M14x2
MDW1210HGS8			0.4764	*12.10*	*206.00*	*137.50*	*63.00*	*13.00*	
MDW1220HGS8			0.4803	*12.20*	*206.00*	*137.50*	*63.00*	*13.00*	
MDW1230HGS8			0.4843	*12.30*	*206.00*	*137.50*	*63.00*	*13.00*	9/16-12
MDW04844HGS8	●	31/64	0.4844	*12.30*	8.1102	5.4134	2.4803	0.5156	
MDW1240HGS8			0.4882	*12.40*	*206.00*	*137.50*	*63.00*	*13.00*	

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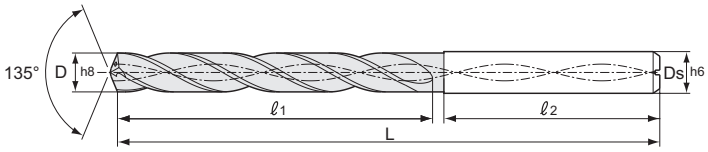
MDW-HGS8 Series Solid Carbide Drills

Coolant Through Drills



MDW-HGS8 8XD drill for excellent chip management and long tool life (Internal coolant)

Catalog Number (inch/*metric*)	Stock	Fractional Wire & Letters	Diameter D (in)	Diameter D (*mm*)	Overall Length L (in/*mm*)	Flute Length ℓ1 (in/*mm*)	Shank Length ℓ2 (in/*mm*)	Shank Diameter Ds (in/*mm*)	Tap Size
MDW1250HGS8	●		0.4921	*12.50*	*206.00*	*137.50*	*63.00*	*13.00*	
MDW1260HGS8			0.4961	*12.60*	*206.00*	*143.00*	*63.00*	*13.00*	
MDW1270HGS8		1/2	0.5000	*12.70*	*206.00*	*143.00*	*63.00*	*13.00*	
MDW05000HGS8	●	1/2	0.5000	*12.70*	8.1102	5.6299	2.4803	0.5156	
MDW1280HGS8			0.5039	*12.80*	*206.00*	*143.00*	*63.00*	*13.00*	
MDW1283HGS8			0.5051	*12.83*	*206.00*	*143.00*	*63.00*	*13.00*	
MDW1290HGS8			0.5079	*12.90*	*206.00*	*143.00*	*63.00*	*13.00*	
MDW1300HGS8	●		0.5118	*13.00*	*206.00*	*143.00*	*63.00*	*13.00*	
MDW05156HGS8	●	33/64	0.5156	*13.10*	8.1102	5.6299	2.4803	0.5156	9/19-18
MDW1310HGS8			0.5157	*13.10*	*218.00*	*148.50*	*64.00*	*14.00*	
MDW1320HGS8			0.5197	*13.20*	*218.00*	*148.50*	*64.00*	*14.00*	
MDW1330HGS8			0.5236	*13.30*	*218.00*	*148.50*	*64.00*	*14.00*	
MDW1340HGS8			0.5276	*13.40*	*218.00*	*148.50*	*64.00*	*14.00*	
MDW05312HGS8	●	17/32	0.5312	*13.49*	8.5827	5.8465	2.5197	0.5469	5/8-11
MDW1350HGS8	●		0.5315	*13.50*	*218.00*	*148.50*	*64.00*	*14.00*	
MDW1360HGS8			0.5354	*13.60*	*218.00*	*154.00*	*64.00*	*14.00*	
MDW1370HGS8			0.5394	*13.70*	*218.00*	*154.00*	*64.00*	*14.00*	
MDW1380HGS8			0.5433	*13.80*	*218.00*	*154.00*	*64.00*	*14.00*	
MDW05469HGS8	●	35/64	0.5469	*13.89*	8.5827	6.0630	2.5197	0.5469	M16x2
MDW1390HGS8			0.5472	*13.90*	*218.00*	*154.00*	*64.00*	*14.00*	
MDW1400HGS8	●		0.5512	*14.00*	*218.00*	*154.00*	*64.00*	*14.00*	
MDW1410HGS8			0.5551	*14.10*	*230.00*	*159.50*	*65.00*	*15.00*	
MDW1420HGS8			0.5591	*14.20*	*230.00*	*159.50*	*65.00*	*15.00*	
MDW05625HGS8	●	9/16	0.5625	*14.29*	9.0551	6.2795	2.5591	0.5937	
MDW1430HGS8			0.5630	*14.30*	*230.00*	*159.50*	*65.00*	*15.00*	
MDW1440HGS8			0.5669	*14.40*	*230.00*	*159.50*	*65.00*	*15.00*	
MDW1450HGS8	●		0.5709	*14.50*	*230.00*	*159.50*	*65.00*	*15.00*	
MDW1460HGS8			0.5748	*14.60*	*230.00*	*165.00*	*65.00*	*15.00*	
MDW05781HGS8	●	37/64	0.5781	*14.68*	9.0551	6.4961	2.5591	0.5937	5/8-18
MDW1470HGS8			0.5787	*14.70*	*230.00*	*165.00*	*65.00*	*15.00*	
MDW1480HGS8			0.5827	*14.80*	*230.00*	*165.00*	*65.00*	*15.00*	
MDW1490HGS8			0.5866	*14.90*	*230.00*	*165.00*	*65.00*	*15.00*	
MDW1500HGS8	●		0.5906	*15.00*	*230.00*	*165.00*	*65.00*	*15.00*	
MDW05937HGS8	●	19/32	0.5937	*15.08*	9.0551	6.4961	2.5591	0.5937	
MDW1510HGS8			0.5945	*15.10*	*242.00*	*170.50*	*66.00*	*16.00*	
MDW1520HGS8			0.5984	*15.20*	*242.00*	*170.50*	*66.00*	*16.00*	
MDW1530HGS8			0.6024	*15.30*	*242.00*	*170.50*	*66.00*	*16.00*	
MDW1540HGS8			0.6063	*15.40*	*242.00*	*170.50*	*66.00*	*16.00*	
MDW06094HGS8	●	39/64	0.6094	*15.48*	9.5276	6.7126	2.5984	0.6250	11/16-12
MDW1550HGS8	●		0.6102	*15.50*	*242.00*	*170.50*	*66.00*	*16.00*	M18x2.5
MDW1560HGS8			0.6142	*15.60*	*242.00*	*176.00*	*66.00*	*16.00*	
MDW1570HGS8			0.6181	*15.70*	*242.00*	*176.00*	*66.00*	*16.00*	
MDW1580HGS8			0.6220	*15.80*	*242.00*	*176.00*	*66.00*	*16.00*	
MDW06250HGS8	●	5/8	0.6250	*15.88*	9.5276	6.9291	2.5984	0.6250	11/16-16
MDW1590HGS8			0.6260	*15.90*	*242.00*	*176.00*	*66.00*	*16.00*	
MDW1600HGS8	●		0.6299	*16.00*	*242.00*	*176.00*	*66.00*	*16.00*	

●=USA stocked item ★= Worldwide Warehouse item available in 10 business days
Some drills can achieve greater depths. Always check for sufficient flute length. Note: Special diameters available upon request.

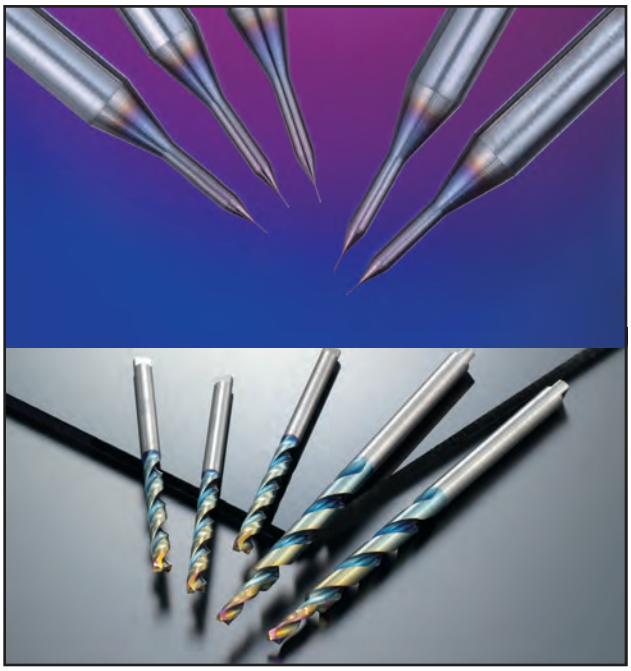
RECOMMENDED PARAMETERS FOR GS/HGS SERIES

MDW		Work Material	Hardness HB	Speed = SFM Feed = IPR	Drill Diameter (inch)		
					ø < - ø0.196	ø0.197 - ø0.394	ø0.395 - ø0.630
GS 2D 4D	P	Low Carbon Steel	<190	SFM	110 - 250	160 - 275	210 - 360
				IPR	.004 - .008	.006 - .010	.008 - .012
			190 ~ 250	SFM	110 - 250	160 - 275	210 - 360
				IPR	.004 - .008	.006 - .010	.008 - .012
			250 ~ 300	SFM	100 - 225	140 - 250	190 - 325
				IPR	.003 - .006	.004 - .008	.006 - .010
		Medium Carbon Steel	180 ~ 275	SFM	110 - 250	160 - 275	210 - 360
				IPR	.004 - .008	.006 - .010	.008 - .012
			275 ~ 350	SFM	100 - 225	140 - 250	190 - 325
				IPR	.003 - .006	.004 - .008	.006 - .010
		Alloy Steel	200	SFM	110 - 250	160 - 275	210 - 360
				IPR	.004 - .008	.006 - .010	.008 - .012
			350	SFM	80 - 210	115 - 220	115 - 250
				IPR	.003 - .006	.004 - .008	.006 - .010
	M	300 Austenitic Stainless Steel	160 ~ 280	SFM	50 -115	60 - 160	80 - 210
				IPR	.002 - .006	.003 - .008	.004 - .010
		400 Martensitic Stainless Steel	160 ~ 240	SFM	60 - 120	75 - 180	90 - 225
				IPR	.002 - .006	.003 - .008	.006 - .010
	K	Cast Iron		SFM	115 - 300	195 - 390	250 -415
				IPR	.006 - .010	.006 - .014	.006 - .014
		Ductile Iron		SFM	115 - 185	160 - 300	210 - 375
				IPR	.006 - .010	.006 - .014	.006 - .014
	H	Hardened Steel	45-60 Rc	SFM	40 - 60	40 - 80	50 - 100
				IPR	.002 - .004	.003 - .006	.004 - .008
	S	Titanium Alloy Ti-6Al-4V		SFM	40 - 80	40 - 100	50 - 110
				IPR	.003 - .004	.003 - .005	.003 - .006
		Exotics - Inconel, Monel		SFM	30 - 60	30 - 60	40 - 80
				IPR	.002 - .003	.003 - .005	.003 - .006
	N	Aluminum alloy		SFM	300 - 700	400 - 800	400 - 800
				IPR	.003 - .006	.004 - .008	.006 - .012
		Copper Alloy		SFM	300 - 700	400 - 800	400 - 800
				IPR	.003 - .006	.004 - .008	.006 - .010

MDW		Work Material	Hardness HB	Speed = SFM Feed = IPR	Drill Diameter (inch)		
					ø < - ø0.196	ø0.197 - ø0.394	ø0.395 - ø0.630
HGS 3D 5D 8D	P	Low Carbon Steel	<190	SFM	300 - 475	400 - 550	450 - 650
				IPR	.004 - .008	.006 - .010	.008 - .014
			190 ~ 250	SFM	225 - 425	265 - 530	425 - 625
				IPR	.004 - .008	.006 - .010	.008 - .014
			250 ~ 300	SFM	175 - 375	225 - 495	250 - 525
				IPR	.003 - .006	.004 - .008	.006 - .012
		Medium Carbon Steel	180 ~ 275	SFM	225 - 425	265 - 530	350 - 575
				IPR	.004 - .008	.006 - .010	.008 - .014
			275 ~ 350	SFM	175 - 375	225 - 495	305 - 525
				IPR	.003 - .006	.004 - .008	.006 - .012
		Alloy Steel	200	SFM	190 - 380	225 - 475	275 - 525
				IPR	.003 - .008	.006 - .010	.008 - .014
			350	SFM	125 - 300	155 - 325	155 - 350
				IPR	.003 - .006	.004 - .008	.006 - .010
	M	300 Austenitic Stainless Steel	160 ~ 280	SFM	120 - 225	150 - 325	150 - 325
				IPR	.002 - .006	.004 - .010	.006 - .012
		400 Martensitic Stainless Steel	160 ~ 240	SFM	120 - 250	175 - 350	175 - 350
				IPR	.002 - .006	.004 - .010	.006 - .012
	K	Cast Iron		SFM	150 - 380	250 - 475	275 - 530
				IPR	.006 - .010	.006 - .014	.006 - .014
		Ductile Iron		SFM	150 - 350	225 - 450	250 - 500
				IPR	.006 - .010	.006 - .014	.006 - .014
	H	Hardened Steel	45-60 Rc	SFM	60 - 190	80 - 225	80 - 225
				IPR	.002 - .004	.003 - .006	.004 - .008
	S	Titanium Alloy Ti-6Al-4V		SFM	65 - 130	80 - 130	80 - 160
				IPR	.003 - .004	.003 - .005	.003 - .006
		Exotics - Inconel, Monel		SFM	40 - 85	40 - 100	50 - 120
				IPR	.002 - .003	.003 - .005	.003 - .006
	N	Aluminum alloy		SFM	500 - 800	600 - 1000	600 - 1000
				IPR	.003 - .006	.004 - .008	.006 - .012
		Copper Alloy		SFM	400 - 800	500 - 800	500 - 800
				IPR	.003 - .006	.004 - .008	.006 - .010

Small Diameter & DLC Coated Drills

Pages 225 - 231



MLDH-L / MLDH-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, SUS416 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	Series	Diameter Range (mm)	Hole Depth ($^L/_D$)	Remarks
Deep Hole Drilling	MLDH□□□□L5 Type	ø0.8 to 2.0	Up to 5	41 Models Stocked
	MLDH□□□□L12 Type	ø0.8 to 2.0	Up to 12	41 Models Stocked
	MLDH□□□□L20 Type	ø0.8 to 2.0	Up to 20	41 Models Stocked
	MLDH□□□□L30 Type	ø0.8 to 2.0	Up to 30	41 Models Stocked
Guide Hole Drilling	MLDH□□□□P Type	ø0.8 to 2.0	Up to 2	41Models Stocked

Recommended Cutting Conditions

MLDH-P Type/MLDH-L5 Type

(v_c: Cutting Speed m/min f: Feed Rate mm/rev)

Drill Diameter øD$_c$ (mm)	Cutting Conditions	Soft Steel Up to 200HB	General Steel Up to 250HB	Alloy Steel Up to 300HB	Stainless Steel Up to 200HB	Cast Iron FC/FCD	Aluminium Alloy	Heat-resistant steels
Up to 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
Up to 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
Up to 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

Min. - **Optimum** - Max.

MLDH-L12 Type/MLDH-L20 Type/MLDH-L30 Type

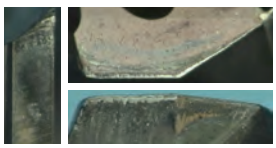
Drill Diameter øD$_c$ (mm)	Cutting Conditions	Soft Steel Up to 200HB	General Steel Up to 250HB	Alloy Steel Up to 300HB	Stainless Steel Up to 200HB	Cast Iron FC/FCD	Aluminium Alloy	Heat-resistant steels
Up to 1.0	v_c	40 - 50 - 60	40 - 50 - 60	40 - 50 - 60	20 - 30 - 40	40 - 50 - 60	50 - 60 - 70	5 - 10 - 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
Up to 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
Up to 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

Min. - **Optimum** - Max.

Application Examples

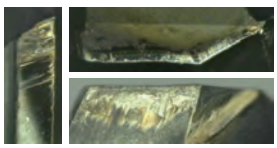
Automotive Component Mould (Equivalent to SUS416)

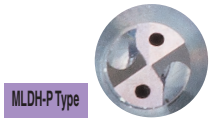
Tool : MLDH1400L20 (Guide : MLDH1400P)
Equipment : Vertical Machining Centre (HSKA63)
Coolant Supply : Internal Coolant (Emulsion Type, Pump Pressure : 4MPa)
Cutting Conditions : v_c=60m/min f=0.03mm/rev H=21mm
Tool Life : 600 Units (11.4m/reg)

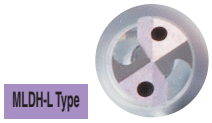


Tooling Component (Equivalent to SKD11)

Tool : MLDH1900L20 (Guide : MLDH1900P)
Equipment : Vertical Machining Centre (HSKA63)
Coolant Supply : Internal Coolant (Emulsion Type, Pump Pressure : 4MPa)
Cutting Conditions : v_c=60m/min f=0.10mm/rev H=27mm
Tool Life : 600 Units (18m/reg)



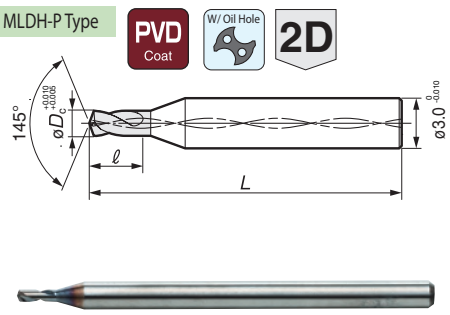




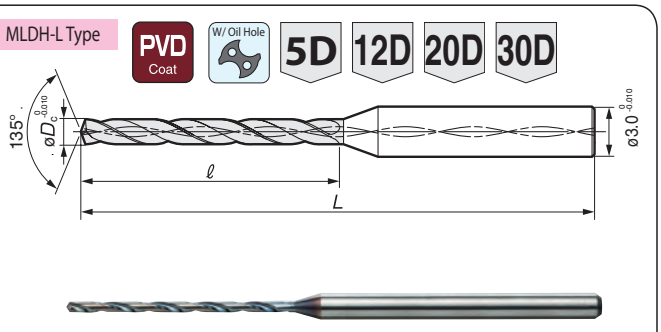
Internal Coolant Supply (MLDH-P Type / MLDH-L Type)

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
◎	◎	○	○		◎			◎	◎	○		

MLDH-P Type



MLDH-L Type



MLDH-P Type/MLDH-L Type Dimensions and Stock Availability

Diameter øDc (mm)	Dedicated Guide Hole MLDH-P Type				Micro Long Drill MLDH-L Type											
						Hole Depth: 5D			Hole Depth: 12D			Hole Depth: 20D			Hole Depth: 30D		
	Cat. No.	Stock	Dimensions (mm)		Cat. No. 5, 12, 20, 30	Stock	Dimensions (mm)		Stock	Dimensions (mm)		Stock	Dimensions (mm)		Stock	Dimensions (mm)	
			L	ℓ		5	L	ℓ	12	L	ℓ	20	L	ℓ	30	L	ℓ
0.80	MLDH 0800P	★	45	3.2	MLDH 0800L□□	★	50	8	★	55	14	★	60	19	★	70	28
0.81	0810P	★			0810L□□	★		9	★			★			★		
0.82	MLDH 0820P	★		3.3	MLDH 0820L□□	★			★			★		20	★		
0.83	0830P	★			0830L□□	★			★			★			★		
0.84	MLDH 0840P	★		3.4	MLDH 0840L□□	★			★			★			★		29
0.85	0850P	★			0850L□□	★			★			★			★		
0.86	0860P	★			0860L□□	★			★		15	★	65	21	★		
0.87	MLDH 0870P	★		3.5	MLDH 0870L□□	★			★			★			★		30
0.88	0880P	★			0880L□□	★			★			★			★		
0.89	MLDH 0890P	★		3.6	MLDH 0890L□□	★			★			★			★		
0.90	0900P	★			0900L□□	★			★			★		22	★		31
0.91	0910P	★			0910L□□	★		10	★			★			★		
0.92	MLDH 0920P	★		3.7	MLDH 0920L□□	★			★	60	16	★			★		
0.93	0930P	★			0930L□□	★			★			★			★		
0.94	MLDH 0940P	★		3.8	MLDH 0940L□□	★			★			★		23	★		32
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	★		41
1.25	MLDH 1250P	★		5.0	MLDH 1250L□□	★		14	★		21	★		30	★	85	43
1.30	MLDH 1300P	★		5.2	MLDH 1300L□□	★			★		22	★	75	31	★		44
1.35	MLDH 1350P	★		5.4	MLDH 1350L□□	★			★		23	★		32	★		46
1.40	MLDH 1400P	★		5.6	MLDH 1400L□□	★			★		24	★		34	★	90	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□□	★			★		27	★		38	★		54
1.65	MLDH 1650P	★	50	6.6	MLDH 1650L□□	★	60	18	★	70	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

Grade: ACV70

Please indicate 5, 12, 20 or 30 in the □□ when ordering.
(Example: MLDH 1000L20)

■ Made to Order Items: Inquire about production of drills in tool diameters and lengths not listed above or not in stock.

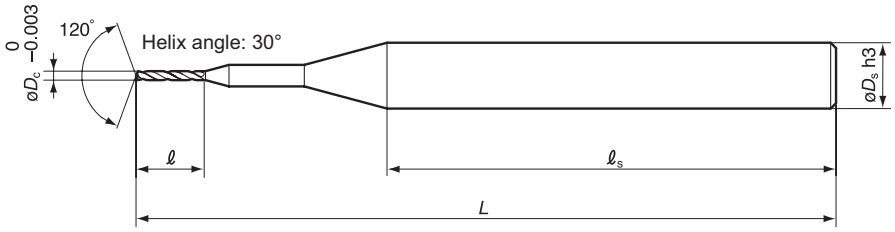
Micro MultiDrills
MDUS Type

■ MDUS-Features & Benefits

- **High precision shank**
  Shank tolerance: h3
  Concentricity: 0.3µm or less
  Roundness: 0.5µm or less

- **New ultra-thin TiAlN coating**
  Provides improved wear resistance

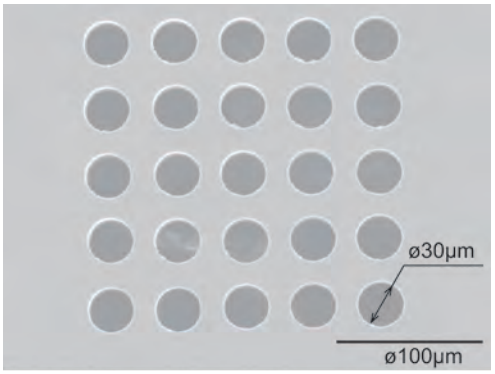
- **Wide material range**
  Ideal for machining steel, stainless steel, and copper



ø0.030 to ø0.180mm

Catalog Number	øDc *(mm)*	øDs *(mm)*	Stock	Dimensions *(mm)*		
				ℓ	ℓs	L
MDUS0030-30C	*0.030*	*3.0*	★	*0.3*	*28*	*38*
MDUS0040-30C	*0.040*		★	*0.4*		
MDUS0050-30C	*0.050*		★	*0.5*		
MDUS0080-30C	*0.080*		★	*0.8*		
MDUS0100-30C	*0.100*		★	*1.0*		
MDUS0120-30C	*0.120*		★	*1.2*		
MDUS0150-30C	*0.150*		★	*1.5*		
MDUS0180-30C	*0.180*		★	*1.8*		

★ = Worldwide Warehouse item available in 10 business days



Material: 304 Stainless Steel
Drill: MDUS0030-30C (ø0.03mm)

Mini MultiDrills MDSS Type

■ Features & Benefits

- High breakage resistance due to a combination of tough, stable carbide substrate and a highly rigid design
- Long tool life is achieved as a result of the PVD coating created especially for small diameter drills
- Wide variety of applications including carbon steel, alloy steel, die steel, and stainless steel

Fig 1

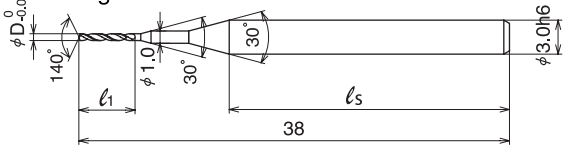
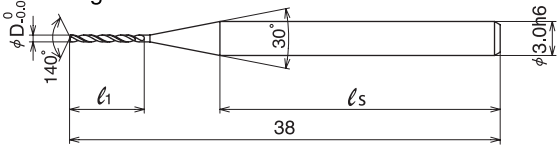


Fig 2



ø0.20 to ø0.49mm

Catalog Number	Stock	øDc (mm)	Dimensions (mm) ℓ	Dimensions (mm) ℓs	Style
MDSS0020	★	0.20	2.5	28	Fig1
MDSS0021	★	0.21			
MDSS0022	★	0.22			
MDSS0023	★	0.23			
MDSS0024	★	0.24			
MDSS0025	★	0.25			
MDSS0026	★	0.26			
MDSS0027	★	0.27			
MDSS0028	★	0.28			
MDSS0029	★	0.29			
MDSS0030	★	0.30	3		
MDSS0031	★	0.31			
MDSS0032	★	0.32			
MDSS0033	★	0.33			
MDSS0034	★	0.34			
MDSS0035	★	0.35	4		Fig2
MDSS0036	★	0.36			
MDSS0037	★	0.37			
MDSS0038	★	0.38			
MDSS0039	★	0.39			
MDSS0040	★	0.40	5		
MDSS0041	★	0.41			
MDSS0042	★	0.42			
MDSS0043	★	0.43			
MDSS0044	★	0.44			
MDSS0045	★	0.45			
MDSS0046	★	0.46			
MDSS0047	★	0.47			
MDSS0048	★	0.48			
MDSS0049	★	0.49			

★ = Worldwide Warehouse item available in 10 business days

ø0.50 to ø0.79mm

Catalog Number	Stock	øDc (mm)	Dimensions (mm) ℓ	Dimensions (mm) ℓs	Style
MDSS0050	★	0.50	6	27	Fig2
MDSS0051	★	0.51			
MDSS0052	★	0.52			
MDSS0053	★	0.53			
MDSS0054	★	0.54			
MDSS0055	★	0.55			
MDSS0056	★	0.56			
MDSS0057	★	0.57			
MDSS0058	★	0.58			
MDSS0059	★	0.59			
MDSS0060	★	0.60	7	26	
MDSS0061	★	0.61			
MDSS0062	★	0.62			
MDSS0063	★	0.63			
MDSS0064	★	0.64			
MDSS0065	★	0.65			
MDSS0066	★	0.66			
MDSS0067	★	0.67			
MDSS0068	★	0.68			
MDSS0069	★	0.69			
MDSS0070	★	0.70	9	24	
MDSS0071	★	0.71			
MDSS0072	★	0.72			
MDSS0073	★	0.73			
MDSS0074	★	0.74			
MDSS0075	★	0.75			
MDSS0076	★	0.76			
MDSS0077	★	0.77			
MDSS0078	★	0.78			
MDSS0079	★	0.79			

(continued on next page)

Mini MultiDrills
MDSS Type

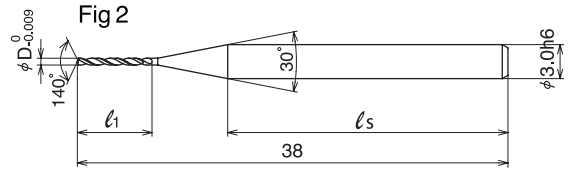
(continued from previous page)

ø0.80 to ø1.00mm

Catalog Number	Stock	øDc (mm)	Dimensions (mm) ℓ	Dimensions (mm) ℓs	Style
MDSS0080	★	0.80	10	23	Fig2
MDSS0081	★	0.81			
MDSS0082	★	0.82			
MDSS0083	★	0.83			
MDSS0084	★	0.84			
MDSS0085	★	0.85			
MDSS0086	★	0.86			
MDSS0087	★	0.87			
MDSS0088	★	0.88			
MDSS0089	★	0.89			
MDSS0090	★	0.90	11	22	
MDSS0091	★	0.91			
MDSS0092	★	0.92			
MDSS0093	★	0.93			
MDSS0094	★	0.94			
MDSS0095	★	0.95			
MDSS0096	★	0.96			
MDSS0097	★	0.97			
MDSS0098	★	0.98			
MDSS0099	★	0.99			
MDSS0100	★	1.00	12	21	

★ = Worldwide Warehouse item
available in 10 business days

Fig 2



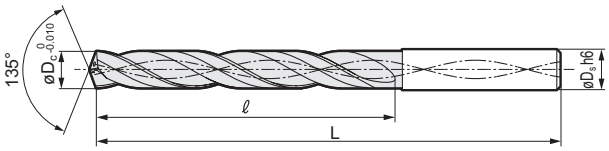
■ Recommended Cutting Conditions (Wet)

Feed Rate=ipm / mm/min		Structural Steel Carbon Steel Gray Cast Iron	Alloy Steel Pre-hardened Steel	Die Steel Tempered Steel	Hardened Steel 40-50 HRc	Hardened Steel 50-55 HRc	Ductile Cast Iron	Stainless Steel
~ø.20 - ø.29 mm	RPM	31,800	26,500	21,200	12,700	10,600	31,800	10,600
	Feed Rate	2.362 / 60	1.969 / 50	1.575 / 40	1.181 / 30	0.787 / 20	2.362 / 60	0.787 / 20
	Step Feed	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD
~ø.30 - .39 mm	RPM	31,800	26,500	21,200	12,700	10,600	31,800	10,600
	Feed Rate	3.937 / 100	3.150 / 80	2.362 / 60	1.575 / 40	1.181 / 30	3.937 / 100	1.181 / 30
	Step Feed	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD
~ø.40 - .49 mm	RPM	31,800	25,900	19,900	12,700	9,900	31,800	9,500
	Feed Rate	5.118 / 130	3.937 / 100	3.150 / 80	1.969 / 50	1.575 / 40	5.118 / 130	1.575 / 40
	Step Feed	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD
~ø.50 - .59 mm	RPM	31,800	25,500	19,100	12,700	9,500	31,800	9,500
	Feed Rate	7.480 / 190	5.906 / 150	4.330 / 110	2.362 / 60	1.969 / 50	7.480 / 190	1.969 / 50
	Step Feed	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD
~ø.60 - 1.00 mm	RPM	23,900	15,900	12,700	8,000	5,600	19,100	5,600
	Feed Rate	14.173 / 360	9.449 / 240	3.543 / 90	3.937 / 100	2.362 / 60	11.417 / 290	3.150 / 80
	Step Feed	0.2XD - .5XD*	0.2XD - .5XD*	0.2XD - .5XD*	0.1XD	0.1XD	0.2XD - .5XD*	0.1XD

* Step feed is recommended for drilling of holes deeper than 3XD

1) The conditions above are recommended under wet conditions, using water-soluble coolant.
2) If machine noises and vibrations are present, adjust the cutting conditions accordingly.
3) If the machine cannot achieve the recommended spindle speed, use the maximum spindle speed available.

DLC Coated Drills NHGS Type



Diameter ø3.00 to 8.00mm (5XD)

Catalog Number	øDc (mm)	øDs (mm)	Stock	Dimensions (mm)	
				ℓ	L
MDW0300NHGS5	3.00	3.0	★	28	78
MDW0340NHGS5	3.40	4.0	★	32	86
MDW0350NHGS5	3.50		★		
MDW0365NHGS5	3.65		★	36	
MDW0380NHGS5	3.80		★		
MDW0400NHGS5	4.00		★		
MDW0430NHGS5	4.30	5.0	★	40	98
MDW0450NHGS5	4.50		★		
MDW0460NHGS5	4.60		★	44	
MDW0500NHGS5	5.00		★		
MDW0510NHGS5	5.10	6.0	★	44	100
MDW0550NHGS5	5.50		★		
MDW0600NHGS5	6.00		★	48	
MDW0610NHGS5	6.10	7.0	★	52	109
MDW0650NHGS5	6.50		★		
MDW0680NHGS5	6.80		★	56	
MDW0700NHGS5	7.00		★		
MDW0735NHGS5	7.35	8.0	★	60	118
MDW0750NHGS5	7.50		★		
MDW0780NHGS5	7.80		★	64	
MDW0800NHGS5	8.00		★		

Diameter ø8.50 to 16.00mm (5XD)

Catalog Number	øDc (mm)	øDs (mm)	Stock	Dimensions (mm)	
				ℓ	L
MDW0850NHGS5	8.50	9.0	★	68	127
MDW0860NHGS5	8.60		★	72	
MDW0900NHGS5	9.00		★		
MDW0921NHGS5	9.21	10.0	★	76	136
MDW0950NHGS5	9.50		★		
MDW0960NHGS5	9.60		★	80	
MDW1000NHGS5	10.00		★		
MDW1040NHGS5	10.40	11.0	★	84	149
MDW1050NHGS5	10.50		★		
MDW1100NHGS5	11.00		★	88	
MDW1110NHGS5	11.10	12.0	★	92	158
MDW1150NHGS5	11.50		★		
MDW1200NHGS5	12.00		★	96	
MDW1210NHGS5	12.10	13.0	★	100	167
MDW1250NHGS5	12.50		★		
MDW1300NHGS5	13.00		★	104	
MDW1350NHGS5	13.50	14.0	★	108	176
MDW1400NHGS5	14.00		★	112	
MDW1410NHGS5	14.10	15.0	★	116	185
MDW1450NHGS5	14.50		★		
MDW1490NHGS5	14.90		★	120	
MDW1500NHGS5	15.00		★		
MDW1550NHGS5	15.50	16.0	★	124	194
MDW1600NHGS5	16.00		★	128	

★ = Worldwide Warehouse item available in 10 business days

■ Features & Benefits

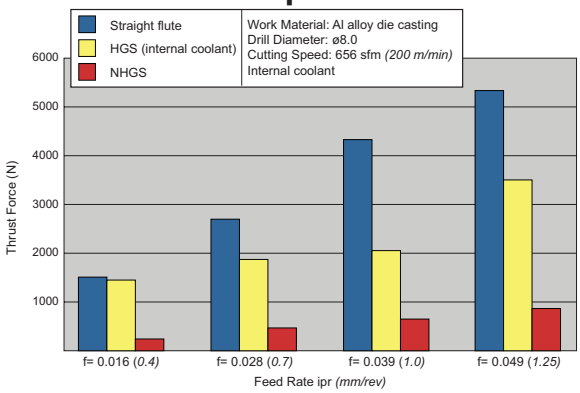
- **High efficiency drilling**
  DLC or "diamond like carbon" coating along with special web thinning drastically reduce cutting resistance

- **Precision drilling**
  Special cutting edge design improves hole quality

- **Longer tool life**
  DLC coating and cutting edge design provide long and stable tool life

- **For a wide variety of work material**
  Die cast aluminum, aluminum casting, wrought aluminum alloy, brass casting, and bronze casting

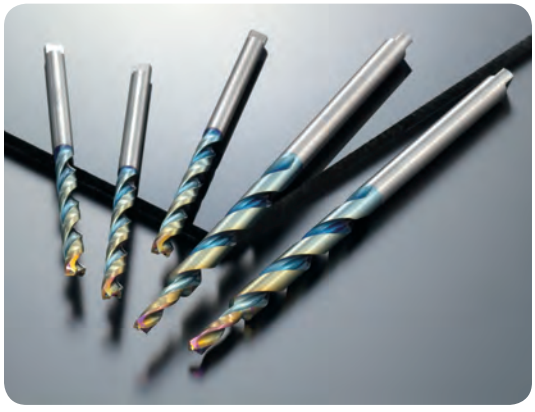
■ Thrust Force Comparison



■ Recommended Running Conditions

Speed: v (m/min)
Feed: f (mm/rev)

Drill Diameter		Aluminum Casting/ Die Cast Aluminum	Wrought Aluminum Alloy
Up to ø6.00	v	80 - 200	80 - 200
	f	0.2 - 0.5	0.2 - 0.3
Up to ø10.00	v	100 - 250	100 - 250
	f	0.4 - 0.8	0.2 - 0.4
Up to ø16.00	v	120 - 250	120 - 250
	f	0.4 - 1.0	0.3 - 0.5



Deep Hole Carbide Drills

Pages 233 - 239

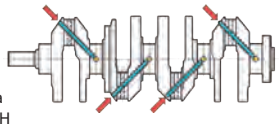
■ Features & Benefits

- **Deep hole drilling**
  New flute shape with improved chip evacuation during deep drilling. High-efficiency drilling to depths of over 30 times drill diameter (V_f = 28 IPM). Stable deep hole drilling with double margin design.
- **Longer tool life**
  Special DEX coating provides long tool life in a variety of work material.
- **Eco-friendly**
  Compatible with the MQL (Minimum Quantity Lubrication) system.

■ Application Examples

• ***Automotive Component***
1045 steel (250HB)

Machine: Horizontal single axis NC machine
Coolant: MQL Air pressure 0.9MPa
MQL Volume Approx. 1cc/H

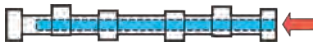


Pilot hole:
- ø0.23 x 0.47in *(ø5.73 x 12mm)*
- Drill point angle: 150°
- V_c = 262.5 SFM *(80m/min)*
- f = 0.008 IPR *(0.20mm/min)*

Deep hole:
- ø0.22 x 3.27in *(ø5.7 x 83mm)*
- V_c = 262.5 SFM *(80m/min)*
- f = 0.010 IPR *(0.25mm/min)*
- V_f = 44 IPM *(1117mm/min)*

⇒ **Tool Life: 250 parts**

• ***Automotive Component***
Gray cast iron



Machine: Horizontal single axis NC machine
Coolant: MQL (volume 3cc/H) Air discharge 0.45 MPa

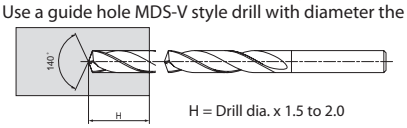
Pilot hole:
- ø0.30 x 0.51in *(ø7.63 x 13mm)*
- Drill point angle: 150°
- V_c = 262.5 SFM *(80m/min)*
- f = 0.010 IPR *(0.25mm/min)*

Deep hole:
- ø0.30 x 9.10in *(ø7.60 x 230mm)*
- V_c = 197 SFM *(60m/min)*
- f = 0.011 IPR *(0.30mm/min)*
- V_f = 29.70 IPM *(754mm/min)*

⇒ **Tool Life: 500 parts**

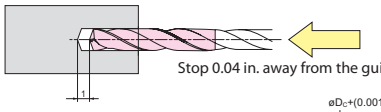
■ Recommended Drilling Method

1. **Make a guide hole using the MDS-V type drill**
   • Use a guide hole MDS-V style drill with diameter the same as the MDW-XHV type



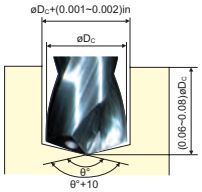
H = Drill dia. x 1.5 to 2.0

2. Feed the MDW-XHV type throught he guide hole at low rotation speed
   • Rotation: 500 rpm Feed Rate: 40 - 80 ipm



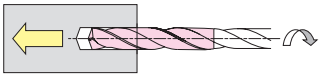
Stop 0.04 in. away from the guide hole depth

OTHER NOTES
- A flat base should be prepared when the surface for the guide tool is slanted
- When drilling through a slanted surface, reduce the drill feed to 0.002 ipm before the drill exits



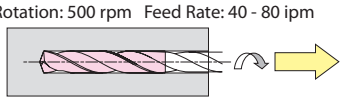
Recommended Guide Hole Values

3. Increase rotation speed until the set rotation speed is reached and start normal drilling



Increase rotation speed

4. After drilling, rotation speed is reduced and the drill is retracted from the work material
   • Rotation: 500 rpm Feed Rate: 40 - 80 ipm



Change rotation speed to 500 rpm

COOLANT
- Internal Coolant
  (Water Soluble): Pump Pressure Steel: 200-300 PSI
  Cast Iron or Aluminum: 500-1000 PSI
- Internal MQL: Air Pressure: 50-100 PSI or above
  Volume (Edge)

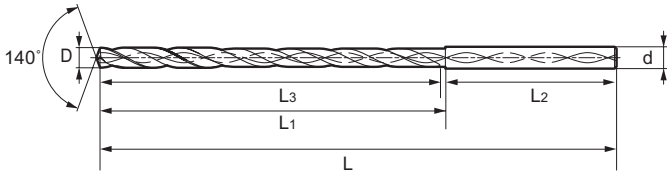
■ Recommended Cutting Conditions

Vc=sfm / *m/min*
f=ipr / *mm/rev*

		General Steel (>300HB)	Hardened Steel (>45HrC)	Stainless Steel (>200HB)	Gray Cast Iron	Ductile Iron
~ø.125 in *~ø3.0 mm*	Vc	165~330 / *50~100*	65~130 / *20~40*	100~165 / *30~50*	165~295 / *50~90*	130~260 / *40~80*
	f	0.003~0.006 / *0.08~0.15*	0.002~0.003 / *0.06~0.05*	0.002~0.005 / *0.06~0.12*	0.006~0.010 / *0.15~0.25*	0.005~0.008 / *0.12~0.20*
ø.125~ø.203 in *ø3.1~ø5.0 mm*	Vc	260~395 / *80~120*	65~130 / *20~40*	100~195 / *30~60*	165~295 / *50~90*	130~260 / *40~80*
	f	0.006~0.010 / *0.15~0.25*	0.003~0.004 / *0.08~0.10*	0.003~0.006 / *0.08~0.15*	0.006~0.012 / *0.15~0.30*	0.006~0.010 / *0.15~0.25*
ø.203~ø.406 in *ø5.1~ø10.0 mm*	Vc	260~395 / *80~120*	65~130 / *20~40*	130~260/ *40~80*	195~330 / *60~100*	165~295 / *50~90*
	f	0.008~0.014 / *0.20~0.35*	0.004~0.006 / *0.10~0.15*	0.004~0.008 / *0.10~0.20*	0.008~0.014 / *0.20~0.35*	0.008~0.014 / *0.20~0.35*
ø.406~ø0.625 in *ø10.1~ø16.0 mm*	Vc	260~425/ *80~130*	65~130 / *20~40*	165~260/ *50~80*	230~395/ *70~120*	195~330 / *60~100*
	f	0.010~0.014 / *0.25~0.35*	0.004~0.006 / *0.10~0.15*	0.004~0.008 / *0.10~0.20*	0.010~0.014 / *0.25~0.35*	0.010~0.014 / *0.25~0.35*

12XD-INCH MDW-XHV

Tolerance of Diameters	
øD	Tolerance
.1181 < øD ≤ .2362	-.00080 -.00145
.2362 < øD ≤ .3937	-.00080 -.00165
.3937 < øD ≤ .7087	-.00080 -.00185



12XD-INCH

Catalog Number	Stock	Cutting Dia.		L	L1	L2	L3	d
		Fraction	Decimal					
MDW1250XHV12	●	1/8″	0.125	3.780	1.890	1.890	1.772	0.157
MDW1406XHV12	●	9/64″	0.141	4.134	2.244	1.890	2.126	0.157
MDW1563XHV12	●	5/32″	0.156	4.370	2.480	1.890	2.362	0.157
MDW1719XHV12	●	11/64″	0.172	4.607	2.638	1.969	2.520	0.236
MDW1875XHV12	●	3/16″	0.188	5.158	3.189	1.969	3.071	0.236
MDW2031XHV12	●	13/64″	0.203	5.158	3.189	1.969	3.071	0.236
MDW2131XHV12	●	#3	0.213	5.158	3.189	1.969	3.071	0.236
MDW2187XHV12	●	7/32″	0.219	5.433	3.465	1.969	3.346	0.236
MDW2500XHV12	●	1/4″	0.250	6.102	4.055	2.047	3.937	0.315
MDW2570XHV12	●	#F	0.257	6.102	4.055	2.047	3.937	0.315
MDW2656XHV12	●	17/64″	0.266	6.102	4.055	2.047	3.937	0.315
MDW2813XHV12	●	9/32″	0.281	6.496	4.449	2.047	4.331	0.315
MDW2969XHV12	●	19/64″	0.297	6.496	4.449	2.047	4.331	0.315
MDW3125XHV12	●	5/16″	0.313	6.496	4.449	2.047	4.331	0.315
MDW3320XHV12	●	#Q	0.332	7.677	5.551	2.126	5.433	0.394
MDW3438XHV12	●	11/32″	0.344	7.677	5.551	2.126	5.433	0.394
MDW3594XHV12	●	23/64″	0.359	7.677	5.551	2.126	5.433	0.394
MDW3750XHV12	●	3/8″	0.375	7.677	5.551	2.126	5.433	0.394
MDW3906XHV12	●	25/64″	0.391	7.677	5.551	2.126	5.433	0.394
MDW4063XHV12	●	13/32″	0.406	8.543	6.339	2.205	6.220	0.472
MDW4219XHV12	●	27/64″	0.422	8.543	6.339	2.205	6.220	0.472
MDW4375XHV12	●	7/16″	0.438	8.543	6.339	2.205	6.220	0.472
MDW4531XHV12	●	29/64″	0.453	8.543	6.339	2.205	6.220	0.472
MDW4688XHV12	●	15/32″	0.469	8.543	6.339	2.205	6.220	0.472
MDW4844XHV12	●	31/64″	0.484	9.566	7.283	2.283	7.165	0.551
MDW5000XHV12	●	1/2″	0.500	9.566	7.283	2.283	7.165	0.551
MDW5312XHV12	●	17/32″	0.531	9.566	7.283	2.283	7.165	0.551
MDW5625XHV12	●	9/16″	0.563	10.669	8.307	2.362	8.189	0.630
MDW6250XHV12	●	5/8″	0.625	10.669	8.307	2.362	8.189	0.630
MDW7500XHV12	●	3/4″	0.750	12.709	10.268	2.441	10.157	0.787

● = USA Stocked item

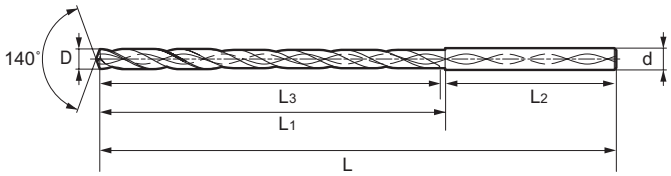
NOTE: MDS-V is the stocked recommended guide drill for the XHV series. Use a guide hole drill with diameter the same as that of the MDW-XHV type.

MDW-XHV

MDW-XHV Deep Hole

Carbide Coolant Through Drills

Tolerance of Diameters	
øD	Tolerance
.1181 < øD ≤ .2362	-.00080 -.00145
.2362 < øD ≤ .3937	-.00080 -.00165
.3937 < øD ≤ .7087	-.00080 -.00185



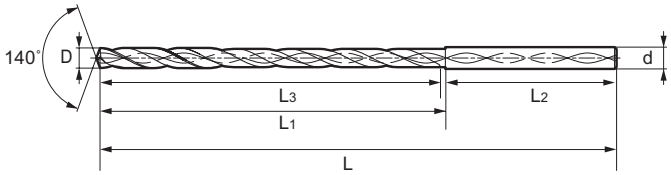
12XD-*METRIC*

Catalog Number	Stock	D	L	L1	L2	L3	d
MDW030XHV12	●	*3.0*	*96*	*48*	*48*	*45*	*4*
MDW035XHV12	●	*3.5*	*105*	*57*	*48*	*54*	*4*
MDW040XHV12	●	*4.0*	*111*	*63*	*48*	*60*	*4*
MDW045XHV12	●	*4.5*	*117*	*67*	*50*	*64*	*6*
MDW050XHV12	●	*5.0*	*131*	*81*	*50*	*78*	*6*
MDW051XHV12	●	*5.1*	*131*	*81*	*50*	*78*	*6*
MDW055XHV12	●	*5.5*	*138*	*88*	*50*	*85*	*6*
MDW060XHV12	●	*6.0*	*138*	*88*	*50*	*85*	*6*
MDW065XHV12	●	*6.5*	*155*	*103*	*52*	*100*	*8*
MDW069XHV12	●	*6.9*	*165*	*113*	*52*	*110*	*8*
MDW070XHV12	●	*7.0*	*165*	*113*	*52*	*110*	*8*
MDW075XHV12	●	*7.5*	*165*	*113*	*52*	*110*	*8*
MDW080XHV12	●	*8.0*	*165*	*113*	*52*	*110*	*8*
MDW085XHV12	●	*8.5*	*195*	*141*	*54*	*138*	*10*
MDW090XHV12	●	*9.0*	*195*	*141*	*54*	*138*	*10*
MDW093XHV12	●	*9.3*	*195*	*141*	*54*	*138*	*10*
MDW095XHV12	●	*9.5*	*195*	*141*	*54*	*138*	*10*
MDW100XHV12	●	*10.0*	*195*	*141*	*54*	*138*	*10*
MDW105XHV12	●	*10.5*	*217*	*161*	*56*	*158*	*12*
MDW110XHV12	●	*11.0*	*217*	*161*	*56*	*158*	*12*
MDW115XHV12	●	*11.5*	*217*	*161*	*56*	*158*	*12*
MDW120XHV12	●	*12.0*	*217*	*161*	*56*	*158*	*12*
MDW125XHV12	●	*12.5*	*243*	*185*	*58*	*182*	*14*
MDW130XHV12	●	*13.0*	*243*	*185*	*58*	*182*	*14*
MDW140XHV12	●	*14.0*	*243*	*185*	*58*	*182*	*14*

● = USA Stocked item

20XD-INCH MDW-XHV

Tolerance of Diameters	
øD	Tolerance
.1181 < øD ≤ .2362	-.00080 -.00145
.2362 < øD ≤ .3937	-.00080 -.00165
.3937 < øD ≤ .7087	-.00080 -.00185



20XD-INCH

Catalog Number	Stock	Cutting Dia.		L	L1	L2	L3	d
		Fraction	Decimal					
MDW1250XHV20	●	1/8″	0.125	4.842	2.952	1.890	2.834	0.157
MDW1406XHV20	●	9/64″	0.141	5.472	3.582	1.890	3.464	0.157
MDW1563XHV20	●	5/32″	0.156	5.472	3.582	1.890	3.464	0.157
MDW1719XHV20	●	11/64″	0.172	6.418	4.449	1.969	4.331	0.236
MDW1875XHV20	●	3/16″	0.188	6.614	4.645	1.969	4.527	0.236
MDW2031XHV20	●	13/64″	0.203	6.614	4.645	1.969	4.527	0.236
MDW2130XHV20	●	#3	0.213	7.520	5.551	1.969	5.433	0.236
MDW2187XHV20	●	7/32″	0.219	7.520	5.551	1.969	5.433	0.236
MDW2500XHV20	●	1/4″	0.250	7.913	5.866	2.047	5.748	0.315
MDW2570XHV20	●	#F	0.257	7.913	5.866	2.047	5.748	0.315
MDW2656XHV20	●	17/64″	0.266	7.913	5.866	2.047	5.748	0.315
MDW2813XHV20	●	9/32″	0.281	9.094	7.047	2.047	6.929	0.315
MDW2969XHV20	●	19/64″	0.297	9.094	7.047	2.047	6.929	0.315
MDW3125XHV20	●	5/16″	0.313	9.094	7.047	2.047	6.929	0.315
MDW3320XHV20	●	#Q	0.332	10.905	8.779	2.126	8.661	0.394
MDW3438XHV20	●	11/32″	0.344	10.905	8.779	2.126	8.661	0.394
MDW3594XHV20	●	23/64″	0.359	10.905	8.779	2.126	8.661	0.394
MDW3750XHV20	●	3/8″	0.375	10.905	8.779	2.126	8.661	0.394
MDW3906XHV20	●	25/64″	0.391	10.905	8.779	2.126	8.661	0.394
MDW4063XHV20	●	13/32″	0.406	12.713	10.508	2.205	10.394	0.472
MDW4219XHV20	●	27/64″	0.422	12.713	10.508	2.205	10.394	0.472
MDW4375XHV20	●	7/16″	0.438	12.713	10.508	2.205	10.394	0.472
MDW4531XHV20	●	29/64″	0.453	12.713	10.508	2.205	10.394	0.472
MDW4688XHV20	●	15/32″	0.469	12.713	10.508	2.205	10.394	0.472
MDW4844XHV20	●	31/64″	0.484	14.521	12.238	2.283	12.126	0.551
MDW5000XHV20	●	1/2″	0.500	14.521	12.238	2.283	12.126	0.551
MDW5312XHV20	●	17/32″	0.531	14.521	12.238	2.283	12.126	0.551

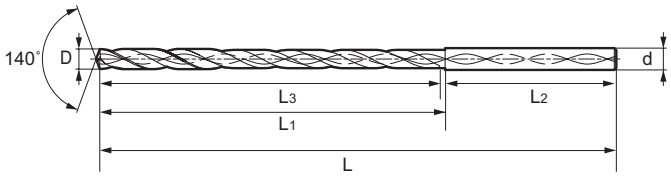
● = USA Stocked item

NOTE: MDS-V is the stocked recommended guide drill for the XHV series. Use a guide hole drill with diameter the same as that of the MDW-XHV type.

MDW-XHV

MDW-XHV Deep Hole
Carbide Coolant Through Drills

Tolerance of Diameters	
øD	Tolerance
.1181 < øD ≤ .2362	-.00080 -.00145
.2362 < øD ≤ .3937	-.00080 -.00165
.3937 < øD ≤ .7087	-.00080 -.00185

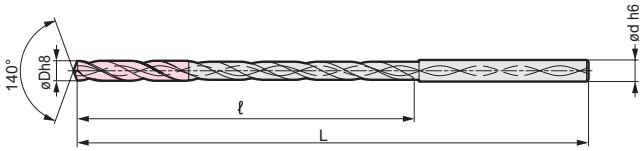


20XD-*METRIC*

Catalog Number	Stock	D	L	L1	L2	L3	d
MDW030XHV20	●	*3.0*	*123.0*	*75*	*48*	*72.0*	*4*
MDW035XHV20	●	*3.5*	*139.0*	*91*	*48*	*88.0*	*4*
MDW040XHV20	●	*4.0*	*139.0*	*91*	*48*	*88.0*	*4*
MDW045XHV20	●	*4.5*	*163.0*	*113*	*50*	*110.0*	*6*
MDW050XHV20	●	*5.0*	*168.0*	*118*	*50*	*115.0*	*6*
MDW051XHV20	●	*5.1*	*168.0*	*118*	*50*	*115.0*	*6*
MDW055XHV20	●	*5.5*	*191.0*	*141*	*50*	*138.0*	*6*
MDW060XHV20	●	*6.0*	*191.0*	*141*	*50*	*138.0*	*6*
MDW065XHV20	●	*6.5*	*201.0*	*149*	*52*	*146.0*	*8*
MDW069XHV20	●	*6.9*	*231.0*	*179*	*52*	*176.0*	*8*
MDW070XHV20	●	*7.0*	*231.0*	*179*	*52*	*176.0*	*8*
MDW075XHV20	●	*7.5*	*231.0*	*179*	*52*	*176.0*	*8*
MDW080XHV20	●	*8.0*	*231.0*	*179*	*52*	*176.0*	*8*
MDW085XHV20	●	*8.5*	*277.0*	*223*	*54*	*220.0*	*10*
MDW090XHV20	●	*9.0*	*277.0*	*223*	*54*	*220.0*	*10*
MDW093XHV20	●	*9.3*	*277.0*	*223*	*54*	*220.0*	*10*
MDW095XHV20	●	*9.5*	*277.0*	*223*	*54*	*220.0*	*10*
MDW100XHV20	●	*10.0*	*277.0*	*223*	*54*	*220.0*	*10*
MDW105XHV20	●	*10.5*	*322.9*	*267*	*56*	*264.0*	*12*
MDW110XHV20	●	*11.0*	*322.9*	*267*	*56*	*264.0*	*12*
MDW115XHV20	●	*11.5*	*322.9*	*267*	*56*	*264.0*	*12*
MDW120XHV20	●	*12.0*	*322.9*	*267*	*56*	*264.0*	*12*
MDW125XHV20	●	*12.5*	*368.8*	*311*	*58*	*308.0*	*14*
MDW130XHV20	●	*13.0*	*368.8*	*311*	*58*	*308.0*	*14*
MDW140XHV20	●	*14.0*	*368.8*	*311*	*58*	*308.0*	*14*

● = USA Stocked item

NOTE: MDS-V is the stocked recommended guide drill for the XHV series. Use a guide hole drill with diameter the same as that of the MDW-XHV type.

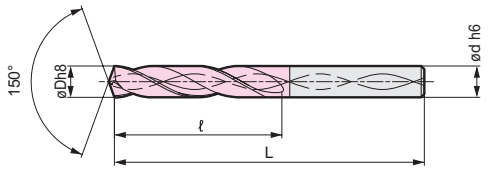


MDW-XHT-*METRIC*

Tool Dia. $øD_c$ *(mm)*	Shank Dia. $øD_s$ *(mm)*	Catalog Number	15XD			25XD			30XD		
			Stock	Dimensions *(mm)*		Stock	Dimensions *(mm)*		Stock	Dimensions *(mm)*	
			15	L	ℓ	25	L	ℓ	30	L	ℓ
2.97	*3.0*	*MDW0297XHT□□*	★	*108*	*60*	★	*138*	*90*	★	*153*	*105*
3.47	*4.0*	*MDW0347XHT□□*	★	*118*	*70*	★	*153*	*105*	★	*171*	*123*
3.97	*4.0*	*MDW0397XHT□□*	★	*128*	*80*	★	*168*	*120*	★	*188*	*140*
4.47	*5.0*	*MDW0447XHT□□*	★	*140*	*90*	★	*185*	*135*	★	*208*	*158*
4.97	*5.0*	*MDW0497XHT□□*	★	*150*	*100*	★	*200*	*150*	★	*225*	*175*
5.47	*6.0*	*MDW0547XHT□□*	★	*162*	*110*	★	*217*	*165*	★	*245*	*193*
5.97	*6.0*	*MDW0597XHT□□*	★	*172*	*120*	★	*232*	*180*	★	*262*	*210*
6.47	*7.0*	*MDW0647XHT□□*	★	*183*	*130*	★	*248*	*195*	★	*281*	*228*
6.97	*7.0*	*MDW0697XHT□□*	★	*193*	*140*	★	*263*	*210*	★	*298*	*245*
7.47	*8.0*	*MDW0747XHT□□*	★	*204*	*150*	★	*279*	*225*	★	*317*	*263*
7.97	*8.0*	*MDW0797XHT□□*	★	*214*	*160*	★	*294*	*240*	★	*334*	*280*

★ = Worldwide Warehouse item available in 10 business days

NOTE: MDW-PHT is the recommended guide drill for the XHT series. Use a guide hole drill with a diameter +0.001 to +0.002 inch larger than that of the MDW-XHT type.



MDW-PHT-*METRIC*

Tool Dia. $øD_c$ *(mm)*	Shank Dia. $øD_s$ *(mm)*	Catalog Number	Guide Hole Drill		
			Stock	Dimensions *(mm)*	
				L	ℓ
3.0	*3.0*	*MDW0300PHT□□*	★	*68*	*17.5*
3.5	*4.0*	*MDW0350PHT□□*	★	*72*	*20.0*
4.0	*4.0*	*MDW0400PHT□□*	★	*72*	*22.5*
4.5	*5.0*	*MDW0450PHT□□*	★	*80*	*25.0*
5.0	*5.0*	*MDW0500PHT□□*	★	*80*	*27.5*
5.5	*6.0*	*MDW0550PHT□□*	★	*82*	*27.5*
6.0	*6.0*	*MDW0600PHT□□*	★	*82*	*30.0*
6.5	*7.0*	*MDW0650PHT□□*	★	*88*	*32.5*
7.0	*7.0*	*MDW0700PHT□□*	★	*88*	*35.0*
7.5	*8.0*	*MDW0750PHT□□*	★	*94*	*37.5*
8.0	*8.0*	*MDW0800PHT□□*	★	*94*	*40.0*

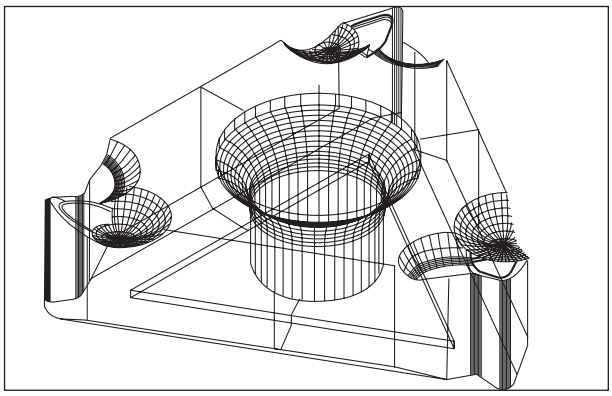
★ = Worldwide Warehouse item available in 10 business days

TECHNICAL INFORMATION & HARDWARE

Pages 241 - 259

Sumitomo Electric has developed TME (external) and TMI (internal) threading inserts with a pitch range of 1.0 ~ 3.0 mm and 8~24 threads per inch (TPI) along with applicable LTE type and STI holders. The superior features of the TME and TMI threading inserts include an M-class tolerance and dimple shaped chipbreaker. 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 chipbreakers.

TME Insert Design



■ FEATURES

- A positive rake angle encourages good chip control and reduces cutting resistance.
- Two tier dimple-style chip breakers evacuate chips smoothly and easily.
- M-class tolerance reduces insert cost.
- Four available grades cover a wider range of applications.

■ INSERT GRADES & RECOMMENDED RUNNING CONDITIONS

Application

AC225 (Coated)
- For stainless and general steels
- Stable machining

T130A (Cermet)
- For soft and general steels
- Good surface finish
- Long tool life

A30 (P30 Carbide)
- For low and medium speed cutting of stainless and general steels

EH20Z (PVD Coated)
- For exotic materials

Recommended Running Conditions (SFM)

Work Material \ Insert Grade	AC225	T130A	A30	EH20Z
Soft Steel	500 ~ 660	330 ~ 500	230 ~ 400	—
Carbon Steel	330 ~ 550	260 ~ 430	230 ~ 330	—
Alloy Steel	300 ~ 500	260 ~ 400	230 ~ 330	—
Stainless Steel	230 ~ 450	–	230 ~ 330	—
Exotics	—	—	—	100 ~ 150

Trouble Shooting

- **Chipping**
  T130A ⟶ AC225
- **Excessive Wear**
  A30 ⟶ AC225 ⟶ T130A
- **Plastic Deformation**
  A30 ⟶ AC225 ⟶ T130A

Recommended Infeed Values mm (inch)

Pass \ Pitch (mm) / TPI	1.0	1.25	1.5	1.75	2	2.5	3
	24	19	16	14	12	9	8
1ST	0.25 (.010)	0.25 (.010)	0.30 (.012)	0.30 (.012)	0.30 (.012)	0.35 (.014)	0.35 (.014)
2ND	0.20 (.008)	0.20 (.008)	0.25 (.010)	0.25 (.010)	0.25 (.010)	0.30 (.012)	0.30 (.012)
3RD	0.15 (.006)	0.15 (.006)	0.20 (.008)	0.20 (.008)	0.20 (.008)	0.25 (.010)	0.25 (.010)
4TH	0.10 (.004)	0.15 (.006)	0.15 (.006)	0.15 (.006)	0.20 (.008)	0.20 (.008)	0.20 (.008)
5TH	0.05 (.002)	0.10 (.004)	0.10 (.004)	0.15 (.006)	0.15 (.006)	0.20 (.008)	0.20 (.008)
6TH	—	0.05 (.002)	0.05 (.002)	0.10 (.004)	0.12 (.005)	0.15 (.006)	0.15 (.006)
7TH	—	—	—	0.05 (.002)	0.10 (.004)	0.15 (.006)	0.15 (.006)
8TH	—	—	—	—	0.05 (.002)	0.10 (.004)	0.15 (.006)
9TH	—	—	—	—	—	0.05 (.002)	0.10 (.004)
10TH	—	—	—	—	—	—	0.10 (.004)
11TH	—	—	—	—	—	—	0.05 (.002)

LAYDOWN THREADING SYSTEM

TERMS:

Thread Form – (most common shapes)

60˚ (UN standard, ISO) 55˚ (British standard) 29˚ (Acme standard/stub)

Pitch – Distance from the top of one thread to the next.

Pitch = 1 (inch) / threads per inch, Ex: 20 TPI = 1 / 20 = .050

T.P.I. – Number of threads per inch

TPI = 1 (inch) / pitch, Ex: 1 / .050 (pitch) = 20 tpi

Lead – Movement caused by one revolution of the screw.

(the same as pitch in a single start thread)

Lead = pitch x number of starts

Example: double start thread with .050 pitch = .100 lead

Multi-Start Thread – Thread with more than one starting position. (lead different than pitch)

Helix angle – Angle generated by the helix of the thread at the pitch diameter.

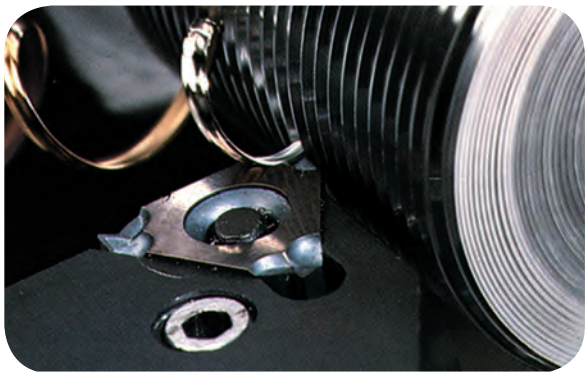
Major Diameter – see drawing below

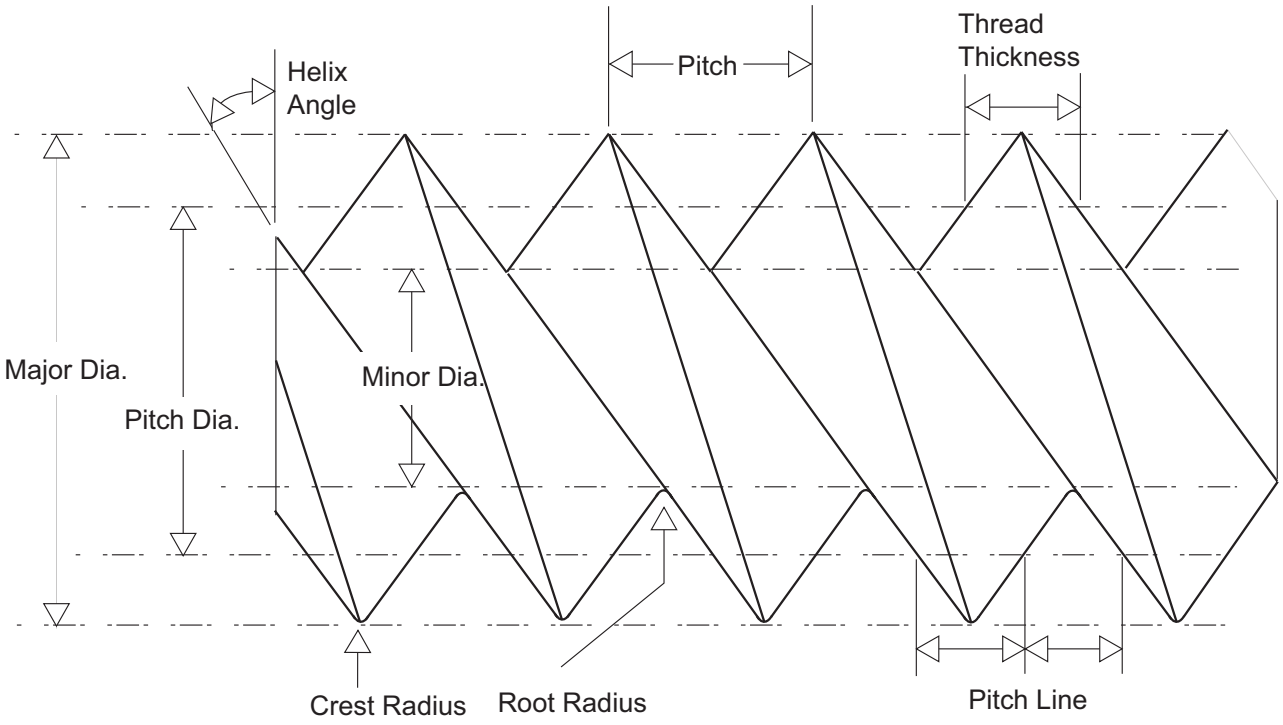
Minor Diameter – see drawing below

Pitch Diameter – see drawing below

Pitch Line – -see drawing below

Crest and Root Radius – see drawing below





RECOMMENDED RUNNING CONDITIONS (SFM)

Material	Application	Hardness	Grade	Low	Low Opt.	High Opt.	High
INDUCTION HARDENED STEEL	Continuous	45-65HrC	BN1000	400	550	650	700
			BNX10	400	500	650	700
			BNC160	400	550	650	800
			BNX20	300	450	550	600
			BNC200	350	500	650	750
			BNC100	400	600	700	1000
			BN2000	300	400	550	600
	Interrupted (DRY)	45-65 HrC	BNX25	400	550	700	750
			BN2000	300	400	550	600
			BN350	300	400	550	600
			BNC300	300	400	550	600
			BNC200	350	400	500	600

Material	Application	Hardness	Grade	Low	Low Opt.	High Opt.	High
CARBURIZED HARDENED STEEL BEARING STEEL	Continuous	45-65 HrC	BNC160	350	450	550	600
			BNX20	250	300	500	600
			BNC200	300	350	550	650
			BNC100	350	425	550	675
			BN2000	300	400	550	600
	Interrupted (DRY)	45-65 HrC	BNX25	400	550	700	750
			BN300	300	400	550	600
			BN350	300	400	550	600
			BNC200	300	400	550	650
			BNC300	300	400	550	600

Material	Application	Hardness	Grade	Low	Low Opt.	High Opt.	High
DIE STEEL HIGH SPEED STEEL	Continuous	55-65 HrC	BN2000	150	250	450	550
			BN1000	250	300	450	650
			BNX10	250	300	400	500
			BNC160	250	300	400	500
			BNX20	150	200	300	450
			BNC200	200	250	350	450
			BNC100	250	300	400	500
	Interrupted (DRY)	55-65 HrC	BN2000	150	200	250	300
			BNX25	300	400	500	550
			BN300	150	200	250	300
			BN350	150	200	250	300
			BNC300	200	250	300	350

FEED RATE

FEED RATE (IPR)		
Finishing	General Purpose	Roughing
0.002 - 0.004	0.004 - 0.006	0.006 - 0.008

Note: Use above speeds for threading and grooving applications.
The recommended feed rate for grooving is 0.001 - 0.002 IPR, while your threading feed rate should be based upon the thread form, but not to exceed 0.006 IPR.

Grade	General Running Parameters* (SFM)			
	Low	Low Opt.	High Opt.	High
BNX10	400	450	650	700
BNC160	400	450	650	720
BNX20	250	400	600	650
BNC200	200	350	650	820
BN250	200	250	400	500
BNX25	450	500	650	700
BN300	200	300	500	550
BN350	200	300	500	550
BNC100	400	525	675	850
BNC300	200	250	400	500

* The above are a general range of running parameters based on grade and material. Please contact your local Sumitomo Sales Representative or the Sumitomo Engineering Department to obtain more application specific running parameters.

Note: Running wiper inserts at the above feed rates will produce a higher quality surface finish when compared to a non-wiper insert.

DEPTH OF CUT

Mini-Tip (NU, NS, NC)	D.O.C. ≤ 0.015"
Medium-Tip (MD)	D.O.C. ≤ 0.020"
Full-Tip	D.O.C. ≤ 0.020"

Note: Depth of cut per pass

PCBN Recommendations for Iron Machining

■ RECOMMENDED RUNNING CONDITIONS (SFM)

Material	Application	Grade	Low	Low Opt.	High Opt.	High
GRAY CAST IRON	Continuous & Interrupted	BN7000	2600	3000	5000	6500
		BN700	2300	3000	5000	6000
		BNS800	1000	2000	5500	6500
		BNC500	600	1000	2000	2500
		BN500	1500	2000	5500	6000

Material	Application	Grade	Low	Low Opt.	High Opt.	High
DUCTILE IRON 150 -300 HBn	Continuous & Interrupted	BNC500	650	800	1300	1650
		BN7000	300	450	550	650
		BN700	300	450	550	600

Material	Application	Grade	Low	Low Opt.	High Opt.	High
GENERAL SINTERED ALLOY	Continuous & Interrupted	BN700	400	550	800	1000
		BN7000	400	550	800	1000
		BN7500	400	550	650	1000

Material	Application	Grade	Low	Low Opt.	High Opt.	High
HIGH DENSITY SINTERED ALLOY	Continuous & Interrupted	BN7500	65	450	550	750
		BN7000	65	450	550	750
		BN700	65	450	550	750
		BNS800	65	450	550	750

■ FEED RATE

FEED RATE (IPR)		
Finishing	General Purpose	Roughing
0.002 - 0.004	0.004 - 0.006	0.006 - 0.008

Note: Use above speeds for threading and grooving applications.
The recommended feed rate for grooving is 0.001 - 0.002 IPR, while your threading feed rate should be based upon the thread form, but not to exceed 0.006 IPR.

Grade	General Running Parameters* (SFM)			
	Low	Low Opt.	High Opt.	High
BN500	500	800	1500	2000
BNS800	2000	3000	5000	6000
BN700	2000	3000	5000	6000

* The above are a general range of running parameters based on grade and material. Please contact your local Sumitomo Sales Representative or the Sumitomo Engineering Department to obtain more application specific running parameters.
Coolant should not be used for any interrupted cutting when using PCBN tools

■ DEPTH OF CUT

Mini-Tip (NU, NS, NC)	D.O.C. ≤ 0.020″
Medium-Tip (MD)	D.O.C. ≤ 0.040″
Full-Tip	D.O.C. ≤ 0.040″
Solid CBN**	D.O.C. ≤ 0.150″

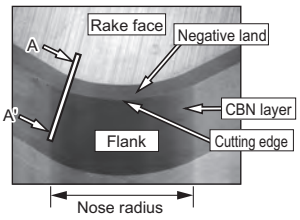
**Depth of cut based on gray cast iron material. For chilled iron, depth of cut should not exceed 0.080″.

Edge Specification of SumiBoron Inserts

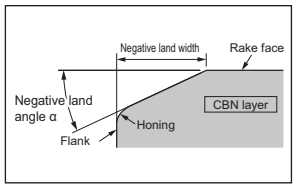
SUMIBORON Insert and Edge Treatment

All SUMIBORON inserts are enhanced with the optimum cutting edge preparation for the various grades and geometries (shown on the right). This is to avoid cutting edge fracture caused by the heavy loads generated during the machining of high hardness materials such as Hardened Steel.
As the pioneer of CBN tools "SUMIBORON," this vast selection of grades and edge treatment combinations is our trump card for Hardened Steel machining.

Close-up of cutting edge



Section A-A'



■ SUMIBORON Insert Cutting Edge Specification List

Series	Work Material	Grade	Negative/ Positive	Standard				Low Resistance Type L					Strong Edge Type H				
				Identification Code	α	W	Honing	Notation	Identification Code	α	W	Honing	Notation	Identification Code	α	W	Honing
SUMIBORON	Hardened Steel	BNX10	Negative/Positive	T01225	25°	0.12	No	-	-	-	-	-	-	-	-	-	-
		BNX20	Negative/Positive	S01225	25°	0.12	Yes	LT	T01215*	15°	0.12	No	-	-	-	-	-
		BNX25	Negative/Positive	S01725	25°	0.17	Yes	-	-	-	-	-	-	-	-	-	-
		BN1000	Negative/Positive	S01225	25°	0.12	Yes	-	-	-	-	-	-	-	-	-	-
		BN250	Negative	S01225	25°	0.12	Yes	LT	T01215	15°	0.12	No	-	-	-	-	-
			Positive	S01235	35°	0.12	Yes	LS	S01225	25°	0.12	Yes					
		BN2000	Negative/Positive	S01225	25°	0.12	Yes	LT	T01215	15°	0.12	No	HS	S01235	35°	0.12	Yes
		BN350	Negative	T01225	25°	0.12	No	-	-	-	-	-	HT	T01235	35°	0.12	No
			Positive	T01235	35°	0.12	No						-	-	-	-	-
	Cast Iron Exotic Alloy	BN500	Negative/Positive	T01215	15°	0.12	No	-	-	-	-	-	-	-	-	-	-
		BN700	Negative/Positive	T01215	15°	0.12	No	LF	Sharp edge	0°	0	No	HS	S01225	25°	0.12	Yes
		BN7000	Negative/Positive	T01215	15°	0.12	No	LF	Sharp edge	0°	0	No	HS	S01225	25°	0.12	Yes
		BN7500	Negative/ Positive	T01215	15°	0.12	No	LF	Sharp edge	0°	0	No	HS	S00525	25°	0.05	Yes
								LE	Sharp edge	0°	0	Yes					
								LS	S00715	15°	0.07	Yes					
		BNS800	Negative	T02020	20°	0.20	No	LF	Sharp edge	0°	0	No	-	-	-	-	-
Coated SUMIBORON	Hardened Steel	BNC100	Negative/Positive	S01225	25°	0.12	Yes	LS	S01715	15°	0.17	Yes	-	-	-	-	-
		BNC160	Negative/Positive	S01225	25°	0.12	Yes	LS	S01020	20°	0.10	Yes	HS	S01730	30°	0.17	Yes
		BNC200	Negative/Positive	S01225	25°	0.12	Yes	LS	S01015	15°	0.10	Yes	HS	S01735	35°	0.17	Yes
		BNC300	Negative/Positive	S01225	25°	0.12	Yes	-	-	-	-	-	HS	S01735	35°	0.17	Yes
	Cast Iron	BNC500	Negative/Positive	S01215	15°	0.12	Yes	-	-	-	-	-	HS	S01225	25°	0.12	Yes

*Identification code will be T00715 for inserts with inscribed circle of less than φ4.76.

■ Cutting Edge Treatment of Inserts with Wipers/Chipbreakers

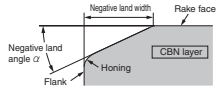
Series	Work Material	Grade	Other Types					
			Notation	Identification Code	α	W	Honing	Type
SUMIBORON	Hardened Steel	BN2000	WG	S01215	15°	0.12	Yes	Wiper
			WH	S01215	15°	0.12	Yes	Wiper
			N-FV	—	0°	0	Yes	With breaker
			N-LV	S00535	35°	0.05	Yes	With breaker
	Cast Iron Exotic Alloy	BNS800	W	T02020	20°	0.20	No	Wiper
			LFW	Sharp edge	0°	0	No	Wiper Sharp edge
Coated SUMIBORON	Hardened Steel	BNC100	W	S01715	15°	0.17	Yes	Wiper
		BNC160	WG	S01215	15°	0.12	Yes	Wiper
			WH	S01215	15°	0.12	Yes	Wiper
			W	S01215	15°	0.12	Yes	Wiper
			N-FV	—	0°	0	Yes	With breaker
			N-LV	S00535	35°	0.05	Yes	With breaker
			N-SV	S01235	35°	0.12	Yes	With breaker
		BNC200	WG	S01215	15°	0.12	Yes	Wiper
			WH	S01215	15°	0.12	Yes	Wiper
			W	S01215	15°	0.12	Yes	Wiper
			N-FV	—	0°	0	Yes	With breaker
			N-LV	S00535	35°	0.05	Yes	With breaker
			N-SV	S01235	35°	0.12	Yes	With breaker
	Cast Iron	BNC500	W	S01215	15°	0.12	Yes	Wiper

■ Edge Treatment Identification Code

Edge Treatment Notation			
No	Standard type		
L	Low cutting forces	+	F: Sharp edge
			E: Honing
H	Strong edge type		T: Negative land
			S: Negative land + Honing
WG/WH/W	Wiper		
N-FV/N-LV/ N-SV	With Chipbreaker		

● Edge treatment identification code

(Ex) S 0 1 2 2 5



Negative land angle
Negative land width
Treatment type
T : Negative land
S : Negative land + honing

Ex: S01225
→25°/0.12mm width negative land with honing

RECOMMENDED RUNNING CONDITIONS

Material	SFM	IPR	D.O.C	Grade Recommendation		
				First	Second	Third
Aluminum Alloys (4% - 8% Si)	3,000 - 10,000	0.004 - 0.025	0.120″	DA1000	DA2200	DA150
Aluminum Alloys (9% - 14% Si)	2,000 - 8,000	0.004 - 0.020	0.120″	DA1000	DA2200	DA150
Aluminum Alloys (15% - 18% Si)	1,000 - 2,300	0.004 - 0.015	0.120″	DA1000	DA2200	DA150
Copper Alloy	3,300	0.002 - 0.008	0.120″	DA1000	DA2200	DA150
Hard Plastic	3,300	0.004 - 0.012	0.080″	DA1000	DA2200	DA150
Wood & Composite	13,000	0.004 - 0.015	–	DA1000	DA2200	DA150
Tungsten Carbide	30 - 70	0.003 - 0.008	0.020″	DA90	DA150	-
Reinforced Plastics	3,300	0.016	0.080″	DA1000	DA2200	DA150

Note: The above running parameters are for turning applications only.

Recommended first choice, Recommended second choice, Recommended third choice

Work Material	Hardness	Grade	Machining Parameters		
			Finishing .002 ~ .008 IPR. 005" ~ .060" D.O.C.	Gen. Purpose .008 ~ .020 IPR .040" ~ .200" D.O.C.	Roughing .008 ~ .020 IPR .040" ~ .200" D.O.C.
LOW CARBON STEELS 1005, 1006, 1008, 1009, 1010, 1011, 1012, 1013, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1025, 1026, 1029, 1108, 1109, 1110, 1115, 1116, 1117, 1118, 1119, 1211, 1212, 1213, 1215, 1513, 1518, 1522			CUTTING SPEED SFM		
	<250	T1500A	800~1650	800~1450	–
		T1500Z	800~1750	800~1550	–
		AC805P	800~1750	800~1550	700~1200
		AC810P	800~1600	800~1400	700~1100
		AC820P	500~1200	500~1000	400~900
		AC830P	–	500~900	400~850
	220~350	T1500A	700~1300	700~1200	–
		T1500Z	700~1450	700~1300	–
		AC805P	700~1300	700~1200	600~1100
		AC810P	700~1200	700~1100	600~950
		AC820P	500~1000	500~900	400~800
		AC830P	–	500~800	400~750
	HRc 35~55	T1500A	400~750	400~650	–
		T1500Z	400~800	400~750	–
		AC805P	400~750	400~650	350~600
		AC810P	400~600	400~550	350~550
		AC820P	300~500	300~450	300~450
		AC830P	250~450	200~400	200~400
		NB90S	400~1400	–	–
LOW/MEDIUM CARBON STEEL -- LEADED 10L18, 10L45, 10L50, 11L17, 11L37, 11L41, 11L44, 12L13, 12L14, 12L15	<250	T1500A	1000~1650	1000~1550	–
		T1500Z	1000~1750	1000~1650	–
		AC805P	1000~1650	1000~1550	900~1450
		AC810P	1000~1500	1000~1400	900~1300
		AC820P	800~1400	750~1300	600~1100
		AC830P	–	750~1200	650~1000
	250~ 350	T1500A	900~1350	800~1200	–
		T1500Z	900~1450	800~1300	–
		AC805P	900~1350	800~1200	700~1100
		AC810P	900~1200	800~1100	700~1000
		AC820P	800~1000	700~900	650~900
		AC830P	–	700~900	650~900
	Chipbreaker Preference		ESE/ESU/ELU	EGE/ELU	EME/EMU

RECOMMENDED RUNNING CONDITIONS

Recommended first choice, Recommended second choice, Recommended third choice

Work Material	Hardness	Grade	Machining Parameters		
			Finishing .002 ~ .012 IPR .005" ~ .060" D.O.C.	Gen. Purpose .010 ~ .020 IPR .040" ~ .200" D.O.C.	Roughing .015 ~ .026 IPR 200" D.O.C.
			CUTTING SPEED SFM		
MEDIUM CARBON STEELS 1030, 1033, 1035, 1037, 1038, 1039, 1040, 1042, 1043, 1044, 1045, 1046, 1049, 1050, 1053, 1055, 1132, 1137, 1139, 1140, 1141, 1144, 1145, 1146, 1151, 1524, 1525, 1526, 1527, 1536, 1541, 1547, 1548, 1551, 1552	<250	T1500A	900~1450	900~1300	–
		T1500Z	900~1550	900~1450	–
		AC805P	900~1450	900~1300	800~1100
		AC810P	900~1300	900~1200	800~1000
		AC820P	800~1000	500~900	450~800
		AC830P	–	500~800	400~700
	220~350	T1500A	800~1300	700~1200	–
		T1500Z	800~1450	700~1300	–
		AC805P	800~1300	700~1200	600~1100
		AC810P	800~1200	700~1100	600~1000
		AC820P	600~1000	500~900	450~950
		AC830P	–	500~850	400~800
	HRc 35~55	T1500A	600~1000	400~900	–
		T1500Z	600~1100	400~1000	–
		AC805P	500~1000	400~800	350~800
		AC810P	500~900	400~750	350~700
		AC820P	400~750	350~700	300~550
		AC830P	–	350~600	300~500
		NB90S	400~1400	–	–
MEDIUM HIGH CARBON STEELS --LEADED 41L30, 41L40, 41L45, 41L47, 41L50, 43L40, 41L50, 43640, 51L32, 52L100, 86L20, 86L40	<250	T1500A	800~1550	800~1450	–
		T1500Z	800~1650	800~1550	–
		AC805P	800~1550	800~1450	700~1200
		AC810P	800~1400	800~1300	700~1100
		AC820P	800~1200	700~1000	600~900
		AC830P	–	650~950	550~800
	250~ 350	T1500A	800~1450	750~1300	–
		T1500Z	800~1550	750~1450	–
		AC805P	800~1450	750~1300	650~1100
		AC810P	800~1300	750~1200	650~1000
		AC820P	700~1100	650~1000	550~900
		AC830P	–	600~1000	500~800
	Chipbreaker Preference		ESE/ESU/ELU	EGE/ELU	EME/EMU

Recommended first choice, Recommended second choice, Recommended third choice

Work Material	Hardness	Grade	Machining Parameters		
			Finishing .002 ~ .012 IPR .005" ~ .060" D.O.C.	Gen. Purpose .010 ~ .020 IPR .040" ~ .200" D.O.C.	Roughing .015 ~ .026 IPR 200" D.O.C.
			CUTTING SPEED SFM		
ALLOY STEELS– MEDIUM CARBON 1340, 1345, 4042, 4047, 4140, 4142, 4145, 4147, 4340, 50B40, 40B44, 5046, 50B46, 5140, 5145, 5147, 81B45, 8640 ,8642, 8645, 86B45, 8740, 8742, 4150, 4161, 50B50, 4060, 50B60, 5150, 5155, 5160, 51B60, 6150, 8650, 8655, 8660, 9254, 9255, 9260	250~350	T1500A	700~1200	700~1100	–
		T1500Z	700~1300	700~1200	–
		AC805P	700~1200	700~1100	500~900
		AC810P	700~1100	700~1000	500~800
		AC820P	600~950	500~850	450~800
		AC830P	–	500~800	400~700
	<250	T1500A	600~1100	600~1000	–
		T1500Z	600~1200	600~1100	–
		AC805P	600~1100	600~1000	–
		AC810P	600~1000	600~900	–
		AC820P	500~900	450~800	400~750
		AC830P	–	400~750	300~700
	250~350	T1500A	300~650	300~550	–
		T1500Z	300~800	300~650	–
		AC805P	300~650	300~550	200~550
		AC810P	300~600	300~500	200~500
		AC820P	250~500	200~450	150~400
		AC830P	250~400	200~400	150~400
		NB90S	500~900	–	–
HIGH CARBON STEELS 50100, 51100 52100, M-50	<250	T1500A	800~1300	700~1200	–
		T1500Z	800~1450	700~1300	–
		AC805P	800~1400	700~1300	600~1100
		AC810P	800~1250	700~1150	600~1000
		AC820P	450~850	300~750	300~700
		AC830P	–	300~750	300~650
	250~350	T1500A	700~1200	600~1100	–
		T1500Z	700~1300	600~1200	–
		AC805P	700~1300	600~1200	500~900
		AC810P	700~1150	600~1100	500~800
		AC820P	550~850	500~750	400~650
		AC830P	–	450~700	400~600
	Chipbreaker Preference		ESE/ESU/ELU	EGE/ELU	EME/EMU

RECOMMENDED RUNNING CONDITIONS

Recommended first choice, Recommended second choice, Recommended third choice

Work Material	Hardness	Grade	Machining Parameters		
			Finishing .002 ~ .012 IPR .005" ~ .060" D.O.C.	Gen. Purpose .010 ~ .020 IPR .040" ~ .200" D.O.C.	Roughing .015 ~ .026 IPR 200" D.O.C.
			CUTTING SPEED SFM		
TOOL STEELS DIE STEELS	<250	T1500A	500~800	350~800	–
		T1500Z	500~950	350~900	–
		AC805P	500~1000	350~900	300~850
		AC810P	500~900	350~800	300~750
		AC820P	400~700	350~650	300~600
		AC830P	–	350~650	300~600
	250~350	T1500A	650~1000	450~950	–
		T1500Z	500~900	350~900	–
		AC805P	500~1000	450~900	350~850
		AC810P	500~900	450~800	350~750
		AC820P	400~750	400~650	300~600
		AC830P	–	300~650	200~600
	HRc 36-50	T1500A	350~550	300~550	–
		T1500Z	300~600	200~550	–
		AC805P	300~650	200~550	200~550
		AC810P	300~600	200~500	200~500
		AC820P	200~400	200~350	150~300
		AC830P	200~400	200~350	150~300
		NB90S	300~600	–	–
HIGH STRENGTH STEELS 300M, 4340, 4340M 4340V, H13, H11 50100, 51100 52100, M-50	250~300	T1500A	600~1000	450~900	–
		T1500Z	550~1050	450~950	–
		AC805P	500~1050	350~950	300~800
		AC810P	500~950	350~850	300~700
		AC820P	400~700	350~700	300~650
		AC830P	–	350~700	300~600
	HRc 35-45	T1500A	550~900	350~850	–
		T1500Z	500~1000	350~950	–
		AC805P	500~1000	350~950	300~900
		AC810P	500~900	350~850	300~800
		AC820P	400~800	300~700	250~650
		AC830P	–	300~650	250~600
	Chipbreaker Preference		ESE/ESU/ELU	EGE/ELU	EME/EMU

Recommended first choice, Recommended second choice, Recommended third choice

Work Material	Hardness	Grade	Machining Parameters		
			Finishing .002 ~ .012 IPR .005" ~ .060" D.O.C.	Gen. Purpose .010 ~ .020 IPR .040" ~ .200" D.O.C.	Roughing .015 ~ .026 IPR 200" D.O.C.
			CUTTING SPEED SFM		
STAINLES STEEL 300 SERIES AUSTENITIC	160~280	**T1500A**	350~850	300~650	–
		T1500Z	300~900	300~800	–
		AC510U	400~700	400~650	–
		AC520U	300~550	300~550	300~550
		AC530U	300~500	250~500	250~500
		EH510	300~500	300~500	–
		EH520	–	300~500	300~500
		AC810P	450~750	400~700	–
		AC820P	–	300~600	300~550
		AC830P	–	250~600	200~550
		AC610M	600~800	500~700	400~600
		AC630M	400~650	300~550	300~500
STAINLESS STEEL 400 SERIES MARTENSITIC	160~260	**T1500A**	300~850	300~750	–
		T1500Z	300~950	300~850	–
		AC510U	500~850	450~750	–
		AC520U	400~700	400~600	300~600
		AC530U	300~600	300~550	300~550
		EH510	300~600	300~550	–
		EH520	300~600	300~550	300~500
		AC810P	–	400~700	–
		AC820P	450~650	300~600	300~550
		AC830P	–	250~600	200~550
		AC610M	500~700	500~650	500~600
		AC630M	300~650	300~600	300~550
	Chipbreaker Preference		EEF/ESU	EEG/EEX/EUP	EEG/EMU

Recommended first choice, Recommended second choice, Recommended third choice

Work Material	Hardness	Grade	Machining Parameters		
			Finishing .002 ~ .010 IPR .005" ~ .060" D.O.C.	Gen. Purpose .008 ~ .016 IPR .040" ~ .150"D.O.C.	Roughing .010 ~ .020 IPR 120~250" D.O.C.
			CUTTING SPEED SFM		
STAINLESS STEEL 400 SERIES MARTENSITIC cont.	260~380	T1500A	200~600	200~550	–
		T1500Z	200~700	200~650	–
		AC510U	400~700	400~650	–
		AC520U	300~600	300~600	300~550
		AC530U	300~550	300~500	300~500
		EH510	300~600	300~600	–
		EH520	–	300~550	250~500
		AC810P	350~800	250~750	–
		AC820P	–	200~600	200~600
		AC830P	–	200~600	200~600
		AC610M	500~700	500~650	500~600
		AC630M	300~650	300~600	300~550
	HrC 36~46	T1500A	200~600	200~500	–
		T1500Z	200~700	200~650	–
		AC510U	300~650	250~600	–
		AC520U	300~600	250~550	250~550
		AC530U	250~550	250~500	250~500
		EH510	200~500	200~450	–
		EH520	–	200~450	200~400
		AC810P	200~750	200~700	–
		AC820P	–	200~550	200~500
		AC830P	–	200~550	200~500
		AC610M	400~700	400~650	400~600
		AC630M	200~650	200~600	200~550
	Chipbreaker Preference		EEF/ESU	EEG/EEX/EUP	EEG/EMU

Recommended first choice, Recommended second choice, Recommended third choice

Work Material	Hardness	Grade	Machining Parameters		
			Finishing .002 ~ .010 IPR .005" ~ .060" D.O.C.	Gen. Purpose .008 ~ .016 IPR .040" ~ .150" D.O.C.	Roughing .010 ~ .020 IPR 120~250" D.O.C.
			CUTTING SPEED SFM		
STAINLESS STEEL PRECIPITATION HARDENING 15-5PH, 16-6PH, 17-4, 17-7PH, 13-8Mo	160~260	T1500A	300~800	250~700	–
		T1500Z	300~900	250~750	–
		AC510U	400~900	350~850	–
		AC520U	400~800	400~750	400~700
		AC530U	300~600	300~550	300~500
		EH510	350~700	325~600	–
		EH520	–	300~650	250~550
		AC810P	400~900	400~800	–
		AC820P	300~750	300~650	300~600
		AC830P	–	300~650	300~600
		AC610M	400~700	400~650	400~600
		AC630M	200~650	200~600	200~550
	25~36	T1500A	200~700	200~600	–
		T1500Z	300~800	300~750	–
		AC510U	300~850	300~750	–
		AC520U	300~750	300~700	300~600
		AC530U	250~600	250~550	250~500
		EH510	250~450	250~400	–
		EH520	–	250~450	250~425
		AC810P	300~800	250~750	–
		AC820P	300~600	200~600	200~550
		AC830P	–	200~600	200~500
		AC610M	500~700	500~650	500~600
		AC630M	300~650	300~600	300~550
	36~46	T1500A	300~650	300~600	–
		T1500Z	300~700	300~650	–
		AC510U	300~650	300~650	–
		AC520U	300~650	300~625	250~600
		AC530U	250~550	250~500	250~500
		AC810P	200~750	200~650	–
		AC820P	200~550	200~525	200~500
		AC830P	–	200~500	200~450
		AC610M	400~700	400~650	400~600
		AC630M	300~650	300~600	300~550
	Chipbreaker Preference		EEF/ESU	EEG/EEX/EUP	EEG/EMU

RECOMMENDED RUNNING CONDITIONS

Recommended first choice, Recommended second choice, Recommended third choice

Work Material	Hardness	Grade	Machining Parameters		
			Finishing .002 ~ .010 IPR .005" ~ .060" D.O.C.	Gen. Purpose .008 ~ .016 IPR .040" ~ .150" D.O.C.	Roughing .010 ~ .020 IPR 120~250" D.O.C.
			CUTTING SPEED SFM		
STAINLESS STEEL WROUGHT AUSTENITIC NITRONIC 32 NITRONIC 33 NITRONIC 40 NITRONIC 50 NITRONIC 60	160~260	**T1500A**	200~600	200~550	–
		T1500Z	200~700	200~650	–
		EH510/520	250~600	200~500	150~400
		AC510U	200~750	200~750	300~700
		AC520U	200~750	200~700	200~700
		AC530U	200~600	200~550	200~500
		AC810P	300~850	250~750	250~750
		AC820P	300~600	200~600	200~600
		AC830P	300~700	200~600	300~600
HIGH TEMP. ALLOYS Nickel Base, Wrought Haynes Alloy 263, Incoloy Alloy 901, 903 Inconel Alloy 617, 625, 702, 706, 718, 721, 722, X-750, 751, M252 Nimonic 75, 80 Waspaloy		EH510/520	50~150	30~130	30~100
		AC510U	100~240	100~200	60~180
		AC520U	100~200	80~180	50~150
	25~36	**AC530U**	80~180	80~150	50~120
		WX2000	400~1500	400~1200	400~1000
		EH510/520	40~130	30~110	30~90
		AC510U	90~200	80~180	80~150
		AC520U	90~180	70~150	50~120
		AC530U	80~160	70~140	50~120
		WX2000	400~1500	400~1200	400~1000
Nickel Base, Wrought Hastelloy Alloy		EH510/520	100~190	80~150	70~130
		AC510U	120~230	90~190	80~170
		AC520U	120~230	90~190	80~170
		AC530U	80~180	80~150	50~150
		WX2000	400~1500	400~1200	400~1000
Nickel Base, Wrought Incoloy Alloy 804, 825 Inconel Alloy 600, 601 Refractaloy 26	36~46	EH510/520	60~140	50~130	40~110
		AC510U	80~180	60~150	50~140
		AC520U	80~180	60~150	50~140
		AC530U	70~150	50~140	50~120
		WX2000	400~1500	400~1200	400~1000
Nickel Base, Cast Hastalloy Alloy		EH510/520	60~130	40~120	30~100
		AC510U	70~200	50~180	40~150
		AC520U	70~170	50~150	40~130
		AC530U	60~150	50~130	40~120
		WX2000	400~1500	400~1200	400~1000
	Chipbreaker Preference		EEF/ESU	EEG/EEX/EUP	EEG/EMU

Recommended first choice, Recommended second choice, Recommended third choice

Work Material	Hardness	Grade	Machining Parameters		
			Finishing .002 ~ .010 IPR .005" ~ .060" D.O.C.	Gen. Purpose .008 ~ .016 IPR .040" ~ .150" D.O.C.	Roughing .010 ~ .020 IPR 120~250" D.O.C.
			CUTTING SPEED SFM		
HIGH TEMP ALLOYS IRON BASE, WROUGHT	180~230	EH510/520	100~180	90~170	80~140
		AC510U	120~220	100~200	80~180
		AC520U	120~220	100~200	80~180
		AC530U	80~150	80~120	70~100
		WX2000	400~1500	400~1200	400~1000
	250~320	EH510/520	100~170	80~150	65~125
		AC510U	120~210	90~190	75~160
		AC520U	120~210	90~190	75~160
		AC530U	80~180	80~160	50~120
		WX2000	400~1500	400~1200	400~1000
COBALT BASE		EH510/520	90~170	90~150	70~130
		AC510U	110~210	100~180	80~160
		AC520U	110~210	100~180	80~160
		AC530U	80~180	70~150	50~120
		WX2000	400~1500	400~1200	400~1000
STELLITE		EH510/520	100~170	90~155	70~120
		AC510U	110~200	100~170	80~150
		AC520U	110~200	100~170	80~150
		AC530U	80~180	80~150	50~120
		WX2000	300~1500	300~1200	300~1000
PURE TITANIUM		**EH510/520**	90~160	80~130	70~125
		AC510U	100~190	90~170	80~140
		AC520U	100~190	90~170	80~140
		AC530U	80~150	70~130	50~120
TITANIUM ALLOY Ti-6AL-4V		EH510/520	100~180	90~160	70~140
		AC510U	120~210	120~190	100~160
		AC520U	120~210	120~190	100~160
		AC530U	80~170	70~150	50~120
ALUMINUM ALLOYS BRASS ALLOYS		**DA1000***	1000~10000	1000~10000	–
		DA2200*	1000~10000	1000~10000	
		DA150*	1000~10000	1000~10000	–
		EH510/520	800~1700	700~1200	700~1000
		AC510U	500~1500	500~1200	500~1000
		AC520U	500~1500	500~1200	500~1000
		G10E	800~1500	700~1200	700~1000
	Chipbreaker Preference		EEF/ESU	EEG/EEX/EUP	EEG/EMU

* Refer to the PCD section for proper running conditions of PCD grades.

RECOMMENDED RUNNING CONDITIONS

Recommended first choice, Recommended second choice, Recommended third choice

Work Material	Hardness	Grade	Machining Parameters		
			Finishing .002 ~ .012 IPR .005" ~ .100" D.O.C.	Gen. Purpose .008 ~ .020 IPR .040" ~ .120" D.O.C.	Roughing .015 ~ .030 IPR .100"~.180" D.O.C.
			CUTTING SPEED SFM		
COPPER ALLOYS WROUGHT 145, 147, 173, 187, 191, 314, 316, 330, 332, 335, 340, 342, 349, 350, 353, 356, 360, 365, 366, 367, 368, 370, 377, 385, 482, 485, 544, 623, 624, 638, 642, 782		**DA1000***	2000~3300	2000~3300	–
		DA2200*	2000~3300	2000~3300	
		DA150*	2000~3300	2000~3300	–
		EH510/520	800~1300	800~1200	700~1100
		AC510U	1200~1700	1100~1500	900~1300
		AC520U	1200~1700	1100~1500	900~1300
		G10E	800~1100	800~1000	700~900
190, 226, 230, 240, 260, 268,270, 280, 425, 435, 442, 443, 444, 445, 464, 465, 466, 467,613, 618, 630, 632, 651, 655, 667, 675, 687, 694, 770		**DA1000***	2000~3300	2000~3300	–
		DA2200*	2000~3300	2000~3300	
		DA150*	2000~3300	2000~3300	–
		EH510/520	800~1100	600~950	500~850
		AC510U	900~1300	800~1150	700~1000
		AC520U	900~1300	800~1150	700~1000
		G10E	800~900	600~750	500~650
411, 413, 505, 512 ,511, 521, 524, 608, 610 ,614, 619, 625, 674, 688, 706, 710 ,715, 7285, 745		**DA1000***	2000~3300	2000~3300	–
		DA2200*	2000~3300	2000~3300	
		DA150*	2000~3300	2000~3300	–
		EH510/520	250~550	200~500	150~450
		AC510U	450~750	350~650	300~600
		AC520U	450~750	350~650	300~600
		G10E	250~350	200~300	150~250
	Chipbreaker Preference		EEF/ESU	EEG/EEX/EUP	EEG/EMU

* Refer to the PCD section for proper running conditions of PCD grades.

Recommended first choice, Recommended second choice, Recommended third choice

Work Material	Hardness	Grade	Machining Parameters		
			Finishing .002 ~ .010 IPR .005" ~ .060" D.O.C.	Gen. Purpose .008 ~ .016 IPR .040" ~ .150" D.O.C.	Roughing .010 ~ .020 IPR 120~250" D.O.C.
			CUTTING SPEED SFM		
COPPER ALLOYS, CAST 834, 836, 938, 842, 844, 848, 852, 8545, 8955, 857, 858, 864, 867, 879, 928, 932, 934, 935, 937, 938, 939, 943, 944, 945, 953, 954, 956, 973, 974, 976, 078		**DA1000***	2000~3300	2000~3300	–
		DA2200*	2000~3300	2000~3300	
		DA150*	2000~3300	2000~3300	–
		EH510/520	1000~1400	850~1250	750~1150
		AC510U	1200~1600	1050~1500	950~1400
		AC520U	1200~1600	1050~1500	950~1400
		G10E	1000~1200	850~1050	750~950
817, 821, 833, 853, 861, 862, 865, 888, 872, 874 ,875, 876, 878, 903, 905, 915, 9022, 923, 9059, 926, 927, 947, 948, 952, 955, 957, 958		**DA1000***	2000~3300	2000~3300	–
		DA2200*	2000~3300	2000~3300	
		DA150*	2000~3300	2000~3300	–
		EH510/520	700~1100	550~850	500~800
		AC510U	950~1350	700~1100	650~1050
		AC520U	950~1350	700~1100	650~1050
		G10E	700~900	550~650	500~600
801, 803, 805, 807, 809, 811, 813, 814, 815, 818, 820 ,822, 824, 825, 826, 827, 828, 863, 902, 907, 909, 910, 911, 913, 916, 917, 962, 963, 964, 966, 993		**DA1000***	2000~3300	2000~3300	–
		DA2200*	2000~3300	2000~3300	
		DA150*	2000~3300	2000~3300	–
		EH510/520	300~600	175~500	150~450
		AC510U	500~850	350~725	325~675
		AC520U	500~850	325~725	325~675
		G10E	300~400	175~300	150~250
GRAY CAST IRON		**BN500***	600~2400	–	–
		BN700*	2000~6000	–	–
		BNS800*	2000~6000	–	–
		SN2000K	1000~3500	800~3500	800~2500
		T2000Z	600~1400	500~1200	–
		AC405K	700~1700	700~1500	600~1400
		AC410K	600~1600	500~1300	400~1000
		AC415K	600~1600	500~1300	400~1000
		AC420K	600~1500	500~1200	400~1000
		AC700G	–	400~1200	400~900
		AC820P	–	600~1000	500~900
		G10E	200~350	150~300	100~250
	Chipbreaker Preference		EEF/ESU	EEG/EEX/EUP	EEG/EMU

* Refer to the PCD section for proper running conditions of PCD grades.

RECOMMENDED RUNNING CONDITIONS

Recommended first choice, Recommended second choice, Recommended third choice

Work Material	Hardness	Grade	Machining Parameters		
			Finishing .002 ~ .010 IPR .005" ~ .060" D.O.C.	Gen. Purpose .008 ~ .016 IPR .040" ~ .150" D.O.C.	Roughing .010 ~ .020 IPR 120~250" D.O.C.
	<220		CUTTING SPEED SFM		
GRAY CAST IRON cont.	>220	BN500*	600~2000	–	–
		BN700*	1900~3100	–	–
		BNS800*	1900~3100	–	–
		SN2000K	1000~3500	800~3500	600~2500
		T1500Z	500~1350	400~1100	–
		AC405K	600~1600	600~1500	600~1400
		AC410K	550~1600	500~1200	450~1000
		AC415K	550~1600	500~1200	450~1000
		AC420K	500~1500	450~1100	400~1000
		AC700G	–	300~1200	400~1000
		AC820P	–	600~1000	500~900
		G10E	200~300	150~300	100~250
DUCTILE IRON NODULAR IRON	<220	BN500*	300~1000	–	–
		T1500Z	350~1000	400~950	–
		SN2000K	600~1700	600~1500	500~1100
		AC405K	600~1700	600~1500	600~1400
		AC410K	500~1500	500~1200	400~1000
		AC415K	500~1500	500~1200	400~1000
		AC420K	500~1400	500~1100	400~1000
		AC700G	–	500~1100	400~1000
		AC820P	–	600~950	600~900
		AC510U	500~800	400~750	350~600
	>220	BN500*	300~900	–	–
		T1500Z	330~900	330~850	–
		SN2000K	500~1700	500~1500	400~1000
		AC405K	500~1700	500~1500	500~1100
		AC410K	400~1300	400~1100	300~1000
		AC415K	400~1300	400~1100	300~1000
		AC420K	400~1100	400~1000	300~900
		AC700G	–	400~900	300~800
		AC820P	–	500~900	450~850
		AC510U	500~800	300~700	300~600
	Chipbreaker Preference		ENZ/FLAT TOP	EGZ/FLAT TOP	EGZ/ FLAT TOP

* Refer to the PCD section for proper running conditions of PCD grades.

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