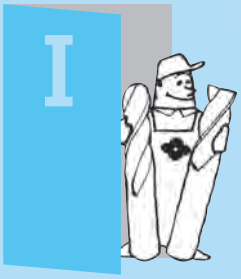
Endmills I

I1 to I137

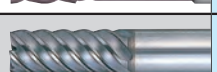
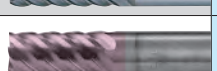
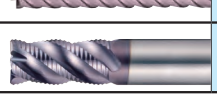


Stock Markings and Symbols

- ●● mark: Standard stocked item
- ● mark: To be replaced with the new item featured on the same page
- ▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)
- * mark: Semi-standard stock (please confirm stock availability)
- ○ mark: Stock or planned stock (please confirm stock availability)
- Blank: Made-to-order item
- — mark: Not available

Square Endmill Selection Guide

●: Best (1st Recommendation)
◎: Best, ○: Good, Blank: Not recommended, ×: Unsuitable

Applications / Features	Diameter DC (Min. to Max.) (mm)	Series Name / Series Code	Ref. Page	Appearance	Work Material: P — General Structure Rolled Steel	P — Carbon Steel	P — Alloy Steel	P — Pre-hardened Steel	P — Tempered Steel/Die Steel	H — Hardened Steel 45 to 55HRC	H — Hardened Steel 55 to 60HRC	H — Hardened Steel 60 up HRC	M — Stainless Steel	S — Titanium Alloy/Heat-Resistant Alloy	K — Cast Iron	N — Aluminum Alloy	N — Copper Alloy	N — Graphite	N — CFRP
General-purpose	ø0.5 to 25	**GSXMILL** 2 Flutes GSX 20000C	132,138, 142,146		●	●	●	●	●	●	○		●	○	●				
	ø0.5 to 25 (2D: ø0.3 to 25)	**GSXMILL** 2 Flutes GSX 20000S	134 to 136, 140, 144		○	◎	◎	◎	◎	◎	○		◎	○	○				
	ø1 to 12	**GSXMILL** 3 Flutes GSX 30000C	148,150		○	◎	◎	◎	◎	◎			◎	○	○				
	ø1 to 25	**GSXMILL** 4 Flutes GSX 40000C	152,156, 160,164		●	●	●	●	●	●	○		●	○	●				
	ø1 to 25	**GSXMILL** 4 Flutes GSX 40000S	154,158, 162		○	◎	◎	◎	◎	◎	○		◎	○	○				
High Efficiency	ø2 to 25	**GSXMILL Anti-vibration** 4 Flutes GSXVL 4000	168		●	●	●	●	●	●	○		●	○	○				
	ø2 to 25	**GSV Anti-vibration** 4 Flutes GSV 4000	166		◎	◎	◎	◎	◎	◎	○		◎	○	○				
	ø2 to 20	**UPMILL** SSUP 4000ZX	170		◎	◎	◎	◎	◎		○		◎	○	○				
	ø3 to 20	**UPMILL Long Neck** SSUPR 4000ZX	171		◎	◎	◎	◎	◎	◎	○		◎	○	○				
Hardened Steel	④ø1 to 2 ⑥ø3 to 12 ⑧ø16 to 20	**GS MILL Hard** GSH 4/6/8000SF	172 to 174		●	●	●	●	●	●	●								
	④ø3 to 5 ⑥ø6 to 12 ⑧ø16 to 32	**Hard** HHM 4/6/8000ZX	175 to 177		○	○	○	◎	◎	◎	◎								
	④ø3 to 5 ⑥ø6 to 12 ⑧ø16 to 32	**Long Hard** LHHM 4/6/8000ZX	178 to 180		○	○	○	◎	◎	◎	○								
	④ø3 to 5 ⑥ø6 to 12 ⑧ø16 to 32	**Extra-Long Hard** EHHM 4/6/8000ZX	181 to 183		○	○	○	◎	◎	◎	○								
Roughing	ø6 to 20	**GS MILL Roughing** GSRE 4000SF	184		◎	◎	◎	◎	◎	◎			◎	○	◎				

④⑥⑧: Number of Flutes

■ Examples of Icons on Product Stock Pages

Coating: GS Coat, GS HARD Coat, GSX Coat, ZX Coat, AURORA Coat DLC, SUMIDIA Coat

No. of Flutes: 1 Flute, 2 Flutes, 3 Flutes, 4 Flutes, 6 Flutes, 8 Flutes

Shape: Gash Land, Sharp Corner, Corner r, Ballnose R, 15° Helix Angle

Applications: Shoulder Milling, Groove Milling, Helical Milling, Ramping, Profiling

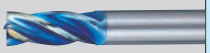
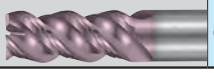
Our square endmill cutting edge shapes have **concave ends.**

Therefore, they do not make flat bottoms in spot facing.

If a flat bottom is required, we recommend using the **Flat MULTIDRILL MDF series**. J26

Square Endmill and Others Selection Guide

●: Best (1st Recommendation)
◎: Best, ○: Good, Blank: Not recommended, ×: Unsuitable

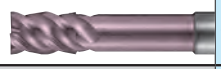
Applications / Features	Diameter DC (Min. to Max.) (mm)	Series Name / Series Code	Ref. Page	Appearance	Work Material: P: General Structure Rolled Steel	P: Carbon Steel	P: Alloy Steel	P: Pre-hardened Steel	P: 30 to 45HRC Tempered Steel/Die Steel	H: Hardened Steel 45 to 55HRC	H: 55 to 60HRC	H: 60 up HRC	M: Stainless Steel	S: Titanium Alloy/Heat-Resistant Alloy	K: Cast Iron	N: Aluminum Alloy	N: Copper Alloy	N: Graphite	N: CFRP
Aluminum and Non-Ferrous Metal	ø2 to 16	**AURORA Coat 2 Flutes** ASM 2000DL	I86													●	○		
	ø2 to 16	**AURORA Coat 4 Flutes** ASM 4000DL	I87													◎	◎		
	ø2 to 16	**Solid Carbide Endmills for Non-Ferrous Cutting** ASM 2000	I88													◎	○		
	①ø4 to 5 ②ø6 to 12	**SUMIDIA Endmills DAE series** DAE	I91, I92		×	×	×	×	×	×	×	×	×	×	×	◎	◎	○	
	②ø4 to 10 ④ø9 to 13	**SUMIDIA Endmills DFE series** DFE	I89, I90		×	×	×	×	×	×	×	×	×	×	×	◎	◎	○	
CFRP/ Graphite	ø6 to 12	**SUMIDIA Coated AVIX type** AVIX	I93		×	×	×	×	×	×	×	×	×	×	×			○	●
	ø6 to 12	**SUMIDIA Coated SSDC series** SSDC 4000	I94		×	×	×	×	×	×	×	×	×	×	×			○	◎
	ø6 to 12	**SUMIDIA Coated SSDCRL series** SSDC 4000RL	I94		×	×	×	×	×	×	×	×	×	×	×			○	●
Multi-purpose	ø1 to 12	**GSX MILL Slot 3 Flutes** GSXSLT 30000C	I132		○	●	●	●	●	●			●	○	○				
	ø2 to 16	**UPMILL Slot** SSUP 3000ZX	I134		◎	◎	◎	◎	◎	◎	○		◎	○	○				
Chamfering	ø2 to 16	**Endmills for Chamfering AVIC type** AVIC	I136		○	○	○	○	○		×	×	◎	◎	○	○	○	×	×

①②④: Number of Flutes

Target Work Material (What do you want to machine?)	Cutting Applications	Recommended Tool	Ref. Page
Steel, Cast Iron, Stainless Steel, Titanium Alloy	High-efficiency Machining Chatter Countermeasures	**GSXVL series GSV series**	I68 I66
	Medium Finishing to Finishing (Good Machining Accuracy)	**GSX series**	I32 to I65
	Medium Finishing (Medium Stock Removal)	**GSH series**	I72 to I74
	Roughing (Large Stock Removal)	**GSXVL series GSRE series**	I68 I84
	Chamfering	**AVIC type**	I136
Hardened Steel (45HRC up)	All Hardened Steels	**GSH series**	I72 to I74
Aluminum Alloy	All Aluminum Alloys	**ASM series**	I86 to I88
CFRP, Graphite	Roughing, Cut-off	**AVIX type SSDC series SSDCRL series**	I93 I94

Corner Radius Endmill Selection Guide

◉: Best (1st Recommendation)
◎: Best, ○: Good, Blank: Not recommended, ×: Unsuitable

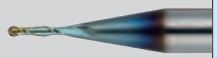
Applications / Features	Diameter DC (Min. to Max.) (mm)	Series Name / Series Code	Ref. Page	Appearance	Work Material: P — General Structure Rolled Steel	P — Carbon Steel	P — Alloy Steel	P — Pre-hardened Steel	P — Tempered Steel/Die Steel	H — Hardened Steel 45 to 55HRC	H — Hardened Steel 55 to 60HRC	H — Hardened Steel 60 up HRC	M — Stainless Steel	S — Titanium Alloy/Heat-Resistant Alloy	K — Cast Iron	N — Aluminum Alloy	N — Copper Alloy	N — Graphite	N — CFRP
General Endmilling with Corner Radius	ø3 to 12	**GSX MILL Radius** GSX 40000-R	I96		◎	◎	◎	◎	◎	◎			◎	○	○				
High-efficiency Endmilling with Corner Radius	ø3 to 25	**GSX MILL Anti-vibration Radius**	I100		○	◉	◉	◉	◉	◉	○		◉	○	○				
	ø3 to 25	**GSV Anti-vibration Radius** GSV 4000-R	I98		○	◎	◎	◎	◎	◎	○		◎	○	○				
	ø3 to 20	**UPMILL Radius** SSUP 4000ZX-R	I106		◎	◎	◎	◎	◎	◎	○		◎	○	◎				
	ø3 to 20	**UPMILL Long Neck Radius** SSUPR 4000ZX-R	I108		◎	◎	◎	◎	◎				○		◎				
Hardened Steel Endmilling with Corner Radius	⑥ø6 to 12 ⑧ø16 to 20	**GS MILL Hard Radius** GSH 6/8000SF-R	I110, I111			◉	◉	◉	◉	◉	◉	◉							
Exotic Alloy	ø4.5 to 25	**SSEH Anti-vibration Radius** SSEHVL 4000W-R	I102										◉	◉					
	ø4.5 to 25	**SSEH Radius** SSEH 4000W-R	I104										◎	◎					
	ø4.5 to 16	**SSEH Anti-vibration Radius** SSEHVL 4000-R	I112										○	◎					
	ø4.5 to 16	**SSEH Radius** SSEH 4000-R	I113										○	◎					
High-precision Mold Profiling	ø0.2 to 2	**Mold Finish Master SUMIBORON Radius Endmills** BNBR	I116					○		○	◎	◎				×	×		
Cemented Carbide and Hard Brittle Materials	ø0.2 to 2	**Mold Finish Master SUMIDIA BINDERLESS Radius Endmills** NPDRS	I114		Cemented Carbide					◎			Hard Brittle Materials						○

⑥⑧: Number of Flutes

Target Work Material (What do you want to machine?)	Cutting Applications	Recommended Tool	Ref. Page
Steel, Cast Iron, Stainless Steel, Titanium Alloy	High-efficiency Machining Chatter Countermeasures	**GSXVL series GSV series**	I100 I98
	Medium Finishing to Finishing (Good Machining Accuracy)	**GSX series SSUP series**	I96 I106
	Roughing (Large Stock Removal)	**GSXVL series**	I100
	Stainless Steel, Titanium Alloy	**SSEH series SSEHVL series**	I102,I104 I112,I113
Hardened Steel (45HRC up)	All Hardened Steels Endmilling with Corner Radius	**GSH series**	I110,I111
	High-precision Mold Profiling	**BNBR series**	I116
CFRP, Graphite	Roughing, Cut-off	**AVIX type SSDC series SSDCRL series**	I93 I94
Cemented Carbide, Hard Brittle Materials	Finishing	**NPDRS type**	I114

Ballnose Endmill Selection Guide

●: Best (1st Recommendation)
◎: Best, ○: Good, Blank: Not recommended, ×: Unsuitable

Applications / Features	Ballnose Radius (Min. to Max.) / Tolerance (mm)	Series Name / Series Code	Ref. Page	Appearance	Work Material: P: General Structure Rolled Steel	P: Carbon Steel	P: Alloy Steel	P: Pre-hardened Steel	P: Tempered Steel/Die Steel	H: Hardened Steel 30 to 45HRC	H: Hardened Steel 45 to 55HRC	H: Hardened Steel 55 to 60HRC	H: Hardened Steel 60 up HRC	M: Stainless Steel	S: Titanium Alloy/Heat-Resistant Alloy	K: Cast Iron	N: Aluminum Alloy	N: Copper Alloy	N: Graphite	N: CFRP
General-purpose	R0.2 to 10 ± 0.01	**GSXMILL Ballnose** GSXB 20000	I118		●	●	●	●	●	●	○		●	○	○					
Hardened Steel	R0.2 to 6 +0.003 up to -0.007	**GS MILL HARD Ballnose** GSBH 20000SF	I120			◎	◎	◎	○	◎	●	●								
Aluminum and Non-Ferrous Metal	R1 to 8 ± 0.01	**AURORA Coat Ballnose** SNB 2000DL	I121														◎	◎		
Copper Electrodes	R0.05 to 2 ± 0.005	**AURORA Coat Long Neck Ballnose Endmills** SNB2	I122														◎	●		
	R0.1 to 0.5 ± 0.005	**Mold Finish Master SUMIBORON Ballnose Endmills** BNBC	I130															●		
High-precision Mold Profiling	R0.2 to 1 ± 0.005	**Mold Finish Master SUMIBORON Ballnose Endmills** BNBP	I128					○		○	◎	◎					×	×		
Cemented Carbide and Hard Brittle Materials	R0.1 to 1	**Mold Finish Master SUMIDIA BINDERLESS Ballnose Endmills** NPDBS (For Standard Finishing)	I124		Cemented Carbide					◎				Hard Brittle Materials		○				
	R0.1 to 1	**Mold Finish Master SUMIDIA BINDERLESS Ballnose Endmills** NPDB (For Precision Finishing)	I125		Cemented Carbide					◎				Hard Brittle Materials		○				
	R0.5 to 1	**SUMIDIA Coat Ballnose Endmills** SDCB	I126		Cemented Carbide					◎				Hard Brittle Materials		○				

Target Work Material (What do you want to machine?)	Cutting Applications	Recommended Tool	Ref. Page
Steel, Cast Iron, Stainless Steel, Titanium Alloy	General Machining	**GSXB series**	I118
Hardened Steel (45HRC up)	All Hardened Steels	**GSBH series**	I120
	High-precision Mold Profiling	**BNBP series**	I128
Aluminum Alloy Copper Alloy	All Aluminum Alloys, Copper	**SNB series**	I121
Copper Electrodes	All Copper Alloys	**SNB2 type BNBC series**	I122 I130
Cemented Carbide, Hard Brittle Materials	Roughing to Medium Finishing	**SDCB type**	I126
	Finishing	**NPDBS (Standard Finishing) NPDB (Precision Finishing)**	I124 I125

Cutting Edge Length List by Diameter

Diameter ø0.3 to ø2.0mm

Square | Others

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF	Page
0.3	0.6	GSX 20030S-2D	40.0	I34
0.4	0.8	GSX 20040S-2D	40.0	I34
0.5	1.0	GSX 20050C-1.5D	40.0	I32
		GSX 20050C-2D	40.0	I38
	1.3	GSX 20050S-2D	40.0	I34
	1.5	GSX 20050C-3D	40.0	I42
		GSX 20050S-3D	40.0	I40
	2.0	GSX 20050C-4D	40.0	I46
		GSX 20050S-4D	40.0	I44
0.6	1.3	GSX 20060S-2D	40.0	I34
0.7	1.4	GSX 20070S-2D	40.0	I34
0.8	1.6	GSX 20080S-2D	40.0	I34
0.9	1.8	GSX 20090S-2D	40.0	I34
1.0	1.5	GSX 20100C-1.5D	40.0	I32
		GSX 30100C-1.5D	40.0	I48
		GSX 40100C-1.5D	40.0	I52
		GSXSLT 30100C-1.5D	40.0	I132
	2.0	GSX 20100C-2D	40.0	I38
		GSX 40100C-2D	40.0	I56
	2.5	GSX 20100S-2D	40.0	I34
		GSX 30100C-2D	40.0	I50
		GSX 40100S-2D	40.0	I54
		GSX 40100S-2D-S3	38.0	I54
	3.0	GSH 4010SF	50.0	I72
		GSX 20100C-3D	40.0	I42
		GSX 20100S-3D	40.0	I40
		GSX 40100C-3D	40.0	I60
		GSX 40100S-3D	40.0	I58
	4.0	GSX 20100C-4D	40.0	I46
		GSX 40100C-4D	40.0	I64
		GSX 40100S-4D	40.0	I62
	5.0	GSX 20100S-4D	40.0	I44
1.1	2.5	GSX 20110S-2D	40.0	I34
1.2	2.5	GSX 20120S-2D	40.0	I34
1.3	2.6	GSX 20130S-2D	40.0	I34
1.4	2.8	GSX 20140S-2D	40.0	I34
1.5	2.3	GSX 20150C-1.5D	40.0	I32
		GSX 30150C-1.5D	40.0	I48
		GSX 40150C-1.5D	40.0	I52
		GSXSLT 30150C-1.5D	40.0	I132
	3.0	GSX 20150C-2D	40.0	I38
		GSX 40150C-2D	40.0	I56
	3.8	GSX 20150S-2D	40.0	I34
		GSX 20150S-2D-S3	38.0	I34
		GSX 30150C-2D	40.0	I50
		GSX 40150S-2D	40.0	I54
	4.0	GSH 4015SF	50.0	I72
	4.5	GSX 20150C-3D	40.0	I42
		GSX 20150S-3D	40.0	I40
		GSX 40150C-3D	40.0	I60
		GSX 40150S-3D	40.0	I58
	6.0	GSX 20150C-4D	40.0	I46
		GSX 40150C-4D	40.0	I64
		GSX 40150S-4D	40.0	I62
	7.0	GSX 20150S-4D	40.0	I44
1.6	3.8	GSX 20160S-2D	40.0	I34
1.7	3.8	GSX 20170S-2D	40.0	I34
1.8	3.8	GSX 20180S-2D	40.0	I34
1.9	3.8	GSX 20190S-2D	40.0	I34
2.0	0.4	AVIC 302000-45-0.4(E)	40.0	I136
	3.0	GSX 20200C-1.5D	40.0	I32
		GSX 30200C-1.5D	40.0	I48
		GSX 40200C-1.5D	40.0	I52
		GSXSLT 30200C-1.5D	40.0	I132
	4.0	GSX 20200C-2D	40.0	I38
		GSX 40200C-2D	40.0	I56
	5.0	GSV 4020-2.5D	50.0	I66
		GSX 20200S-2D	40.0	I34
		GSX 20200S-2D-S3	38.0	I34
		GSX 30200C-2D	40.0	I50
		GSX 40200S-2D	40.0	I54
		GSX 40200S-2D-S3	38.0	I54

Diameter ø2.0 to ø3.0mm

Square | Others

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF	Page
2.0	5.0	GSXVL 4020-2.5D	50.0	I68
	6.0	ASM 2020	40.0	I88
		ASM 2020DL	40.0	I86
		ASM 4020DL	40.0	I87
		GSH 4020SF	50.0	I72
		GSX 20200C-3D	40.0	I42
		GSX 20200S-3D	40.0	I40
		GSX 40200C-3D	40.0	I60
		GSX 40200S-3D	40.0	I58
		SSUP 3020ZX	50.0	I134
		SSUP 4020ZX	50.0	I70
	8.0	GSX 20200C-4D	40.0	I46
		GSX 40200C-4D	40.0	I64
		GSX 40200S-4D	40.0	I62
	9.0	GSX 20200S-4D	40.0	I44
2.1	6.0	GSX 20210S-2D	40.0	I34
2.2	6.0	GSX 20220S-2D	40.0	I34
2.3	6.0	GSX 20230S-2D	40.0	I34
2.383	0.4	AVIC 302383-45-0.4(E)	38.1	I136
2.4	6.0	GSX 20240S-2D	40.0	I34
2.5	3.8	GSX 20250C-1.5D	40.0	I32
		GSX 30250C-1.5D	40.0	I48
		GSX 40250C-1.5D	40.0	I52
		GSXSLT 30250C-1.5D	40.0	I132
	5.0	GSX 20250C-2D	40.0	I38
		GSX 40250C-2D	40.0	I56
	6.3	GSX 20250S-2D	40.0	I34
		GSX 30250C-2D	40.0	I50
		GSX 40250S-2D	40.0	I54
	7.5	GSX 20250C-3D	40.0	I42
		GSX 20250S-3D	40.0	I40
		GSX 40250C-3D	40.0	I60
	8.0	GSX 40250S-3D	40.0	I58
		SSUP 3025ZX	50.0	I134
	10.0	GSX 20250C-4D	50.0	I46
		GSX 40250C-4D	50.0	I64
		GSX 40250S-4D	50.0	I62
	12.0	GSX 20250S-4D	50.0	I44
2.6	7.0	GSX 20260S-2D	40.0	I34
	8.0	GSX 20260S-3D	50.0	I40
2.7	7.0	GSX 20270S-2D	40.0	I34
	8.5	GSX 20270S-3D	50.0	I40
2.8	7.0	GSX 20280S-2D	40.0	I34
	9.0	GSX 20280S-3D	50.0	I40
2.9	7.0	GSX 20290S-2D	40.0	I34
	9.0	GSX 20290S-3D	50.0	I40
3.0	0.6	AVIC 303000-45-0.6(E)	40.0	I136
	4.5	GSX 20300C-1.5D	45.0	I32
		GSX 30300C-1.5D	45.0	I48
		GSX 40300C-1.5D	45.0	I52
		GSXSLT 30300C-1.5D	45.0	I132
		SSUPR 4030ZX	60.0	I71
	6.0	GSX 20300C-2D	45.0	I38
		GSX 40300C-2D	45.0	I56
	7.5	GSX 20300S-2D	45.0	I34
		GSX 20300S-2D-S3	38.0	I34
		GSX 30300C-2D	45.0	I50
		GSX 40300S-2D	45.0	I54
		GSX 40300S-2D-S3	38.0	I54
	8.0	GSH 6030SF	50.0	I73
		GSV 4030-2.5D	50.0	I66
		GSXVL 4030-2.5D	50.0	I68
		HHM 4030ZX	50.0	I75
		SSUP 3030ZX	50.0	I134
		SSUP 4030ZX	50.0	I70
	9.0	GSX 20300C-3D	50.0	I42
		GSX 20300S-3D	50.0	I40
		GSX 40300C-3D	50.0	I60
		GSX 40300S-3D	50.0	I58
	10.0	ASM 2030	45.0	I88
		ASM 2030DL	45.0	I86
		ASM 4030DL	45.0	I87

Cutting Edge Length List by Diameter

Diameter ø3.0 to ø4.5mm

Square | Others

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF	Page
3.0	12.0	GSX 20300C-4D	50.0	I46
		GSX 20300S-4D	50.0	I44
		GSX 40300C-4D	50.0	I64
		GSX 40300S-4D	50.0	I62
	20.0	LHHM 4030ZX	55.0	I78
		EHHM 4030ZX	60.0	I81
3.1	7.5	GSX 20310S-2D	45.0	I34
3.175	0.6	AVIC 303175-45-0.6(E)	38.1	I136
	10.0	AVIX 403175-R03	60.0	I93
3.2	7.5	GSX 20320S-2D	45.0	I34
3.3	7.5	GSX 20330S-2D	45.0	I34
3.4	7.5	GSX 20340S-2D	45.0	I34
3.5	5.3	GSX 20350C-1.5D	45.0	I32
		GSX 40350C-1.5D	45.0	I52
	7.0	GSX 20350C-2D	45.0	I38
		GSX 40350C-2D	45.0	I56
	8.8	GSX 20350S-2D	45.0	I34
		GSX 40350S-2D	45.0	I54
	10.0	SSUP 3035ZX	50.0	I134
	11.0	GSX 20350C-3D	50.0	I42
		GSX 40350C-3D	50.0	I60
		GSX 40350S-3D	50.0	I58
	12.0	GSX 20350S-3D	50.0	I40
	14.0	GSX 20350C-4D	50.0	I46
		GSX 20350S-4D	50.0	I44
		GSX 40350C-4D	50.0	I64
		GSX 40350S-4D	50.0	I62
3.6	8.8	GSX 20360S-2D	45.0	I34
3.7	8.8	GSX 20370S-2D	45.0	I34
3.8	8.8	GSX 20380S-2D	45.0	I34
3.9	8.8	GSX 20390S-2D	45.0	I34
3.969	0.8	AVIC 303969-45-0.8(E)	50.8	I136
4.0	0.8	AVIC 304000-45-0.8(E)	50.0	I136
	6.0	GSX 20400C-1.5D	45.0	I32
		GSX 30400C-1.5D	45.0	I48
		GSX 40400C-1.5D	45.0	I52
		GSXSLT 30400C-1.5D	45.0	I132
		SSUPR 4040ZX	60.0	I71
	8.0	GSX 20400C-2D	45.0	I38
		GSX 40400C-2D	45.0	I56
	10.0	GSV 4040-2.5D	50.0	I66
		GSXVL 4040-2.5D	50.0	I68
		HHM 4040ZX	50.0	I75
	11.0	GSH 6040SF	50.0	I73
		GSX 20400S-2D	45.0	I34
		GSX 20400S-2D-S4	45.0	I34
		GSX 30400C-2D	45.0	I50
		GSX 40400S-2D	45.0	I54
		GSX 40400S-2D-S4	45.0	I54
		SSUP 3040ZX	50.0	I134
		SSUP 4040ZX	50.0	I70
	12.0	ASM 2040	45.0	I88
		ASM 2040DL	45.0	I86
		ASM 4040DL	45.0	I87
		GSX 20400C-3D	50.0	I42
		GSX 20400S-3D	50.0	I40
		GSX 40400C-3D	50.0	I60
		GSX 40400S-3D	50.0	I58
		AVIX 404000-R03	60.0	I93
	15.0	LHHM 4040ZX	60.0	I78
	16.0	GSX 20400C-4D	50.0	I46
		GSX 20400S-4D	50.0	I44
		GSX 40400C-4D	50.0	I64
		GSX 40400S-4D	50.0	I62
	25.0	EHHM 4040ZX	65.0	I81
4.1	11.0	GSX 20410S-2D	45.0	I34
4.2	11.0	GSX 20420S-2D	45.0	I34
4.3	11.0	GSX 20430S-2D	45.0	I34
4.4	11.0	GSX 20440S-2D	45.0	I35
4.5	6.8	GSX 20450C-1.5D	50.0	I32
		GSX 40450C-1.5D	50.0	I52
	9.0	GSX 20450C-2D	50.0	I38

Diameter ø4.5 to ø6.0mm

Square | Others

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF	Page
4.5	9.0	GSX 40450C-2D	50.0	I56
	11.0	SSUP 3045ZX	50.0	I134
	11.3	GSX 20450S-2D	50.0	I35
		GSX 40450S-2D	50.0	I54
	14.0	GSX 20450C-3D	50.0	I42
		GSX 40450C-3D	50.0	I60
	15.0	GSX 20450S-3D	50.0	I40
		GSX 40450S-3D	50.0	I58
	18.0	GSX 20450C-4D	60.0	I46
		GSX 20450S-4D	60.0	I44
		GSX 40450C-4D	60.0	I64
		GSX 40450S-4D	60.0	I62
4.6	11.3	GSX 20460S-2D	50.0	I35
4.7	11.3	GSX 20470S-2D	50.0	I35
4.763	1.0	AVIC 304763-45-1.0(E)	50.8	I136
4.8	11.3	GSX 20480S-2D	50.0	I35
4.9	11.3	GSX 20490S-2D	50.0	I35
5.0	1.0	AVIC 305000-45-1.0(E)	50.0	I136
	7.5	GSX 20500C-1.5D	50.0	I32
		GSX 30500C-1.5D	50.0	I48
		GSX 40500C-1.5D	50.0	I52
		GSXSLT 30500C-1.5D	50.0	I132
		SSUPR 4050ZX	60.0	I71
	10.0	GSX 20500C-2D	50.0	I38
		GSX 40500C-2D	50.0	I56
	12.0	HHM 4050ZX	50.0	I75
	13.0	GSH 6050SF	50.0	I73
		GSV 4050-2.5D	60.0	I66
		GSX 20500S-2D	50.0	I35
		GSX 30500C-2D	50.0	I50
		GSX 40500S-2D	50.0	I54
		GSXVL 4050-2.5D	60.0	I68
		SSUP 3050ZX	60.0	I134
		SSUP 4050ZX	60.0	I70
	15.0	ASM 2050	50.0	I88
		ASM 2050DL	50.0	I86
		ASM 4050DL	50.0	I87
		GSX 20500C-3D	50.0	I42
		GSX 20500S-3D	50.0	I40
		GSX 40500C-3D	50.0	I60
		GSX 40500S-3D	50.0	I58
	18.0	LHHM 4050ZX	60.0	I78
	20.0	GSX 20500C-4D	60.0	I46
		GSX 20500S-4D	60.0	I44
		GSX 40500C-4D	60.0	I64
		GSX 40500S-4D	60.0	I62
	30.0	EHHM 4050ZX	70.0	I81
5.1	13.0	GSX 20510S-2D	50.0	I35
5.2	13.0	GSX 20520S-2D	50.0	I35
5.3	13.0	GSX 20530S-2D	50.0	I35
5.4	13.0	GSX 20540S-2D	50.0	I35
5.5	8.3	GSX 20550C-1.5D	50.0	I32
		GSX 40550C-1.5D	50.0	I52
	11.0	GSX 20550C-2D	50.0	I38
		GSX 40550C-2D	50.0	I56
	13.0	GSX 20550S-2D	50.0	I35
		GSX 40550S-2D	50.0	I54
		SSUP 3055ZX	60.0	I134
	17.0	GSX 20550C-3D	50.0	I42
		GSX 40550C-3D	50.0	I60
	18.0	GSX 20550S-3D	50.0	I40
		GSX 40550S-3D	50.0	I58
	22.0	GSX 20550C-4D	60.0	I46
		GSX 20550S-4D	60.0	I44
		GSX 40550C-4D	60.0	I64
		GSX 40550S-4D	60.0	I62
5.6	13.0	GSX 20560S-2D	50.0	I35
5.7	13.0	GSX 20570S-2D	50.0	I35
5.8	13.0	GSX 20580S-2D	50.0	I35
5.9	13.0	GSX 20590S-2D	50.0	I35
6.0	1.4	AVIC 306000-45-1.4(E)	50.0	I136
	9.0	GSX 20600C-1.5D	50.0	I32

Cutting Edge Length List by Diameter

Diameter ø6.0 to ø7.0mm

Square | Others

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF	Page
6.0	9.0	GSX 30600C-1.5D	50.0	I48
		GSX 40600C-1.5D	50.0	I52
		GSXSLT 30600C-1.5D	50.0	I132
		SSUPR 4060ZX	60.0	I71
	12.0	GSX 20600C-2D	50.0	I38
		GSX 40600C-2D	50.0	I56
		HHM 6060ZX	50.0	I76
	13.0	GSH 6060SF	50.0	I73
		GSRE 4060SF	50.0	I84
		GSX 20600S-2D	50.0	I35
		GSX 30600C-2D	50.0	I50
		GSX 40600S-2D	50.0	I54
		SSUP 3060ZX	60.0	I134
		SSUP 4060ZX	60.0	I70
	15.0	ASM 2060	50.0	I88
		ASM 2060DL	50.0	I86
		ASM 4060DL	50.0	I87
		GSV 4060-2.5D	60.0	I66
		GSXVL 4060-2.5D	60.0	I68
	18.0	GSX 20600C-3D	50.0	I42
		GSX 20600S-3D	50.0	I40
		GSX 40600C-3D	50.0	I60
		GSX 40600S-3D	50.0	I58
		LHHM 6060ZX	60.0	I79
		AVIX 506000-R03	70.0	I93
	24.0	GSX 20600C-4D	60.0	I46
		GSX 20600S-4D	60.0	I44
		GSX 40600C-4D	60.0	I64
		GSX 40600S-4D	60.0	I62
	30.0	EHHM 6060ZX	70.0	I82
6.1	13.0	GSX 20610S-2D	50.0	I35
6.2	13.0	GSX 20620S-2D	50.0	I35
6.3	13.0	GSX 20630S-2D	50.0	I35
6.35	1.4	AVIC 306350-45-1.4(E)	50.8	I136
	19.0	AVIX 506350-R03	70.0	I93
6.4	13.0	GSX 20640S-2D	50.0	I35
6.5	10.0	GSX 20650C-1.5D	60.0	I32
		GSX 40650C-1.5D	60.0	I52
	13.0	GSX 20650C-2D	60.0	I38
		GSX 20650S-2D	60.0	I35
		GSX 40650C-2D	60.0	I56
		GSX 40650S-2D	60.0	I54
	16.0	SSUP 3065ZX	70.0	I134
	20.0	GSX 20650C-3D	70.0	I42
		GSX 20650S-3D	70.0	I40
		GSX 40650C-3D	70.0	I60
		GSX 40650S-3D	70.0	I58
	26.0	GSX 20650C-4D	70.0	I46
		GSX 20650S-4D	70.0	I44
		GSX 40650C-4D	70.0	I64
		GSX 40650S-4D	70.0	I62
6.6	13.2	GSX 20660S-2D	60.0	I35
6.7	13.4	GSX 20670S-2D	60.0	I35
6.8	13.6	GSX 20680S-2D	60.0	I35
6.9	13.8	GSX 20690S-2D	60.0	I35
7.0	10.5	SSUPR 4070ZX	80.0	I71
	11.0	GSX 20700C-1.5D	60.0	I32
		GSX 30700C-1.5D	60.0	I48
		GSX 40700C-1.5D	60.0	I52
		GSXSLT 30700C-1.5D	60.0	I132
	14.0	GSX 20700C-2D	60.0	I38
		GSX 40700C-2D	60.0	I56
	16.0	GSRE 4070SF	60.0	I84
		GSX 20700S-2D	60.0	I35
		GSX 30700C-2D	60.0	I50
		GSX 40700S-2D	60.0	I54
		SSUP 3070ZX	70.0	I134
		SSUP 4070ZX	70.0	I70
	18.0	GSV 4070-2.5D	70.0	I66
		GSXVL 4070-2.5D	70.0	I68
	21.0	GSX 20700C-3D	70.0	I42
		GSX 20700S-3D	70.0	I40

Diameter ø7.0 to ø8.5mm

Square | Others

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF	Page
7.0	21.0	GSX 40700C-3D	70.0	I60
		GSX 40700S-3D	70.0	I58
	28.0	GSX 20700C-4D	80.0	I46
		GSX 20700S-4D	80.0	I44
		GSX 40700C-4D	80.0	I64
		GSX 40700S-4D	80.0	I62
7.1	16.0	GSX 20710S-2D	60.0	I35
7.2	16.0	GSX 20720S-2D	60.0	I35
7.3	16.0	GSX 20730S-2D	60.0	I35
7.4	16.0	GSX 20740S-2D	60.0	I35
7.5	12.0	GSX 20750C-1.5D	60.0	I32
		GSX 40750C-1.5D	60.0	I52
	15.0	GSX 20750C-2D	60.0	I38
		GSX 40750C-2D	60.0	I56
	16.0	GSX 20750S-2D	60.0	I35
		GSX 40750S-2D	60.0	I54
		SSUP 3075ZX	70.0	I134
	23.0	GSX 20750C-3D	70.0	I42
		GSX 20750S-3D	70.0	I40
		GSX 40750C-3D	70.0	I60
		GSX 40750S-3D	70.0	I58
	30.0	GSX 20750C-4D	80.0	I46
		GSX 20750S-4D	80.0	I44
		GSX 40750C-4D	80.0	I64
		GSX 40750S-4D	80.0	I62
7.6	16.0	GSX 20760S-2D	60.0	I35
7.7	16.0	GSX 20770S-2D	60.0	I35
7.8	16.0	GSX 20780S-2D	60.0	I35
7.9	16.0	GSX 20790S-2D	60.0	I35
7.938	1.5	AVIC 307938-45-1.5(E)	63.5	I136
8.0	1.5	AVIC 308000-45-1.5(E)	60.0	I136
	12.0	GSX 20800C-1.5D	60.0	I32
		GSX 30800C-1.5D	60.0	I48
		GSX 40800C-1.5D	60.0	I52
		GSXSLT 30800C-1.5D	60.0	I132
		SSUPR 4080ZX	80.0	I71
	16.0	GSX 20800C-2D	60.0	I38
		GSX 40800C-2D	60.0	I56
		HHM 6080ZX	60.0	I76
	18.0	ASM 2080	60.0	I88
		ASM 2080DL	60.0	I86
		ASM 4080DL	60.0	I87
	19.0	GSH 6080SF	60.0	I73
		GSRE 4080SF	60.0	I84
		GSX 20800S-2D	60.0	I35
		GSX 30800C-2D	60.0	I50
		GSX 40800S-2D	60.0	I54
		SSUP 3080ZX	80.0	I134
		SSUP 4080ZX	80.0	I70
	20.0	GSV 4080-2.5D	80.0	I66
		GSXVL 4080-2.5D	80.0	I68
	24.0	GSX 20800C-3D	70.0	I42
		GSX 20800S-3D	70.0	I40
		GSX 40800C-3D	70.0	I60
		GSX 40800S-3D	70.0	I58
		AVIX 508000-R03	80.0	I93
	25.0	LHHM 6080ZX	75.0	I79
	32.0	GSX 20800C-4D	80.0	I46
		GSX 20800S-4D	80.0	I44
		GSX 40800C-4D	80.0	I64
		GSX 40800S-4D	80.0	I62
	40.0	EHHM 6080ZX	90.0	I82
8.1	19.0	GSX 20810S-2D	60.0	I35
8.2	19.0	GSX 20820S-2D	60.0	I35
8.3	19.0	GSX 20830S-2D	60.0	I35
8.4	19.0	GSX 20840S-2D	60.0	I35
8.5	13.0	GSX 20850C-1.5D	70.0	I32
		GSX 40850C-1.5D	70.0	I52
	17.0	GSX 20850C-2D	70.0	I38
		GSX 40850C-2D	70.0	I56
	19.0	GSX 20850S-2D	70.0	I35
		GSX 40850S-2D	70.0	I54

Cutting Edge Length List by Diameter

Diameter ø8.5 to ø10.0mm

Square | Others

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF	Page
8.5	19.0	SSUP 3085ZX	90.0	I134
	26.0	GSX 20850C-3D	75.0	I42
		GSX 20850S-3D	75.0	I40
		GSX 40850C-3D	75.0	I60
		GSX 40850S-3D	75.0	I58
	34.0	GSX 20850C-4D	90.0	I46
		GSX 20850S-4D	90.0	I44
		GSX 40850C-4D	90.0	I64
		GSX 40850S-4D	90.0	I62
8.6	19.0	GSX 20860S-2D	70.0	I35
8.7	19.0	GSX 20870S-2D	70.0	I35
8.8	19.0	GSX 20880S-2D	70.0	I35
8.9	19.0	GSX 20890S-2D	70.0	I36
9.0	13.5	SSUPR 4090ZX	90.0	I71
	14.0	GSX 20900C-1.5D	70.0	I32
		GSX 30900C-1.5D	70.0	I48
		GSX 40900C-1.5D	70.0	I52
		GSXSLT 30900C-1.5D	70.0	I132
	18.0	GSX 20900C-2D	70.0	I38
		GSX 40900C-2D	70.0	I56
	19.0	GSRE 4090SF	70.0	I84
		GSX 20900S-2D	70.0	I36
		GSX 30900C-2D	70.0	I50
		GSX 40900S-2D	70.0	I54
		SSUP 3090ZX	90.0	I134
		SSUP 4090ZX	90.0	I70
	23.0	GSV 4090-2.5D	90.0	I66
		GSXVL 4090-2.5D	90.0	I68
	27.0	GSX 20900C-3D	75.0	I42
		GSX 20900S-3D	75.0	I40
		GSX 40900C-3D	75.0	I60
		GSX 40900S-3D	75.0	I58
	36.0	GSX 20900C-4D	90.0	I46
		GSX 20900S-4D	90.0	I44
		GSX 40900C-4D	90.0	I64
		GSX 40900S-4D	90.0	I62
9.1	19.0	GSX 20910S-2D	70.0	I36
9.2	19.0	GSX 20920S-2D	70.0	I36
9.3	19.0	GSX 20930S-2D	70.0	I36
9.4	19.0	GSX 20940S-2D	70.0	I36
9.5	15.0	GSX 20950C-1.5D	70.0	I32
		GSX 40950C-1.5D	70.0	I52
	19.0	GSX 20950C-2D	70.0	I38
		GSX 40950C-2D	70.0	I56
		GSX 40950S-2D	70.0	I54
		SSUP 3095ZX	90.0	I134
	20.0	GSX 20950S-2D	70.0	I36
	29.0	GSX 20950C-3D	75.0	I42
		GSX 20950S-3D	75.0	I40
		GSX 40950C-3D	75.0	I60
9.525	1.7	AVIC 309525-45-1.7(E)	76.2	I136
	28.0	AVIX 509525-R03	80.0	I89
9.5	29.0	GSX 40950S-3D	75.0	I58
	38.0	GSX 20950C-4D	90.0	I46
		GSX 20950S-4D	90.0	I44
	39.0	GSX 40950C-4D	90.0	I64
		GSX 40950S-4D	90.0	I62
9.6	20.0	GSX 20960S-2D	70.0	I36
9.7	20.0	GSX 20970S-2D	70.0	I36
9.8	20.0	GSX 20980S-2D	70.0	I36
9.9	20.0	GSX 20990S-2D	70.0	I36
10.0	1.7	AVIC 310000-45-1.7(E)	70.0	I136
	15.0	GSX 21000C-1.5D	70.0	I32
		GSX 31000C-1.5D	70.0	I48
		GSX 41000C-1.5D	70.0	I52
		GSXSLT 31000C-1.5D	70.0	I132
		SSUPR 4100ZX	100.0	I71
	20.0	GSX 21000C-2D	70.0	I38
		GSX 41000C-2D	70.0	I56
		HHM 6100ZX	71.0	I76
	22.0	ASM 2100	71.0	I88
		ASM 2100DL	71.0	I86

Diameter ø10.0 to ø12.0mm

Square | Others

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF	Page
10.0	22.0	ASM 4100DL	71.0	I87
		GSH 6100SF	70.0	I73
		GSRE 4100SF	70.0	I84
		GSX 21000S-2D	70.0	I36
		GSX 31000C-2D	70.0	I50
		GSX 41000S-2D	70.0	I54
		SSUP 3100ZX	90.0	I134
		SSUP 4100ZX	90.0	I70
	25.0	GSV 4100-2.5D	90.0	I66
		GSXVL 4100-2.5D	90.0	I68
	30.0	GSX 21000C-3D	90.0	I42
		GSX 21000S-3D	90.0	I40
		GSX 41000C-3D	90.0	I60
		GSX 41000S-3D	90.0	I58
		LHHM 6100ZX	80.0	I79
		AVIX 510000-R03	80.0	I93
	40.0	GSX 21000C-4D	90.0	I46
		GSX 21000S-4D	90.0	I44
		GSX 41000C-4D	90.0	I64
		GSX 41000S-4D	90.0	I62
	50.0	EHHM 6100ZX	100.0	I82
10.5	16.0	GSX 21050C-1.5D	75.0	I32
		GSX 41050C-1.5D	75.0	I52
	21.0	GSX 21050C-2D	75.0	I38
		GSX 41050C-2D	75.0	I56
	22.0	GSX 21050S-2D	75.0	I36
		GSX 41050S-2D	75.0	I54
	32.0	GSX 21050C-3D	90.0	I42
		GSX 21050S-3D	90.0	I40
		GSX 41050C-3D	90.0	I60
		GSX 41050S-3D	90.0	I58
	42.0	GSX 21050C-4D	100.0	I46
		GSX 21050S-4D	100.0	I44
		GSX 41050C-4D	100.0	I64
		GSX 41050S-4D	100.0	I62
11.0	16.5	SSUPR 4110ZX	120.0	I71
	17.0	GSX 21100C-1.5D	75.0	I32
		GSX 41100C-1.5D	75.0	I52
	22.0	GSRE 4110SF	75.0	I84
		GSX 21100C-2D	75.0	I38
		GSX 21100S-2D	75.0	I36
		GSX 41100C-2D	75.0	I56
		GSX 41100S-2D	75.0	I54
		SSUP 3110ZX	90.0	I134
		SSUP 4110ZX	90.0	I70
	28.0	GSV 4110-2.5D	90.0	I66
		GSXVL 4110-2.5D	90.0	I68
	33.0	GSX 21100C-3D	90.0	I42
		GSX 21100S-3D	90.0	I40
		GSX 41100C-3D	90.0	I60
		GSX 41100S-3D	90.0	I58
	44.0	GSX 21100C-4D	100.0	I46
		GSX 21100S-4D	100.0	I44
		GSX 41100C-4D	100.0	I64
		GSX 41100S-4D	100.0	I62
11.5	18.0	GSX 21150C-1.5D	75.0	I32
		GSX 41150C-1.5D	75.0	I52
	23.0	GSX 21150C-2D	75.0	I38
		GSX 21150S-2D	75.0	I36
		GSX 41150C-2D	75.0	I56
		GSX 41150S-2D	75.0	I54
	35.0	GSX 21150C-3D	90.0	I42
		GSX 21150S-3D	90.0	I40
		GSX 41150C-3D	90.0	I60
		GSX 41150S-3D	90.0	I58
	46.0	GSX 21150C-4D	100.0	I46
		GSX 21150S-4D	100.0	I44
		GSX 41150C-4D	100.0	I64
		GSX 41150S-4D	100.0	I62
12.0	2.0	AVIC 312000-45-2.0(E)	70.0	I136
	18.0	GSX 21200C-1.5D	75.0	I32
		GSX 31200C-1.5D	75.0	I48

Cutting Edge Length List by Diameter

Diameter ø12.0 to ø15.0mm

Square | Others

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF	Page
12.0	18.0	GSX 41200C-1.5D	75.0	I52
		GSXSLT 31200C-1.5D	75.0	I132
		SSUPR 4120ZX	120.0	I71
	24.0	GSX 21200C-2D	75.0	I38
		GSX 41200C-2D	75.0	I56
		HHM 6120ZX	75.0	I76
	25.0	ASM 2120	75.0	I88
		ASM 2120DL	75.0	I86
		ASM 4120DL	75.0	I87
	26.0	GSH 6120SF	75.0	I73
		GSRE 4120SF	75.0	I84
		GSX 21200S-2D	75.0	I36
		GSX 31200C-2D	75.0	I50
		GSX 41200S-2D	75.0	I54
		SSUP 3120ZX	90.0	I134
		SSUP 4120ZX	90.0	I70
	30.0	GSV 4120-2.5D	90.0	I66
		GSXVL 4120-2.5D	90.0	I68
		LHHM 6120ZX	100.0	I79
	36.0	GSX 21200C-3D	90.0	I42
		GSX 21200S-3D	90.0	I40
		GSX 41200C-3D	90.0	I60
		GSX 41200S-3D	90.0	I58
		AVIX 612000-R03	90.0	I93
	48.0	GSX 21200C-4D	100.0	I46
		GSX 21200S-4D	100.0	I44
		GSX 41200C-4D	100.0	I64
		GSX 41200S-4D	100.0	I62
	50.0	EHHM 6120ZX	120.0	I82
12.5	26.0	GSX 21250S-2D	75.0	I36
12.7	2.0	AVIC 312700-45-2.0(E)	76.2	I136
	38.0	AVIX 612700-R03	90.0	I93
13.0	19.5	SSUPR 4130ZX	130.0	I71
	20.0	GSX 21300C-1.5D	90.0	I32
		GSX 41300C-1.5D	90.0	I52
	26.0	GSX 21300C-2D	90.0	I38
		GSX 21300S-2D	90.0	I36
		GSX 41300C-2D	90.0	I56
		GSX 41300S-2D	90.0	I54
		SSUP 3130ZX	100.0	I134
	39.0	GSX 21300C-3D	100.0	I42
		GSX 21300S-3D	100.0	I40
		GSX 41300C-3D	100.0	I60
	39.0	GSX 41300S-3D	100.0	I58
	52.0	GSX 21300C-4D	110.0	I46
		GSX 21300S-4D	110.0	I44
		GSX 41300C-4D	110.0	I64
		GSX 41300S-4D	110.0	I62
13.5	27.0	GSX 41350S-2D	90.0	I54
14.0	21.0	GSX 21400C-1.5D	90.0	I32
		GSX 41400C-1.5D	90.0	I52
	26.0	GSRE 4140SF	90.0	I84
		SSUP 3140ZX	110.0	I134
		SSUP 4140ZX	110.0	I70
	28.0	GSX 21400C-2D	90.0	I38
		GSX 21400S-2D	90.0	I36
		GSX 41400C-2D	90.0	I56
		GSX 41400S-2D	90.0	I54
	32.0	ASM 2140	90.0	I88
	35.0	GSV 4140-2.5D	110.0	I66
		GSXVL 4140-2.5D	110.0	I68
	42.0	GSX 21400C-3D	110.0	I42
		GSX 21400S-3D	110.0	I40
		GSX 41400C-3D	110.0	I60
		GSX 41400S-3D	110.0	I58
	56.0	GSX 21400C-4D	110.0	I46
		GSX 21400S-4D	110.0	I44
		GSX 41400C-4D	110.0	I64
		GSX 41400S-4D	110.0	I62
15.0	23.0	GSX 21500C-1.5D	90.0	I32
		GSX 41500C-1.5D	90.0	I52
	26.0	SSUP 3150ZX	110.0	I134

Diameter ø15.0 to ø18.0mm

Square

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF	Page
15.0	26.0	SSUP 4150ZX	110.0	I70
	30.0	GSX 21500C-2D	90.0	I38
		GSX 21500S-2D	90.0	I36
		GSX 41500C-2D	90.0	I56
		GSX 41500S-2D	90.0	I54
	32.0	ASM 2150	90.0	I88
	38.0	GSV 4150-2.5D	110.0	I66
		GSXVL 4150-2.5D	110.0	I68
	45.0	GSX 21500C-3D	110.0	I42
		GSX 21500S-3D	110.0	I40
		GSX 41500C-3D	110.0	I60
		GSX 41500S-3D	110.0	I58
	60.0	GSX 21500C-4D	120.0	I46
		GSX 21500S-4D	120.0	I44
		GSX 41500C-4D	120.0	I64
		GSX 41500S-4D	120.0	I62
16.0	24.0	GSX 21600C-1.5D	90.0	I32
		GSX 41600C-1.5D	90.0	I52
		SSUPR 4160ZX	160.0	I71
	32.0	ASM 2160	90.0	I88
		ASM 2160DL	90.0	I86
		ASM 4160DL	90.0	I87
		GSH 8160SF	90.0	I74
		GSRE 4160SF	90.0	I84
		GSX 21600C-2D	90.0	I38
		GSX 21600S-2D	90.0	I36
		GSX 41600C-2D	90.0	I56
		GSX 41600S-2D	90.0	I54
		HHM 8160ZX	90.0	I77
		SSUP 3160ZX	115.0	I134
		SSUP 4160ZX	115.0	I70
	40.0	GSV 4160-2.5D	115.0	I66
		GSXVL 4160-2.5D	115.0	I68
	48.0	GSX 21600C-3D	110.0	I42
		GSX 21600S-3D	110.0	I40
		GSX 41600C-3D	110.0	I60
		GSX 41600S-3D	110.0	I58
	50.0	LHHM 8160ZX	105.0	I80
	64.0	GSX 21600C-4D	120.0	I46
		GSX 21600S-4D	120.0	I44
		GSX 41600C-4D	120.0	I64
		GSX 41600S-4D	120.0	I62
	70.0	EHHM 8160ZX	140.0	I83
17.0	25.5	SSUPR 4170ZX	170.0	I71
	26.0	GSX 21700C-1.5D	100.0	I32
		GSX 41700C-1.5D	100.0	I52
	34.0	GSX 21700C-2D	100.0	I38
		GSX 41700C-2D	100.0	I56
	35.0	GSX 21700S-2D	100.0	I36
		GSX 41700S-2D	100.0	I54
	51.0	GSX 21700C-3D	110.0	I42
		GSX 21700S-3D	110.0	I40
		GSX 41700C-3D	110.0	I60
		GSX 41700S-3D	110.0	I58
	68.0	GSX 21700C-4D	130.0	I46
		GSX 21700S-4D	130.0	I44
		GSX 41700C-4D	130.0	I64
		GSX 41700S-4D	130.0	I62
18.0	27.0	GSX 21800C-1.5D	100.0	I32
		GSX 41800C-1.5D	100.0	I52
	32.0	GSRE 4180SF	100.0	I84
		SSUP 4180ZX	120.0	I70
	36.0	GSX 21800C-2D	100.0	I38
		GSX 41800C-2D	100.0	I56
	40.0	GSX 21800S-2D	100.0	I36
		GSX 41800S-2D	100.0	I54
	45.0	GSV 4180-2.5D	120.0	I66
		GSXVL 4180-2.5D	120.0	I68
	54.0	GSX 21800C-3D	120.0	I42
		GSX 21800S-3D	120.0	I40
		GSX 41800C-3D	120.0	I60
		GSX 41800S-3D	120.0	I58

Cutting Edge Length List by Diameter

Diameter ø18.0 to ø32.0mm — Square

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF	Page
18.0	72.0	GSX 21800C-4D	130.0	I46
		GSX 21800S-4D	130.0	I44
		GSX 41800C-4D	130.0	I64
		GSX 41800S-4D	130.0	I62
19.0	29.0	GSX 21900C-1.5D	100.0	I32
		GSX 41900C-1.5D	100.0	I52
	38.0	GSX 21900C-2D	100.0	I38
		GSX 41900C-2D	100.0	I56
	40.0	GSX 21900S-2D	100.0	I36
		GSX 41900S-2D	100.0	I54
	57.0	GSX 21900C-3D	120.0	I42
		GSX 21900S-3D	120.0	I40
		GSX 41900C-3D	120.0	I60
		GSX 41900S-3D	120.0	I58
	76.0	GSX 21900C-4D	140.0	I46
		GSX 21900S-4D	140.0	I44
		GSX 41900C-4D	140.0	I64
		GSX 41900S-4D	140.0	I62
20.0	30.0	GSX 22000C-1.5D	100.0	I32
		GSX 42000C-1.5D	100.0	I52
		SSUPR 4200ZX	200.0	I71
	38.0	GSH 8200SF	100.0	I74
		GSRE 4200SF	100.0	I84
		SSUP 4200ZX	125.0	I70
	40.0	GSX 22000C-2D	100.0	I38
		GSX 22000S-2D	100.0	I36
		GSX 42000C-2D	100.0	I56
		GSX 42000S-2D	100.0	I54
		HHM 8200ZX	106.0	I77
	50.0	GSV 4200-2.5D	125.0	I66
		GSXVL 4200-2.5D	125.0	I68
	55.0	LHHM 8200ZX	120.0	I80
	60.0	GSX 22000C-3D	120.0	I42
		GSX 22000S-3D	120.0	I40
		GSX 42000C-3D	120.0	I60
		GSX 42000S-3D	120.0	I58
	80.0	GSX 22000C-4D	140.0	I46
		GSX 22000S-4D	140.0	I44
		GSX 42000C-4D	140.0	I64
		GSX 42000S-4D	140.0	I62
	85.0	EHHM 8200ZX	165.0	I83
21.0	42.0	GSX 22100S-2D	110.0	I36
22.0	44.0	GSX 22200S-2D	110.0	I36
		GSX 42200S-2D	110.0	I54
	66.0	GSX 42200S-3D	130.0	I58
23.0	46.0	GSX 22300S-2D	120.0	I36
24.0	48.0	GSX 22400S-2D	120.0	I36
		GSX 42400S-2D	120.0	I54
	72.0	GSX 22400S-3D	130.0	I40
25.0	38.0	GSX 22500C-1.5D	120.0	I32
		GSX 42500C-1.5D	120.0	I52
	50.0	GSX 22500C-2D	120.0	I38
		GSX 22500S-2D	120.0	I36
		GSX 42500C-2D	120.0	I56
		GSX 42500S-2D	120.0	I54
	63.0	GSV 4250-2.5D	140.0	I66
		GSXVL 4250-2.5D	140.0	I68
	65.0	LHHM 8250ZX	140.0	I80
	75.0	GSX 22500C-3D	130.0	I42
		GSX 22500S-3D	130.0	I40
		GSX 42500C-3D	130.0	I60
		GSX 42500S-3D	130.0	I58
	100.0	EHHM 8250ZX	185.0	I83
		GSX 22500C-4D	160.0	I46
		GSX 22500S-4D	160.0	I44
		GSX 42500C-4D	160.0	I64
		GSX 42500S-4D	160.0	I62
30.0	75.0	LHHM 8300ZX	160.0	I80
	110.0	EHHM 8300ZX	205.0	I83
32.0	64.0	HHM 8320ZX	130.0	I77
	85.0	LHHM 8320ZX	170.0	I80
	110.0	EHHM 8320ZX	205.0	I83

Diameter ø3.0 to ø6.0mm — Radius

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF	Page
3.0	4.5	SSUPR 4030ZX-R02	60.0	I108
		SSUPR 4030ZX-R05	60.0	I108
	8.0	GSV 4030-R02-2.5D	50.0	I98
		GSV 4030-R05-2.5D	50.0	I98
		GSX 40300-R02-2D	45.0	I96
		GSX 40300-R05-2D	45.0	I96
		GSXVL 4030-R02-2.5D	50.0	I100
		GSXVL 4030-R05-2.5D	50.0	I100
		SSUP 4030ZX-R02	50.0	I106
		SSUP 4030ZX-R05	50.0	I106
4.0	6.0	SSUPR 4040ZX-R02	60.0	I108
		SSUPR 4040ZX-R05	60.0	I108
	10.0	GSV 4040-R02-2.5D	50.0	I98
		GSV 4040-R05-2.5D	50.0	I98
		GSV 4040-R10-2.5D	50.0	I98
		GSXVL 4040-R02-2.5D	50.0	I100
		GSXVL 4040-R05-2.5D	50.0	I100
		GSXVL 4040-R10-2.5D	50.0	I100
	11.0	GSX 40400-R02-2D	45.0	I96
		GSX 40400-R05-2D	45.0	I96
		GSX 40400-R10-2D	45.0	I96
		SSUP 4040ZX-R02	50.0	I106
		SSUP 4040ZX-R05	50.0	I106
		SSUP 4040ZX-R10	50.0	I106
4.5	12.0	SSEH 4045-R05	50.0	I113
		SSEH 4045W-R05	50.0	I104
		SSEHVL 4045-R05	50.0	I112
		SSEHVL 4045-R10	50.0	I112
		SSEHVL 4045W-R05	50.0	I102
		SSEHVL 4045W-R10	50.0	I102
5.0	7.5	SSUPR 4050ZX-R02	60.0	I108
		SSUPR 4050ZX-R05	60.0	I108
	13.0	GSV 4050-R02-2.5D	60.0	I98
		GSV 4050-R05-2.5D	60.0	I98
		GSV 4050-R10-2.5D	60.0	I98
		GSX 40500-R02-2D	50.0	I96
		GSX 40500-R05-2D	50.0	I96
		GSX 40500-R10-2D	50.0	I96
		GSXVL 4050-R02-2.5D	60.0	I100
		GSXVL 4050-R05-2.5D	60.0	I100
		GSXVL 4050-R10-2.5D	60.0	I100
		SSEH 4050-R05	60.0	I113
		SSEH 4050W-R05	60.0	I104
		SSEHVL 4050-R05	60.0	I112
		SSEHVL 4050-R10	60.0	I112
		SSEHVL 4050W-R05	60.0	I102
		SSEHVL 4050W-R10	60.0	I102
		SSUP 4050ZX-R02	60.0	I106
		SSUP 4050ZX-R05	60.0	I106
		SSUP 4050ZX-R10	60.0	I106
6.0	9.0	SSUPR 4060ZX-R03	60.0	I108
		SSUPR 4060ZX-R05	60.0	I108
	13.0	GSH 6060SF-R02	50.0	I110
		GSH 6060SF-R05	50.0	I110
		GSH 6060SF-R10	50.0	I110
		GSX 40600-R02-2D	50.0	I96
		GSX 40600-R05-2D	50.0	I96
		GSX 40600-R10-2D	50.0	I96
		GSX 40600-R15-2D	50.0	I96
		SSEH 4060-R10	60.0	I113
		SSEH 4060W-R10	60.0	I104
		SSEHVL 4060-R10	60.0	I112
		SSEHVL 4060W-R10	60.0	I102
		SSUP 4060ZX-R03	60.0	I106
		SSUP 4060ZX-R05	60.0	I106
		SSUP 4060ZX-R10	60.0	I106
		SSUP 4060ZX-R15	60.0	I106
	15.0	GSV 4060-R03-2.5D	60.0	I98
		GSV 4060-R05-2.5D	60.0	I98
		GSV 4060-R10-2.5D	60.0	I98
		GSV 4060-R15-2.5D	60.0	I98
		GSXVL 4060-R03-2.5D	60.0	I100

Cutting Edge Length List by Diameter

Diameter ø6.0 to ø10.0mm

Radius

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF	Page
6.0	15.0	GSXVL 4060-R05-2.5D	60.0	I100
		GSXVL 4060-R10-2.5D	60.0	I100
		GSXVL 4060-R15-2.5D	60.0	I100
7.0	10.5	SSUPR 4070ZX-R03	80.0	I108
		SSUPR 4070ZX-R05	80.0	I108
8.0	12.0	SSUPR 4080ZX-R05	80.0	I108
		SSUPR 4080ZX-R10	80.0	I108
	19.0	GSH 6080SF-R02	60.0	I110
		GSH 6080SF-R05	60.0	I110
		GSH 6080SF-R10	60.0	I110
		GSX 40800-R02-2D	60.0	I96
		GSX 40800-R05-2D	60.0	I96
		GSX 40800-R10-2D	60.0	I96
		GSX 40800-R15-2D	60.0	I96
		SSEH 4080-R10	80.0	I113
		SSEH 4080W-R10	80.0	I104
		SSEHVL 4080-R10	80.0	I112
		SSEHVL 4080W-R10	80.0	I102
		SSUP 4080ZX-R03	80.0	I106
		SSUP 4080ZX-R05	80.0	I106
		SSUP 4080ZX-R10	80.0	I106
		SSUP 4080ZX-R15	80.0	I106
		SSUP 4080ZX-R20	80.0	I106
	20.0	GSV 4080-R03-2.5D	80.0	I98
		GSV 4080-R05-2.5D	80.0	I98
		GSV 4080-R10-2.5D	80.0	I98
		GSV 4080-R15-2.5D	80.0	I98
		GSV 4080-R20-2.5D	80.0	I98
		GSXVL 4080-R03-2.5D	80.0	I100
		GSXVL 4080-R05-2.5D	80.0	I100
		GSXVL 4080-R10-2.5D	80.0	I100
		GSXVL 4080-R15-2.5D	80.0	I100
		GSXVL 4080-R20-2.5D	80.0	I100
9.0	13.5	SSUPR 4090ZX-R05	90.0	I108
		SSUPR 4090ZX-R10	90.0	I108
10.0	15.0	SSUPR 4100ZX-R05	100.0	I108
		SSUPR 4100ZX-R10	100.0	I108
		SSUPR 4100ZX-R15	100.0	I108
	22.0	GSH 6100SF-R05	70.0	I110
		GSH 6100SF-R10	70.0	I110
		GSH 6100SF-R15	70.0	I110
		GSH 6100SF-R20	70.0	I110
		GSX 41000-R02-2D	70.0	I96
		GSX 41000-R05-2D	70.0	I96
		GSX 41000-R10-2D	70.0	I96
		GSX 41000-R15-2D	70.0	I96
		GSX 41000-R20-2D	70.0	I96
		SSEH 4100-R10	90.0	I113
		SSEH 4100-R30	90.0	I113
		SSEH 4100W-R10	90.0	I104
		SSEH 4100W-R30	90.0	I104
		SSEHVL 4100-R10	90.0	I112
		SSEHVL 4100-R30	90.0	I112
		SSEHVL 4100W-R10	90.0	I102
		SSEHVL 4100W-R30	90.0	I102
		SSUP 4100ZX-R03	90.0	I106
		SSUP 4100ZX-R05	90.0	I106
		SSUP 4100ZX-R10	90.0	I106
		SSUP 4100ZX-R15	90.0	I106
		SSUP 4100ZX-R20	90.0	I106
	25.0	GSV 4100-R03-2.5D	90.0	I98
		GSV 4100-R05-2.5D	90.0	I98
		GSV 4100-R10-2.5D	90.0	I98
		GSV 4100-R15-2.5D	90.0	I98
		GSV 4100-R20-2.5D	90.0	I98
		GSXVL 4100-R03-2.5D	90.0	I100
		GSXVL 4100-R05-2.5D	90.0	I100
		GSXVL 4100-R10-2.5D	90.0	I100
		GSXVL 4100-R15-2.5D	90.0	I100
		GSXVL 4100-R20-2.5D	90.0	I100

Diameter ø11.0 to ø17.0mm

Radius

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF	Page
11.0	16.5	SSUPR 4110ZX-R05	120.0	I108
		SSUPR 4110ZX-R10	120.0	I108
		SSUPR 4110ZX-R15	120.0	I108
12.0	18.0	SSUPR 4120ZX-R05	120.0	I108
		SSUPR 4120ZX-R10	120.0	I108
		SSUPR 4120ZX-R15	120.0	I108
	26.0	GSH 6120SF-R05	75.0	I110
		GSH 6120SF-R10	75.0	I110
		GSH 6120SF-R15	75.0	I110
		GSH 6120SF-R20	75.0	I110
		GSX 41200-R02-2D	75.0	I96
		GSX 41200-R05-2D	75.0	I96
		GSX 41200-R10-2D	75.0	I96
		GSX 41200-R15-2D	75.0	I96
		GSX 41200-R20-2D	75.0	I96
		SSEH 4120-R10	90.0	I113
		SSEH 4120-R30	90.0	I113
		SSEH 4120W-R10	90.0	I104
		SSEH 4120W-R30	90.0	I104
		SSEHVL 4120-R10	90.0	I112
		SSEHVL 4120-R30	90.0	I112
		SSEHVL 4120W-R10	90.0	I102
		SSEHVL 4120W-R30	90.0	I102
		SSUP 4120ZX-R05	90.0	I106
		SSUP 4120ZX-R10	90.0	I106
		SSUP 4120ZX-R15	90.0	I106
		SSUP 4120ZX-R20	90.0	I106
		SSUP 4120ZX-R30	90.0	I106
	30.0	GSV 4120-R05-2.5D	90.0	I98
		GSV 4120-R10-2.5D	90.0	I98
		GSV 4120-R15-2.5D	90.0	I98
		GSV 4120-R20-2.5D	90.0	I98
		GSV 4120-R30-2.5D	90.0	I98
		GSXVL 4120-R05-2.5D	90.0	I100
		GSXVL 4120-R10-2.5D	90.0	I100
		GSXVL 4120-R15-2.5D	90.0	I100
		GSXVL 4120-R20-2.5D	90.0	I100
		GSXVL 4120-R30-2.5D	90.0	I100
13.0	19.5	SSUPR 4130ZX-R05	130.0	I108
		SSUPR 4130ZX-R10	130.0	I108
		SSUPR 4130ZX-R15	130.0	I108
16.0	24.0	SSUPR 4160ZX-R10	160.0	I108
		SSUPR 4160ZX-R15	160.0	I108
		SSUPR 4160ZX-R20	160.0	I108
	32.0	GSH 8160SF-R10	90.0	I111
		GSH 8160SF-R15	90.0	I111
		GSH 8160SF-R20	90.0	I111
		SSEH 4160-R10	115.0	I113
		SSEH 4160-R30	115.0	I113
		SSEH 4160W-R10	115.0	I104
		SSEH 4160W-R30	115.0	I104
		SSEHVL 4160-R10	115.0	I112
		SSEHVL 4160-R30	115.0	I112
		SSEHVL 4160W-R10	115.0	I102
		SSEHVL 4160W-R30	115.0	I102
		SSUP 4160ZX-R10	115.0	I106
		SSUP 4160ZX-R15	115.0	I106
		SSUP 4160ZX-R20	115.0	I106
		SSUP 4160ZX-R30	115.0	I106
	40.0	GSV 4160-R10-2.5D	115.0	I98
		GSV 4160-R15-2.5D	115.0	I98
		GSV 4160-R20-2.5D	115.0	I98
		GSV 4160-R30-2.5D	115.0	I98
		GSXVL 4160-R10-2.5D	115.0	I100
		GSXVL 4160-R15-2.5D	115.0	I100
		GSXVL 4160-R20-2.5D	115.0	I100
		GSXVL 4160-R30-2.5D	115.0	I100
17.0	25.5	SSUPR 4170ZX-R10	170.0	I108
		SSUPR 4170ZX-R15	170.0	I108
		SSUPR 4170ZX-R20	170.0	I108

Cutting Edge Length List by Diameter

Diameter ø20.0 to ø25.0mm

Radius

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF	Page
20.0	30.0	SSUPR 4200ZX-R10	200.0	I108
		SSUPR 4200ZX-R15	200.0	I108
		SSUPR 4200ZX-R20	200.0	I108
	38.0	GSH 8200SF-R10	100.0	I111
		GSH 8200SF-R15	100.0	I111
		GSH 8200SF-R20	100.0	I111
		SSUP 4200ZX-R10	125.0	I106
		SSUP 4200ZX-R15	125.0	I106
		SSUP 4200ZX-R20	125.0	I106
		SSUP 4200ZX-R30	125.0	I106
	40.0	SSEH 4200W-R10	125.0	I104
		SSEH 4200W-R30	125.0	I104
		SSEHVL 4200W-R10	125.0	I102
		SSEHVL 4200W-R30	125.0	I102
	50.0	GSV 4200-R10-2.5D	125.0	I98
		GSV 4200-R15-2.5D	125.0	I98
		GSV 4200-R20-2.5D	125.0	I98
		GSV 4200-R30-2.5D	125.0	I98
		GSXVL 4200-R10-2.5D	125.0	I100
		GSXVL 4200-R15-2.5D	125.0	I100
		GSXVL 4200-R20-2.5D	125.0	I100
		GSXVL 4200-R30-2.5D	125.0	I100
25.0	50.0	SSEH 4250W-R10	140.0	I104
		SSEH 4250W-R30	140.0	I104
		SSEHVL 4250W-R10	140.0	I102
		SSEHVL 4250W-R30	140.0	I102
	63.0	GSV 4250-R10-2.5D	140.0	I98
		GSV 4250-R15-2.5D	140.0	I98
		GSV 4250-R20-2.5D	140.0	I98
		GSV 4250-R30-2.5D	140.0	I98
		GSXVL 4250-R10-2.5D	140.0	I100
		GSXVL 4250-R15-2.5D	140.0	I100
		GSXVL 4250-R20-2.5D	140.0	I100
		GSXVL 4250-R30-2.5D	140.0	I100

Diameter ø0.1 to ø0.6mm

Ballnose

0.1	0.1	SNB2 0005 0034DL	45.0	I122
		SNB2 0005 0064DL	45.0	I122
0.2	0.2	SNB2 0010 0054DL	45.0	I122
		SNB2 0010 0104DL	45.0	I122
		SNB2 0010 0204DL	45.0	I122
0.3	0.3	SNB2 0015 0054DL	45.0	I122
		SNB2 0015 0104DL	45.0	I122
		SNB2 0015 0204DL	45.0	I122
		SNB2 0015 0304DL	45.0	I122
0.4	0.4	GSBH 20020SF	50.0	I120
		SNB2 0020 0104DL	45.0	I122
		SNB2 0020 0204DL	45.0	I122
		SNB2 0020 0304DL	45.0	I122
		SNB2 0020 0404DL	45.0	I122
	0.6	GSXB 20020	50.0	I118
0.5	0.45	SNB2 0025 0104DL	45.0	I122
		SNB2 0025 0204DL	45.0	I122
		SNB2 0025 0304DL	45.0	I122
		SNB2 0025 0404DL	45.0	I122
0.6	0.6	GSBH 20030SF	50.0	I120
		SNB2 0030 0204DL	45.0	I122
		SNB2 0030 0304DL	45.0	I122
		SNB2 0030 0404DL	45.0	I122
		SNB2 0030 0504DL	45.0	I122
		SNB2 0030 0604DL	45.0	I122
	0.9	GSXB 20030	50.0	I118

Diameter ø1.0 to ø20.0mm

Ballnose

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF	Page
1.0	1.0	GSBH 20050SF	50.0	I120
	1.5	GSXB 20050	50.0	I118
		SNB2 0050 0304DL	45.0	I122
		SNB2 0050 0404DL	45.0	I122
		SNB2 0050 0604DL	45.0	I122
		SNB2 0050 0804DL	50.0	I122
		SNB2 0050 1004DL	50.0	I122
1.5	1.5	GSBH 20075SF	50.0	I120
	2.3	SNB2 0075 0304DL	45.0	I122
		SNB2 0075 0604DL	45.0	I122
		SNB2 0075 1004DL	50.0	I122
	2.5	GSXB 20075	50.0	I118
2.0	2.0	GSBH 20100SF	60.0	I120
	3.0	GSXB 20100	60.0	I118
		SNB 2020DL	60.0	I121
		SNB2 0100 0304DL	50.0	I122
		SNB2 0100 0604DL	50.0	I122
		SNB2 0100 1004DL	50.0	I122
		SNB2 0100 1504DL	60.0	I122
		SNB2 0100 2004DL	60.0	I122
2.5	2.5	GSBH 20125SF	60.0	I120
	4.0	GSXB 20125	60.0	I118
3.0	3.0	GSBH 20150SF	60.0	I120
	4.5	GSXB 20150	60.0	I118
		SNB 2030DL	80.0	I121
4.0	4.0	GSBH 20200SF	70.0	I120
	6.0	GSXB 20200	70.0	I118
		SNB 2040DL	80.0	I121
		SNB2 0200 1606DL	80.0	I122
		SNB2 0200 2006DL	80.0	I122
		SNB2 0200 3006DL	80.0	I122
5.0	5.0	GSBH 20250SF	80.0	I120
	7.5	GSXB 20250	80.0	I118
		SNB 2050DL	90.0	I121
6.0	6.0	GSBH 20300SF	80.0	I120
	9.0	GSXB 20300	80.0	I118
		SNB 2060DL	100.0	I121
7.0	11.0	GSXB 20350	90.0	I118
8.0	8.0	GSBH 20400SF	90.0	I120
	12.0	GSXB 20400	90.0	I118
		SNB 2080DL	100.0	I121
10.0	10.0	GSBH 20500SF	100.0	I120
	15.0	GSXB 20500	100.0	I118
		SNB 2100DL	120.0	I121
12.0	12.0	GSBH 20600SF	110.0	I120
	18.0	GSXB 20600	110.0	I118
		SNB 2120DL	120.0	I121
14.0	21.0	GSXB 20700	110.0	I118
16.0	24.0	GSXB 20800	140.0	I118
		SNB 2160DL	160.0	I121
18.0	27.0	GSXB 20900	140.0	I118
20.0	30.0	GSXB 21000	160.0	I118

Endmill Coatings

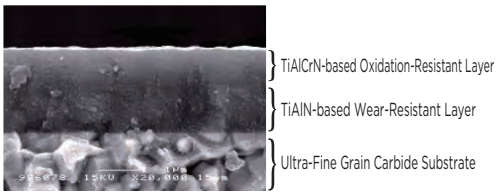
■ Types of Endmill Coatings

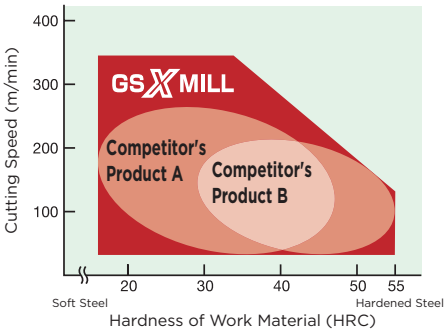
Coating Name	GSX Coat	GS Hard Coat	ZX Coat	AURORA Coat	SUMIDIA Coat
Coating type	TiAlCrN	TiAlCrSiCN	TiAlN	DLC	Diamond
Wear Resistance	◎	◎	○	○	◎
Adhesion Resistance	◎	◎	○	◎	△
Thermal Resistance	◎	◎	○	△	○
Coating Thickness	up to 2µm	up to 2µm	up to 2µm	up to 0.5µm	up to 15µm
Feature	Excellent thermal resistance and adhesion resistance	Excellent hardness, thermal resistance and adhesion resistance	General-purpose	Low coefficient of friction and excellent adhesion resistance	Excellent hardness and wear resistance
Main Application	For general steel and stainless steel milling	For general steel and high-hardness steel milling	For general steel and cast iron milling	For aluminum alloy and copper alloy milling	For CFRP milling
Main Applicable Products	GSX/GSXB/GSXVL series	GSH/GSBH/SSEH/SSEHVL series	UPMILL/HHM series	ASM/SNB/SNB2 series	SSDC

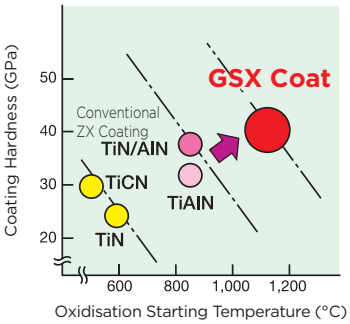
● GSX Coat

- Micro-grain carbide substrate provides high transverse rupture strength and excellent thermal shock resistance, improving reliability in wet cutting applications.
- Adopts GSX Coat for better wear resistance and thermal resistance, improving reliability and tool life when machining a wide range of work materials.

[Coating Structure]

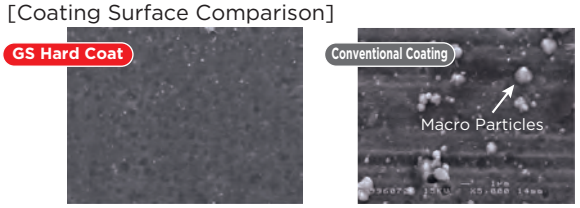




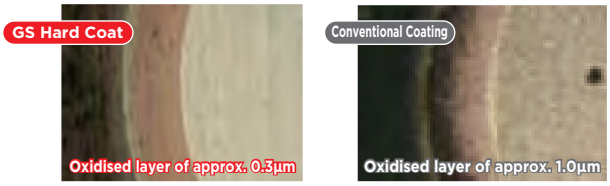


● GS Hard Coat

[Coating Surface Comparison]

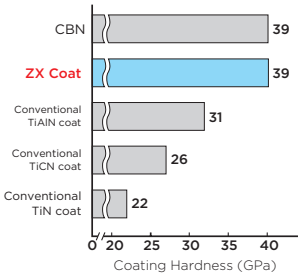


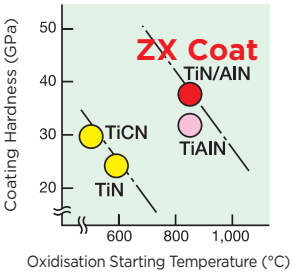
[Oxidation Resistance Evaluation] (Scratches from calotest performed after one-hour exposure to air at 1,100°C)



● ZX Coat

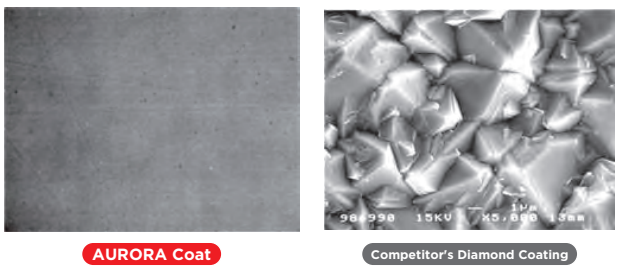
- Hardness almost equivalent to that of CBN
- Improvement in wear resistance, oxidation resistance and peel-off resistance
- Approx. 6 times longer tool life compared with uncoated products





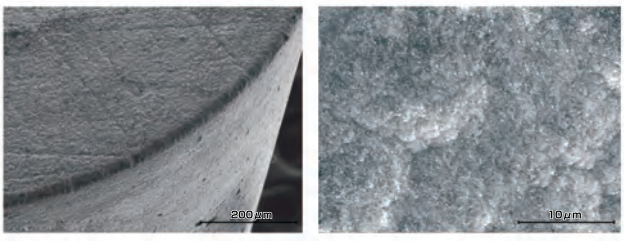
● AURORA Coat

- Very smooth AURORA COAT results in low adhesion as well as good surface finish
- Low cutting force enables high feed milling and milling of low rigidity workpieces
- Perfect for milling non-ferrous metal/copper electrodes



● SUMIDIA Coat

- Our original polycrystalline diamond coating technology achieves over 10 times higher wear resistance than uncoated carbide
- Realizes a micro-grain diamond film that provides the required combination of high strength and high wear resistance on smooth surfaces for CFRP milling



MEMO

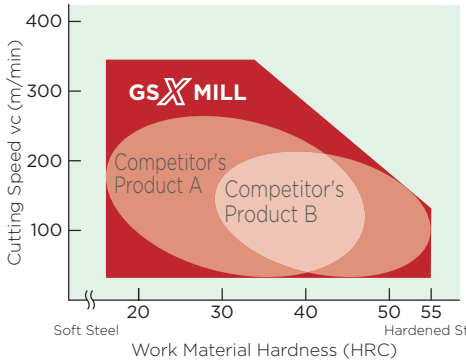
Global Standard Solid Endmills

GSX MILL series

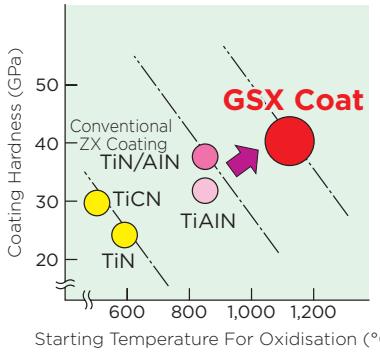
■ Features and Applications

- A wide selection with 3 types of cutting flute configurations and 4 cutting lengths to cover a wide range of applications
- Micro-grained carbide substrate provides high transverse rupture strength and excellent thermal shock resistance, improving reliability in wet cutting applications
- GSX Coat has increased wear resistance and thermal resistance for improved reliability and longer tool life
- Large rake angle and unique flute design improve sharpness and chip evacuation
- Utilizing a gash land improves cutting edge corner strength

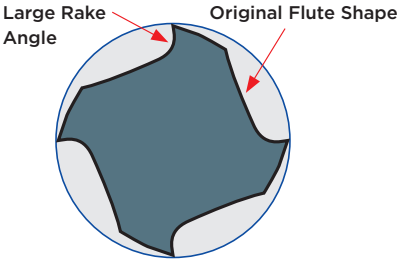
● Wear resistance



● Thermal resistance



● Improved chip evacuation

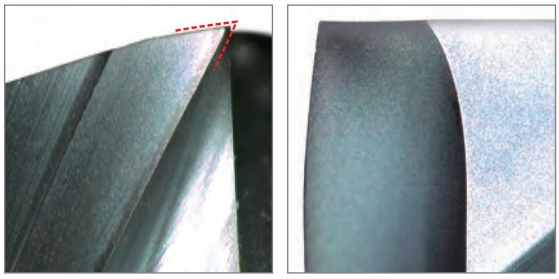


Large rake angle combined with our unique flute design improve sharpness and chip evacuation.

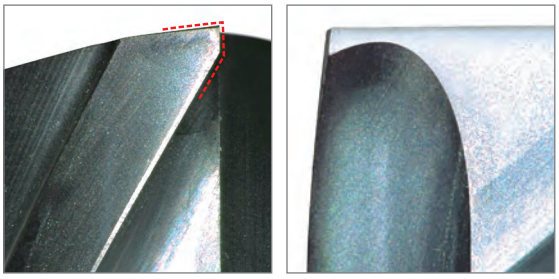
■ Expanded machining applications with 2 cutting edge corner styles

Sharp edged S type and fracture-resistant C type are available.

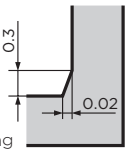
Sharp Corner: Sharper Edge Design S type



Gash Land: Fracture Resistant Design C type



Note: When using endmills with gash land, some material remains on the right. Use the S type to obtain sharp corners.



Example: Corner after ø10mm milling (Unit: mm)

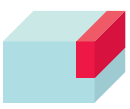
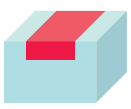
■ Work Material

◎: Best ○: Suitable Blank: Not recommended

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

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

■ Recommended Machining Examples (General-purpose type)

Applications	Side Milling		Groove Milling		Groove Finishing	
Form						
Cutting Edge Corner	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing
S type		◎		○ *2		◎
C type	◎	○	◎	◎	◎	○

The S type is best for removing inside corners. *2: Use with small depth of cut.

GSX MILL series

■ Product Range

Applications	Number of Flutes	Cutting Edge Length						
		1.5D	2D		3D		4D	
		C type	S type	C type	S type	C type	S type	C type
General-purpose	2 Flutes	GSX20000C-1.5D ø0.5 to ø25.0mm →I32	GSX20000S-2D ø0.3 to ø25.0mm →I34	GSX20000C-2D ø0.5 to ø25.0mm →I38	GSX20000S-3D ø0.5 to ø25.0mm →I40	GSX20000C-3D ø0.5 to ø25.0mm →I42	GSX20000S-4D ø0.5 to ø25.0mm →I44	GSX20000C-4D ø0.5 to ø25.0mm →I46
	3 Flutes	GSX30000C-1.5D ø1.0 to ø12.0mm →I48		GSX30000C-2D ø1.0 to ø12.0mm →I50				
	4 Flutes	GSX40000C-1.5D ø1.0 to ø25.0mm →I52	GSX40000S-2D ø1.0 to ø25.0mm →I54	GSX40000C-2D ø1.0 to ø25.0mm →I56	GSX40000S-3D ø1.0 to ø25.0mm →I58	GSX40000C-3D ø1.0 to ø25.0mm →I60	GSX40000S-4D ø1.0 to ø25.0mm →I62	GSX40000C-4D ø1.0 to ø25.0mm →I64
Multi-purpose	3 Flutes	GSXSLT30000C-1.5D ø1.0 to ø12.0mm →I132						
Radius	4 Flutes		GSX40000-R-2D ø3.0 to ø12.0mm →I96					

High-efficiency Square type: GSV4000-2.5D →I66 GSXVL4000-2.5D →I68 High-efficiency Radius type: GSV4000-R-2.5D →I98 GSXVL4000-R-2.5D →I100
Ball type: GSXB20000 →I118

■ High Precision

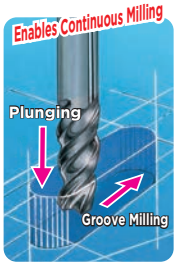
● **Endmill tolerance is reduced to 2/3 of conventional types, so diameter compensation is not required when changing tools.**

■ Multi-purpose

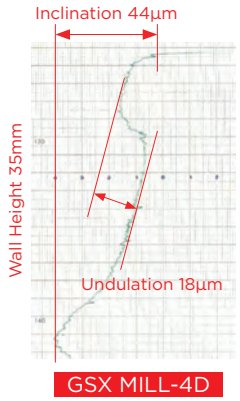
● **Optimised flute design of slot mill 3 flute (short) type reduces cutting force.**

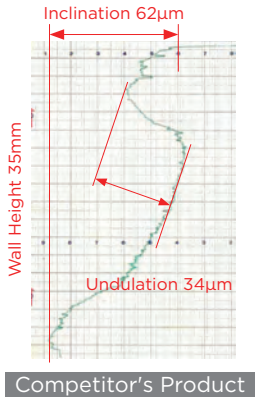
(1) Continuous (composite) applications such as plunging and groove milling is possible

(2) Perfect for use with thin plates and small machining centres.



■ Long Cutting Edge Length with High Rigidity (C type)



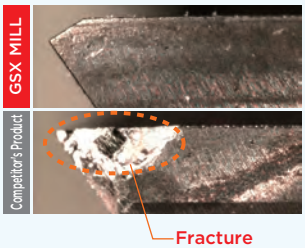


Tool Diameter ø10 (2 Flutes)
Cutting Conditions: vc = 44m/min (n = 1,400min⁻¹)
Depth of Cut ap = 35mm
ae = 0.1mm × 25 times

Work Material S50C
Feed Rate: vf = 240mm/min (fz = 0.086mm/t)
Coolant Wet
Machine: Vertical Machining Centre BT30

■ Application Examples (Square)

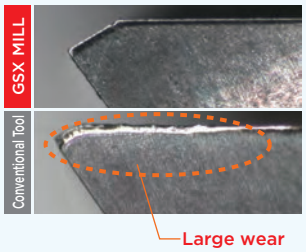
● Carbon Steel Groove Milling with GSX20000C



Gash land for stronger cutting edge

Tool Diameter ø6 (2 Flutes)
Work Material S50C
Cutting Conditions: vc = 87m/min (n = 4,615min⁻¹)
vf = 553mm/min (fz = 0.06mm/t)
ap = 3mm
ae = 6mm
Dry
Machine: Vertical Machining Centre BT50

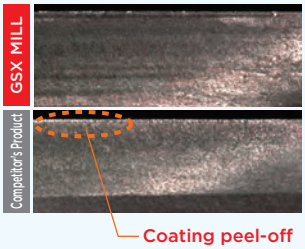
● Cast Iron Groove Milling with GSX20000C



GSX Coat for improved wear resistance

Tool Diameter ø10 (2 Flutes)
Work Material FCD600 equivalent
Cutting Conditions: vc = 66m/min (n = 2,100min⁻¹)
vf = 302mm/min (fz = 0.072mm/t)
ap = 5mm × 5 times
ae = 10mm
Dry
Machine: Vertical Machining Centre BT40

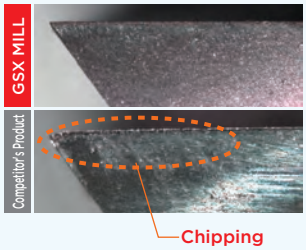
● Stainless Steel Milling with GSX20000C



Improved reliability even with wet machining

Tool Diameter ø10 (2 Flutes)
Work Material SUS304
Cutting Conditions: vc = 50m/min (n = 1,591min⁻¹)
vf = 127mm/min (fz = 0.04mm/t)
ap = 10mm
ae = 0.5mm
Dry
Machine: Vertical Machining Centre BT50

● S50C Side Milling with GSX20000S



The S type delivers optimum sharpness

Tool Diameter ø6 (2 Flutes)
Work Material S50C
Cutting Conditions: vc = 87m/min (n = 4,615min⁻¹)
vf = 553mm/min (fz = 0.06mm/t)
ap = 10mm
ae = 0.3mm
Dry
Machine: Vertical Machining Centre BT50

GSX MILL series

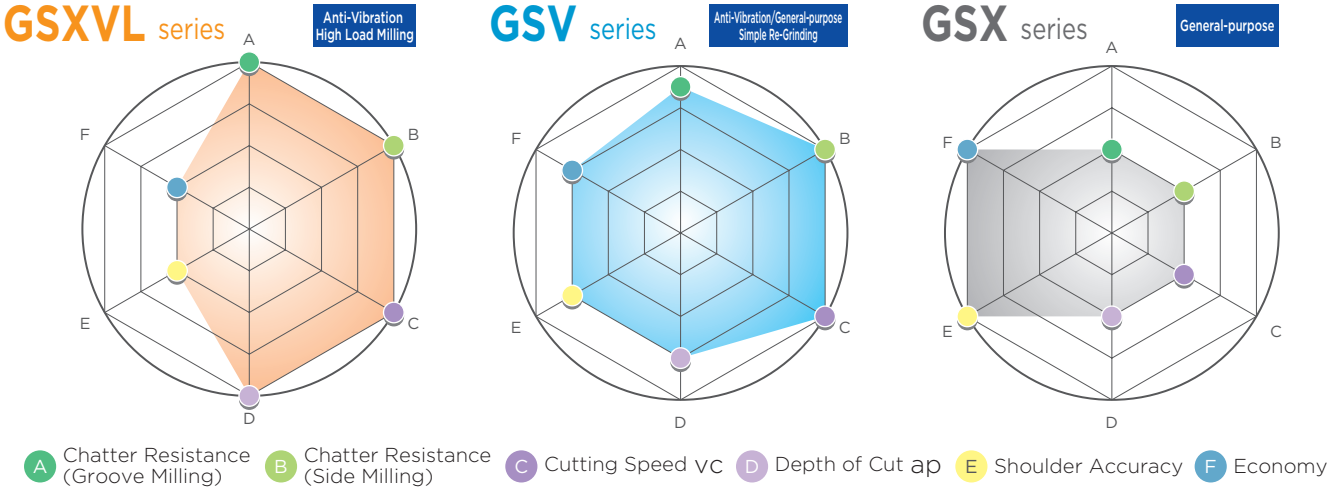
☞I68, I100 ☞I66, I98

■ Recommended Milling Examples

Applications	Side Milling		Groove Milling		Groove Finishing	
	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing
GSXVL series	◎	○	◎	◎	◎	○
GSV series	◎	◎	○	◎	◎	○

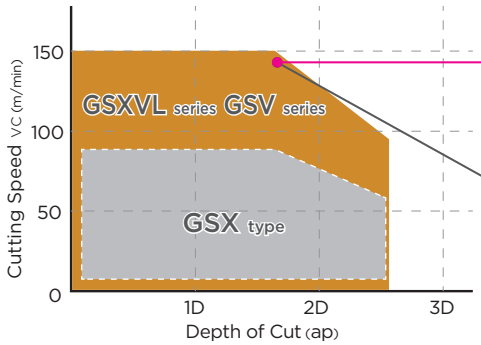
■ Differentiating the Usage of Anti-vibration GSXVL series / GSV series

GSXVL types exhibit outstanding performance for high load milling. GSV series is both chatter-resistant and economical.

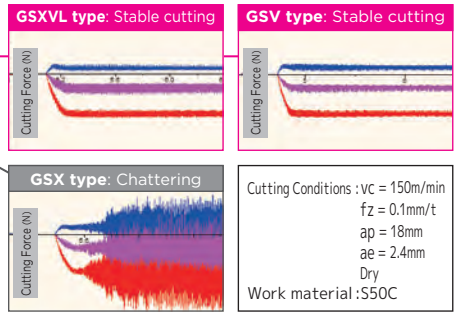


■ Application Range

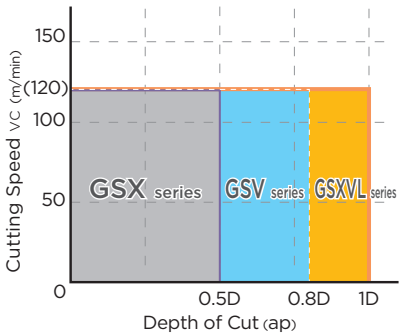
● Side Milling



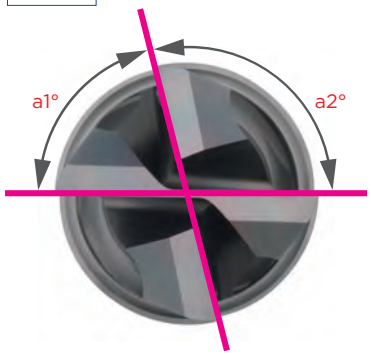
● Cutting Force



● Groove Milling



Irregular Pitch a1° ≠ a2°



Irregular Lead b1° ≠ b2°

Regular Lead b2° = b2°

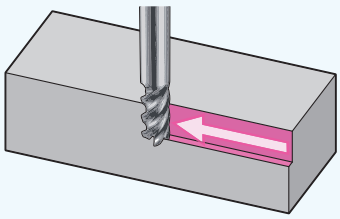
Rounded Land (Used for ø5mm and larger sizes)

GSX MILL series

■ Application Examples (Anti-vibration type)

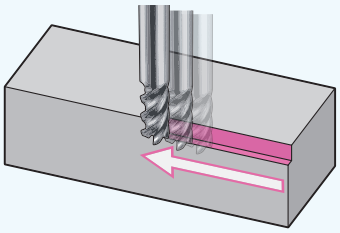
Work Material: S50C Tool Diameter: ø12 Cutting Conditions: Dry (Air Blow)

(1) Side Milling GSXVL series ◯ / GSV series ◎



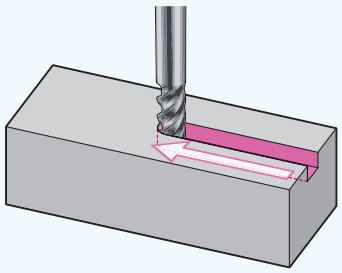
Cutting Conditions: vc = 102m/min (n = 4,100min^{-1}) Tool Diameter: ø8
vf = 1,080mm/min (0.1mm/t)
ap = 24mm, ae = 2.0mm

(2) High-speed Side Milling GSXVL series ◎ / GSV series ◎



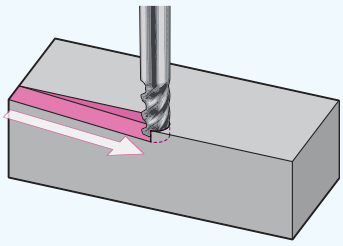
Cutting Conditions: vc = 151m/min (n = 4,000min^{-1}) Tool Diameter: ø12
vf = 4,800mm/min (0.3mm/t)
ap = 12mm, ae = 2.0mm

(3) Groove Milling GSXVL series ◎ / GSV series ◯



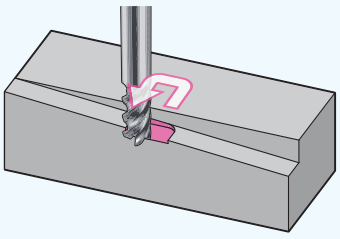
Cutting Conditions: vc = 90m/min (n = 2,400min^{-1}) Tool Diameter: ø12
vf = 960mm/min (0.1mm/t)
ap = 12mm

(4) Ramping GSXVL series ◎ / GSV series ◯



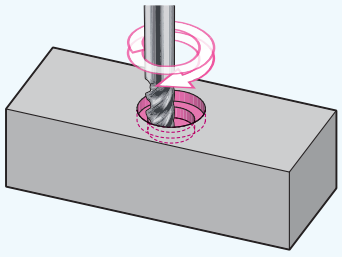
Cutting Conditions: vc = 90m/min (n = 2,400min^{-1}) Tool Diameter: ø12
vf = 480mm/min (0.05mm/t)
Ramp Angle 5°

(5) Seat Face Expansion Milling GSXVL series ◎ / GSV series ◎



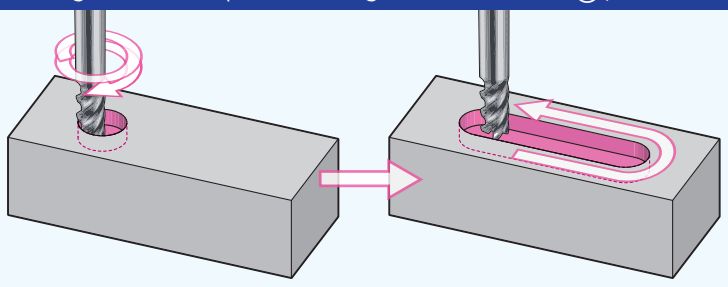
Cutting Conditions: vc = 90m/min (n = 2,400min^{-1}) Tool Diameter: ø12
vf = 960mm/min (0.1mm/t)

(6) Helical Milling x 2 GSXVL series ◎ / GSV series ◎



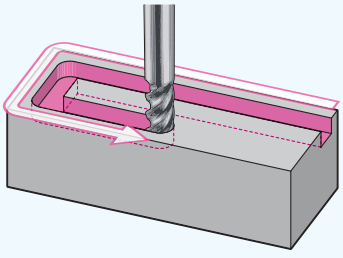
Cutting Conditions: vc = 90m/min (n = 2,400min^{-1}) Tool Diameter: ø12
vf = 480mm/min (0.05mm/t)
Ramp Angle 3°

(7) Helical Milling to Groove Expansion Milling x 2 GSXVL series ◎ / GSV series ◎



Cutting Conditions: vc = 90m/min (n = 2,400min^{-1}) Tool Diameter: ø12
[Helical] vf = 480mm/min (0.05mm/t) [Groove Expansion] vf = 672mm/min (0.07mm/t) [Finishing] vf = 1,920mm/min (0.2mm/t)
Ramp Angle 3°
ap = 24mm, ae = 0.1mm

(8) Engraving GSXVL series ◎ / GSV series ◯



Cutting Conditions: vc = 79m/min (n = 2,100min^{-1}) Tool Diameter: ø12
vf = 588mm/min (0.07mm/t)
ap = 12mm

GSX MILL series

I118

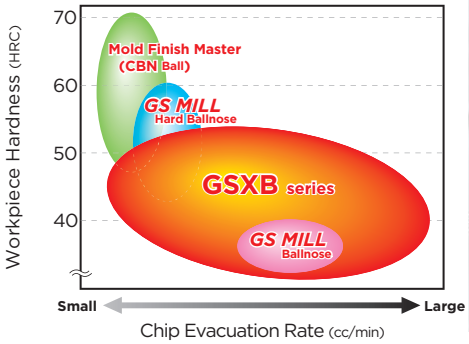
Recommended Milling Examples

Applications	Radius Milling		Profiling		Pocketing	
	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing
GSXB type	◎	◎	◎	◎	◎	◎

Improved Thermal Resistance and Wear Resistance

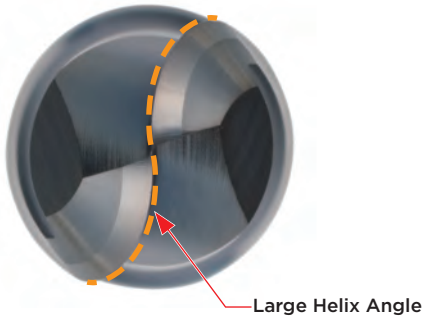
New coating combined with an ultra-fine grained carbide substrate for better thermal and wear resistance.

Application Range



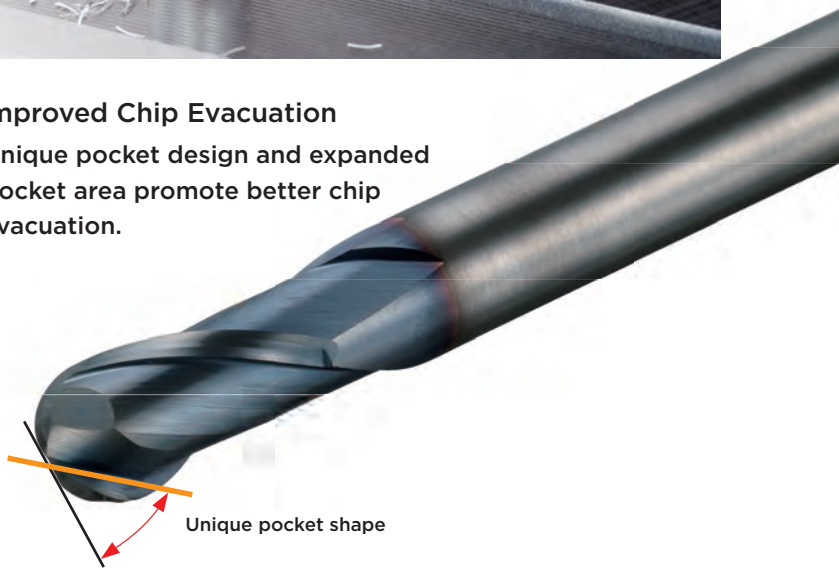
Reduced Cutting Force

Large helix angle on curved cutting edge reduces cutting force



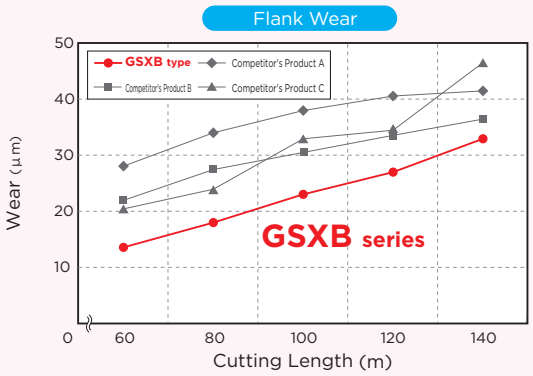
Improved Chip Evacuation

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



Application Examples

Die Steel Milling with GSXB20000



Work Material: SKD61 (50HRC)
Tool Diameter: R3.0 (2 Flutes)
Cutting Conditions: vc = 179m/min (n = 9,500min^{-1}), vf = 2,250mm/min (fz = 0.12mm/t)
ap = 0.2 to 1.0mm, pf = 0.3mm Wet
Equipment: Vertical Machining Centre BT40

SUMIDIA Coated AVIX type

New

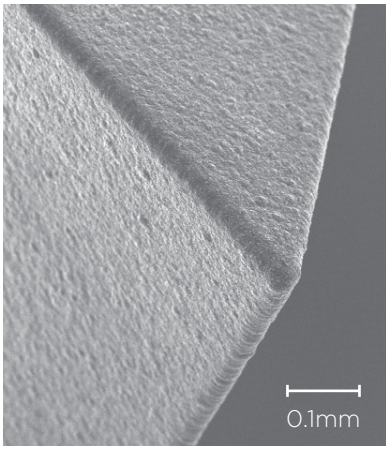
■ Features

- The use of a complex cross-nicked edge shape reduces cutting force and realises stability in high-efficiency machining
- Sharp cutting edge and uniform coating thickness along the cutting edge length realise high quality and long tool life

■ Complex Cross-nicked Shape

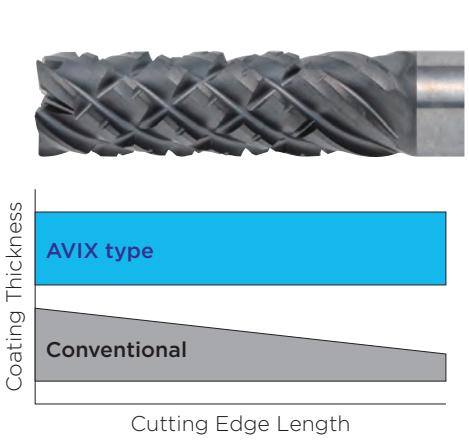
Variably sized nicked cutting edge shape realises stable machining with low resistance

■ Sharp Cutting Edge



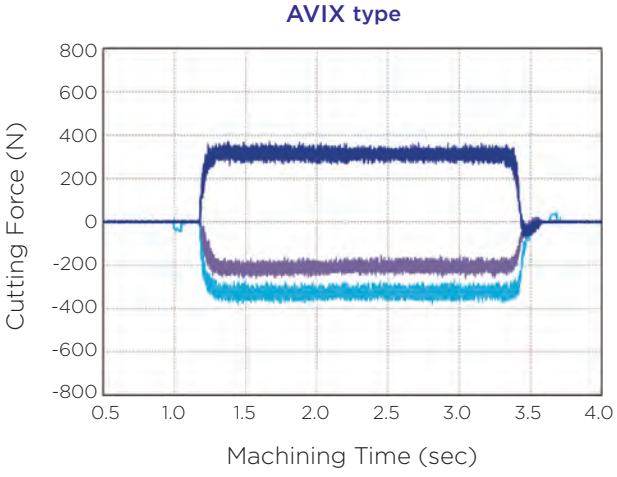
New coating process provides high quality sharp cutting edges

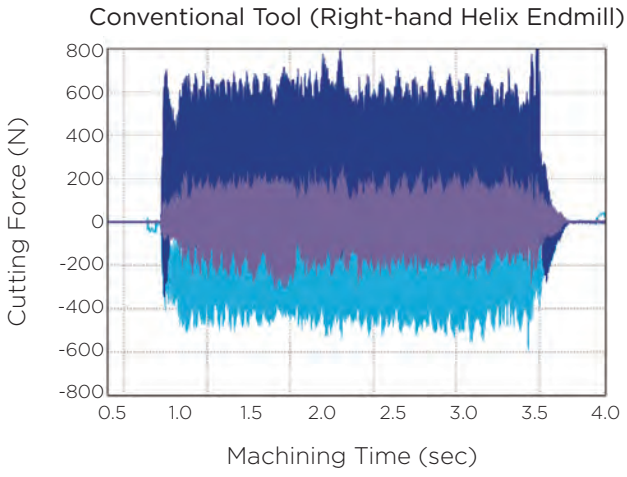
■ Diamond Coating with Uniform Thickness



Uniform coating thickness realises stable tool life

■ Cutting Performance

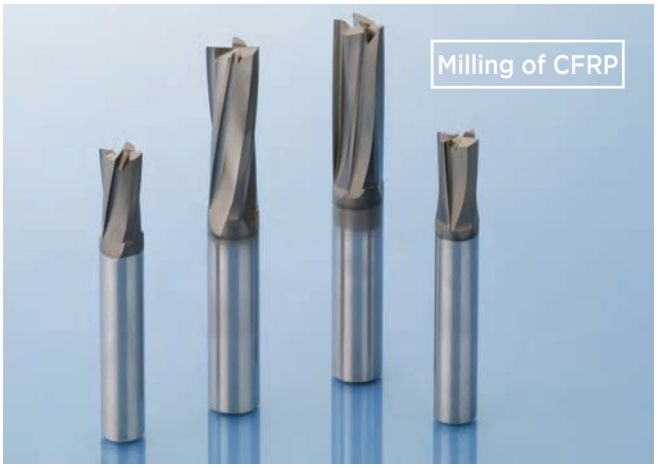




Work Material	: CFRP (Thickness 9.5mm)
Tool	: AVIX510000-R03 (Tool Diameter ø10, 5 flutes)
Cutting Conditions	: vc = 200m/min, vf = 2,000mm/min, Dry, Cutting

Suppresses chatter to realise stable machining

SUMIDIA Coated SSDC series



I94

■ Product Range

Cat. No.	Number of Flutes	Shape	Diameter (mm)
SSDC 4000	4 Flutes	Right-hand Helix I94	ø6 to ø12
SSDC 4000RL	4 Flutes	Right-Left-hand Helix I94	ø6 to ø12

■ Features and Applications

● Two different types of flute shapes are available.

SSDC series (Right-hand Helix type)

Achieving both better sharpness and longer tool life through optimising the rake and relief angles, along with a small helix angle.

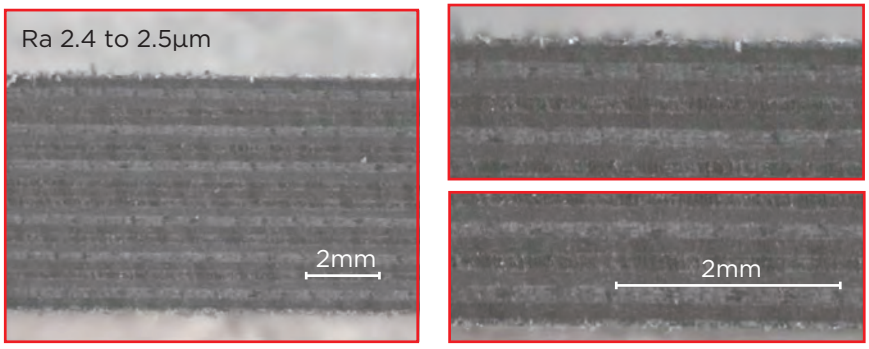
SSDCRL series (Right-Left-hand Helix type)

Right-Left-hand helix prevents delamination on top and bottom surfaces.
Cutting force is dispersed even with unstable clamping, improving surface quality.

■ Performance

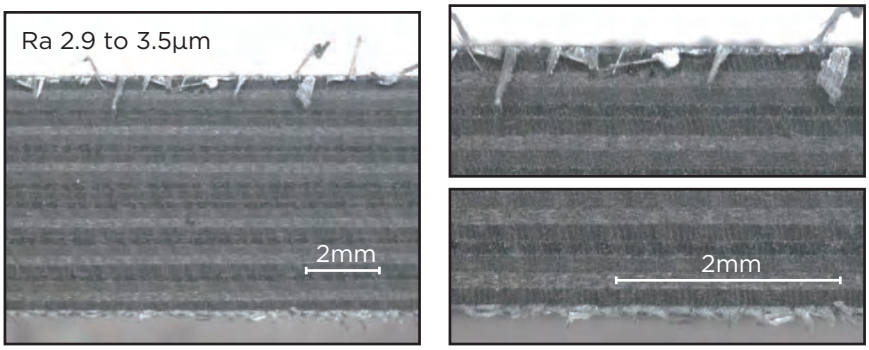
● Surface Finish Comparison

SSDC series



Work Material: CFRP
Tool Diameter: ø10 (4 Flutes)
Cutting Conditions: vc = 314m/min
(n = 10,000min^{-1})
vf = 1,000mm/min
(fz = 0.025mm/t)
Dry

Competitor's Product



Results

SSDC series

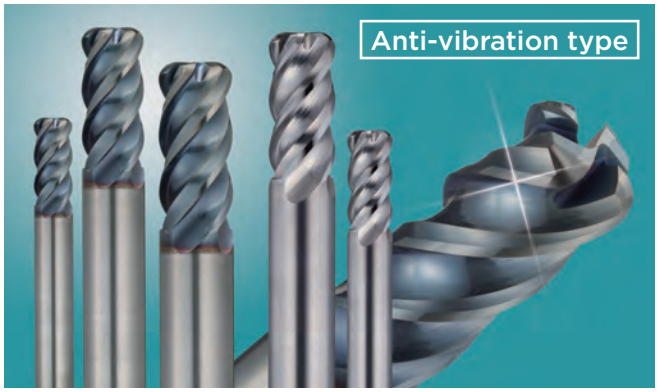
High surface quality with no burrs

Competitor's Product

Burrs are formed. Poor surface quality

SSEH series

☞I104, I113



☞I102, I112

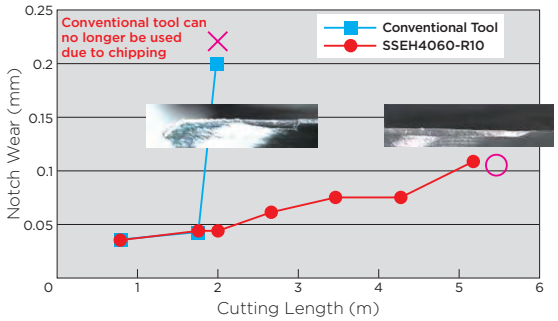
SSEH series Radius

■ Features and Applications

- High helix (45° helix) improves sharpness
- Combination of unique flute design and semi-mirrored rake face improves chip evacuation and adhesion resistance.
- Ultra-smooth coating with improved hardness and thermal resistance combined with tough carbide substrate improves tool life when working with heat-resistant alloys.
- Unique, smooth radius shape mitigates cutting impact and improves fracture resistance.
- Both coated and uncoated types are in stock to meet various conditions.

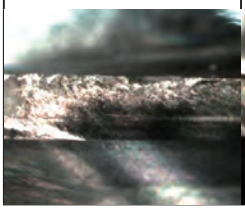
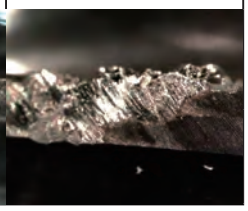
■ Application Examples

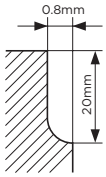
- Inconel 718 (Side Milling)



Tool Diameter: ø6 x R1
Cutting Conditions: vc = 20m/min, fz = 0.025mm/t,
ap = 5mm, ae = 0.5mm, Wet

- Inconel 713 (Side Milling)

SSEH 4100W-R10	Competitor's Product
	

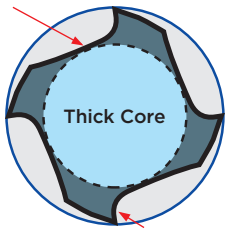


In Sumitomo Electric Hardmetal tests, the special coating with excellent adhesion resistance provided less cutting edge adhesion than the competitor's product and enabled fracture-free machining. The competitor's product suffered from edge adhesion leading to breakage.

Tool Diameter: ø10 x R1 Number of Workpieces: 150pcs./unit
Cutting Conditions: vc = 32m/min, fz = 0.018mm/t,
ap = 20mm, ae = 0.8mm, Dry

Unique, smooth radius design

Original wide arc flute



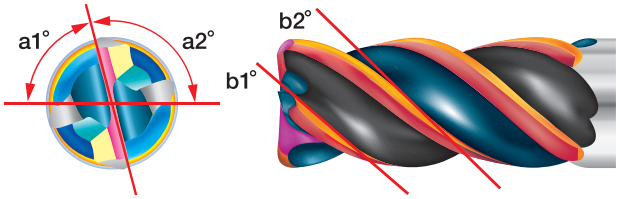
Semi-mirrored Rake Face

SSEH series Anti-vibration type

■ Features and Applications

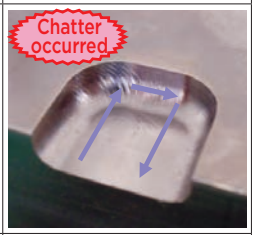
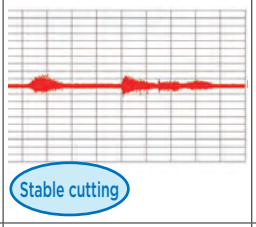
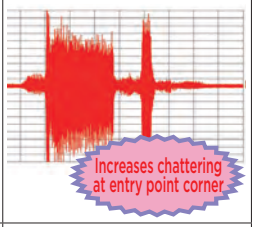
- New anti-vibration type added to the SSEH type endmill for exotic alloys.
- Builds on the same features of existing endmills by adding an irregular lead for exceptional anti-vibration performance.
- Compatible with a wide range of milling for exotic alloys including SUS, Inconel and Titanium.
- Reduces chattering for high-speed, high-feed cutting.
- Both coated and uncoated types are in stock to meet various conditions.

Irregular Pitch + Irregular Lead



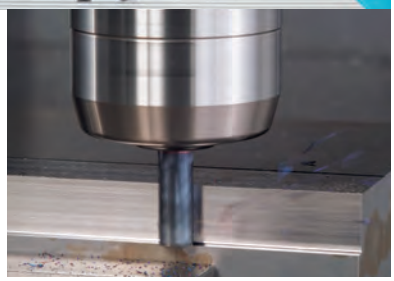
■ Application Examples

- Corner Finishing for Titanium Alloy

	SSEH Radius Anti-Vibration Endmill SSEHVL 4120W-30	No Anti-Vibration Mechanism Endmill ø12 x R3.0
Machined Surface		
Vibration Data		
Tool Breakage		

Cutting Conditions: vc = 42.4m/min (n = 1,125min^{-1})
vf = 200mm/min (fz = 0.044min/t)
ap = 5.0mm, ae = 12mm Wet

GS MILL Hard series

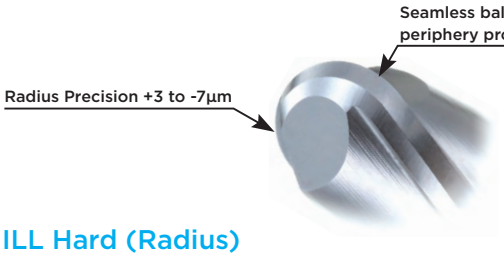


Side Milling of SKD61 (53HRC) with GS MILL Hard Radius

■ Features

GS MILL Hard (Square/Ballnose/Radius)

- With the high-Al content Al-Ti-Cr coating GS HARD Coat, oxidation resistance is now 3 times higher at 1,100°C, thereby improving thermal and wear resistance under ultra-high speed machining conditions.
- Coating surface roughness is similar to the standard GS Coat, which reduces cutting friction while enhancing smooth cutting.
- Ultra-fine grained high-hardness cemented carbide substrate with low cobalt content has been newly developed to improve substrate strength. This increases tool durability and prevents micro-plastic deformation of the cutting edge that occurs during ultra-high speed machining.
- New unique cross-sectional design achieves better chip evacuation and tool rigidity.
- Hard (Radius) / New endmill series with improved fracture resistance.
- Hard (Ballnose) / Utilises a new coating with excellent lubricity and thermal resistance. Achieves precision finishing of hardened steel, with a precise radial tolerance of +3 to -7µm and a seamless ball to periphery profile.



■ Product Range

● GS MILL Hard (Square/Ballnose)

Cat. No.	No. of Flutes	Shape	Diameter (mm)
GSH 4000SF **GSH 6000SF** **GSH 8000SF**	4 Flutes 6 Flutes 8 Flutes	 I72, I73, I74	ø1 to ø20
GSBH 20000SF	2 Flutes	 I120	R0.2 to R6.0 (ø0.4 to ø12)

● GS MILL Hard (Radius)

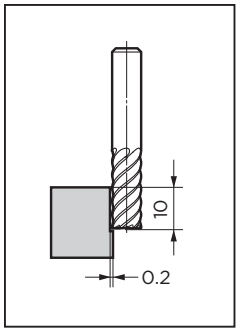
Cat. No.	No. of Flutes	Shape	Diameter (mm)
GSH 6000SF-R **GSH 8000SF-R**	6 Flutes 8 Flutes	 I110, I111	ø6 to ø20

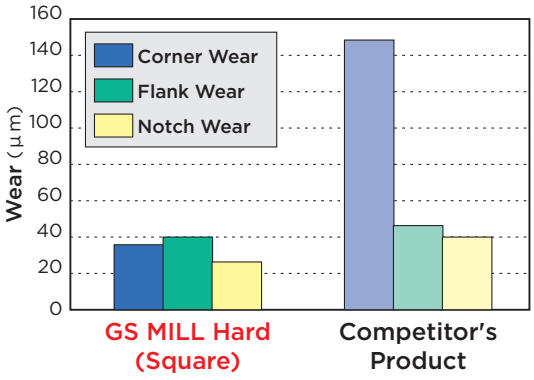
■ GS MILL Hard (Square)

● Cutting Performance (6 Flutes, ø10 Side Milling)

Work Material: SKD61 (53HRC)
Tool: GSH 6100SF (ø10)
Cutting Length: 75m
Cutting Conditions: vc = 800m/min (n = 25,460min^{-1})
fz = 0.07mm/t (f = 10,500mm/min)
ap = 10mm, ae = 0.2mm
Dry (Air Blow), Down Cut

Dimensions (mm)



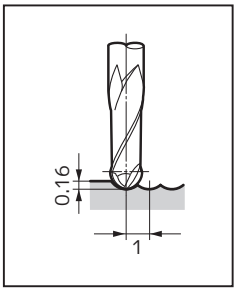


■ GS MILL Hard (Ballnose)

● Application Example (Precision Forging Die for Automotive Components)

Work Material: SKH51 (62HRC)
Tool: GSBH 20300SF (R3)
Cutting Length: Approx. 150m
Cutting Conditions: vc = 75m/min (n = 4,000min^{-1})
n = 4,000min^{-1}
fz = 0.075mm/t (f = 600mm/min)
ap = 0.16mm, pf = 1mm

Dimensions (mm)



GS MILL Hard (Ballnose)	Very small amount of wear 
Competitor's Product	Tip is worn flat 

DLC (Diamond-like Carbon) Coating Endmill series

AURORA Coat Endmills

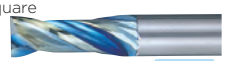
☞I86, I87, I121

☞I122

■ Features and Applications

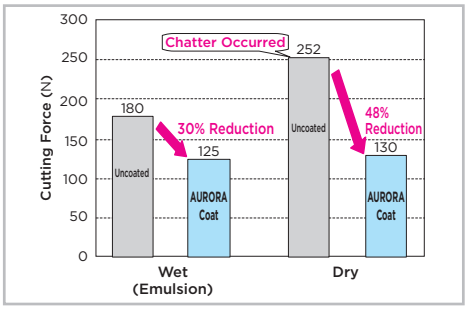
- Very smooth AURORA Coat results in low adhesion as well as a good surface finish
- With lower cutting forces and high rigidity, this series is suitable for low rigidity machines
- Available in 2- and 4-flutes square type as well as ballnose type endmills
- Added R0.05 to R2.00mm long neck ballnose endmills for machining copper electrodes

■ Product Range

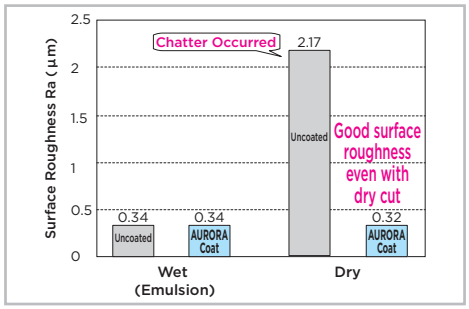
Cat. No.	No. of Flutes	Shape	Diameter (mm)
ASM 2000DL	2 Flutes	Square  ☞I86	ø2 to ø16
ASM 4000DL	4 Flutes	Square  ☞I87	ø2 to ø16
SNB 2000DL	2 Flutes	Ballnose  ☞I121	R1 to R8 (ø2 to ø16)
SNB2	2 Flutes	Long Neck Ballnose  ☞I122	R0.05 to R2 (ø0.1 to ø4)

■ Performance

● Comparison of Cutting Force



● Surface Roughness Comparison

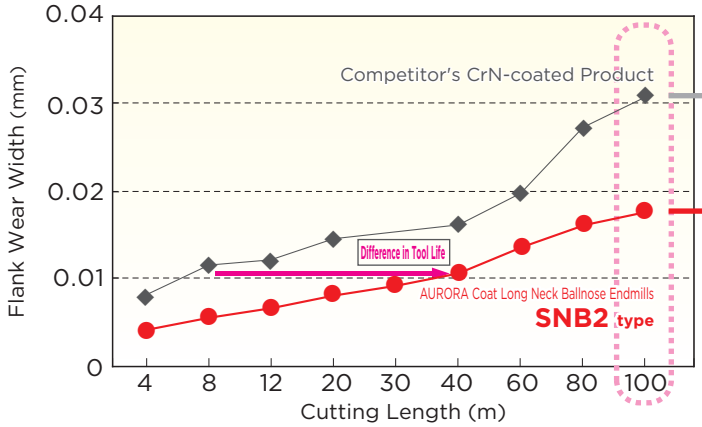


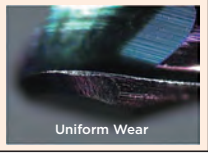
Work Material: A5052
Tool: ASM4100DL
ø10 (4 Flutes)
Cutting Conditions:
vc = 200m/min
n = 6,300min^{-1}
fz = 0.05mm/t
vf = 1,300mm/min
ap = 10mm
ae = 1mm
Down Cut

■ AURORA Coat Long Neck Ballnose Endmill SNB 2 type

- Achieves longer tool life compared with chromium nitride (CrN) coated carbide tools
- Products with ballnose radii of 0.05 to 2.00mm
- Reduced coefficient of friction
- Extremely smooth coating layer

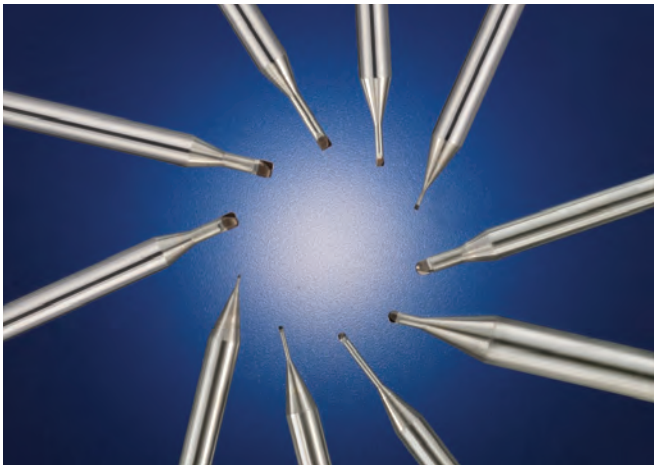
● Tool Wear Comparison



Tool	Cutting Length 100m	Cutting Conditions
Competitor's CrN-coated Product	 Large amount of wear	Work Material: Tough-pitch Copper Tool: R0.3mm Ballnose Endmill Cutting Conditions: vc = 57m/min n = 30,000min^{-1} vf = 700mm/min ap = 0.035mm ae = 0.03mm Oil Mist
SNB2 type	 Uniform Wear	

Excellent adhesion resistance in copper alloy milling with long tool life!

Mold Finish Master series



MOLD FINISH MASTER

MOLD FINISH MASTER

SUMIDIA BINDERLESS Endmills

NPDRS type/NPDBS type/NPDB type

SUMIDIA Coated Endmills

SDCB type

SUMIBORON Endmills

BNBR type/BNBP type/BNBC type

SUMIDIA BINDERLESS Radius Endmills

NPDRS type

Corner r

Binderless PCD

For Standard Finishing

I114

For Finishing of Cemented Carbide and Hard Brittle Materials

SUMIDIA BINDERLESS Ballnose Endmills

NPDBS type/NPDB type

Ballnose R

Binderless PCD

For Standard Finishing

For Precision Finishing

I124, I125

For Finishing of Cemented Carbide and Hard Brittle Materials

- Nano-polycrystalline diamond, which is harder than single-crystal diamond, is used for the cutting edge
- Enables direct engraving of cemented carbide, which is impossible for existing single-crystal or polycrystalline diamonds
- Ideal for finishing hard brittle materials, including cemented carbide. Realizes high-precision machining and long tool life
- Standard finish NPDBS type dramatically reduces machining cost
- Precision finish NPDB type prevents deformation by eliminating polishing process

SUMIDIA Coat Ballnose Endmills

SDCB type

Ballnose R

SUMIDIA Coat

For Rough/Medium-Finishing

I126

For Rough/Medium Finishing of Cemented Carbide and Hard Brittle Materials

- Realizes high-efficiency rough/medium finishing of carbide molds
- Newly developed diamond coating exhibits stable tool life
- Achieves the highest level of precision when used in combination with SUMIDIA BINDERLESS endmills

SUMIBORON Radius Endmills

BNBR type

Corner r

CBN

I116

For Hardened Steel

SUMIBORON Ballnose Endmills

BNBP type

Ballnose R

CBN

I128

For Hardened Steel

- Achieves longer tool life in high-speed, high-precision machining from pre-hardened steel to high-hardness steel in excess of **60HRC**
- Excellent machined surface quality drastically reduces the grinding process
- Edge design suited for profiling and face milling plus an extensive selection of grades allows a wide range of machining applications

SUMIBORON Ballnose Endmills

BNBC type

Ballnose R

CBN

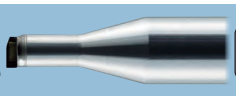
I130

For Copper Electrodes

- Ballnose radii of **R0.1mm to R0.5mm** are available in this series
- Utilising a high CBN content grade provides excellent edge sharpness and wear resistance
- Achieves high quality milling with high precision cutting edge

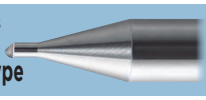
Mold Finish Master series

SUMIDIA BINDERLESS Radius Endmills
NPDRS type



Hard Brittle Materials

SUMIDIA BINDERLESS Ballnose Endmills
NPDBS type/NPDB type



Hard Brittle Materials

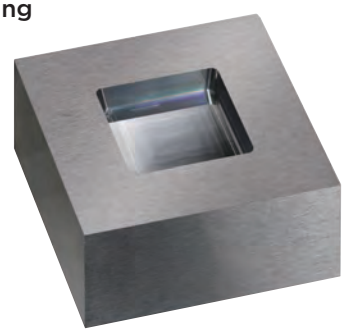
■ General Features

SUMIDIA BINDERLESS is polycrystalline diamond that directly binds nano-sized diamond particles with high strength without using any binders. Harder than single-crystal diamond, it has no cleavability, enabling machining of hard brittle materials such as cemented carbide and making new machining methods possible.

■ Features

- SUMIDIA BINDERLESS is a pure diamond material, but unlike single-crystal diamonds, it has no anisotropy. It therefore displays excellent wear resistance with less uneven wear.
- Thanks to its polycrystalline structure, SUMIDIA BINDERLESS does not have the cleavability peculiar to single-crystal diamonds and displays excellent fracture resistance.

● Pocketing

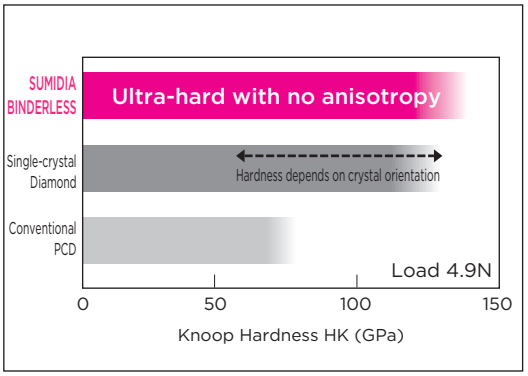


Work Material	: Cemented Carbide VF20 (Ultra-fine Grain AF1, 92.5HRA)
Machining Application	: 10mm x 10mm x Depth 2mm
Tool	: NPDRS 1100R005-030 (ø1 x Corner Radius R0.05mm)
Cutting Conditions	: n = 40,000min^{-1}, vf = 200mm/min pf = 0.005mm, Oil Mist
Surface Roughness	: Ra 0.015µm
Cutting Time	: 2 Hours

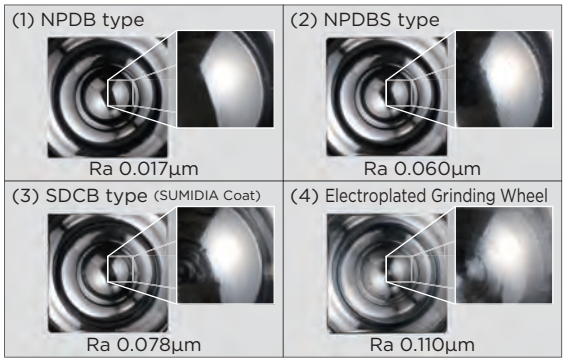
● Application for Medical Use (µ-TAS Mold)

Work Material	: Cemented Carbide VF20 (Ultra-fine Grain AF1, 92.5HRA)
Tool	: NPDB 1030-010 (Ballnose R0.3mm)
Cutting Conditions	: n = 38,000min^{-1}, vf = 95mm/min pf = 0.001mm Wet (Oil-based)
Machining Allowance	: 0.003mm
Surface Roughness	: Ra 0.016 to 0.020µm
Machining Distance	: 8.3m
Cutting Time	: Finishing 1 Hour 28 Minutes

■ Hardness



● Hemispherical Surface Milling



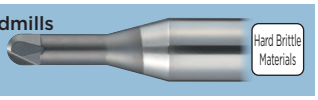
Work Material	: Cemented Carbide VF20 (Ultra-fine Grain AF1, 92.5HRA)
Machining Application	: ø6 (Hemispherical Surface Milling)
Tool	: (1) NPDB 1050-020 (Ballnose R0.5mm) (2) NPDBS 1050-020 (Ballnose R0.5mm) (3) SDCB 2R050-020 (Ballnose R0.5mm) (4) R0.5, #400
Cutting Conditions	: n = 40,000min^{-1}, vf = 120mm/min pf = 0.005mm, Oil Mist
Cutting Time	: 1 Hour 30 Minutes

● Application for Optical Use (Fly-Eye Lens Mold)

Work Material	: Cemented Carbide VF20 (Ultra-fine Grain AF1, 92.5HRA)
Tool	: Finishing NPDB 1050-020 (Ballnose R0.5mm) Roughing Diamond-Coated Endmill (Ballnose R0.5mm)
Cutting Conditions	: n = 60,000min^{-1}, vf = 300mm/min pf = 0.005mm, Oil Mist
Surface Roughness	: Ra 0.015µm
Cutting Time	: Finishing 2 Hours 40 Minutes Roughing 55 Minutes

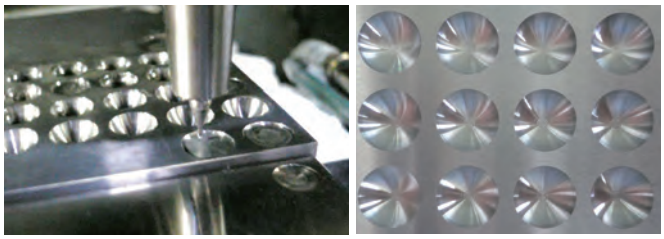
Mold Finish Master series

SUMIDIA Coat Ballnose Endmills SDCB type



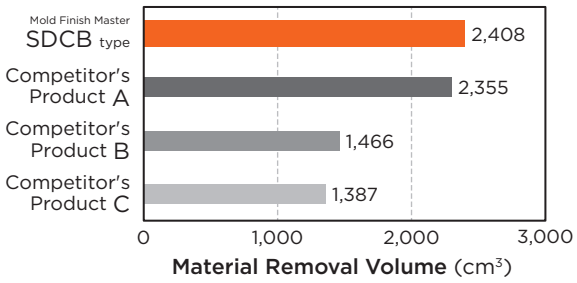
- Realizes high-efficiency roughing/medium finishing of carbide molds
- Newly developed diamond coating exhibits stable tool life
- Achieves the highest level of precision when used in combination with SUMIDIA BINDERLESS endmills

ø10mm hemispherical machining

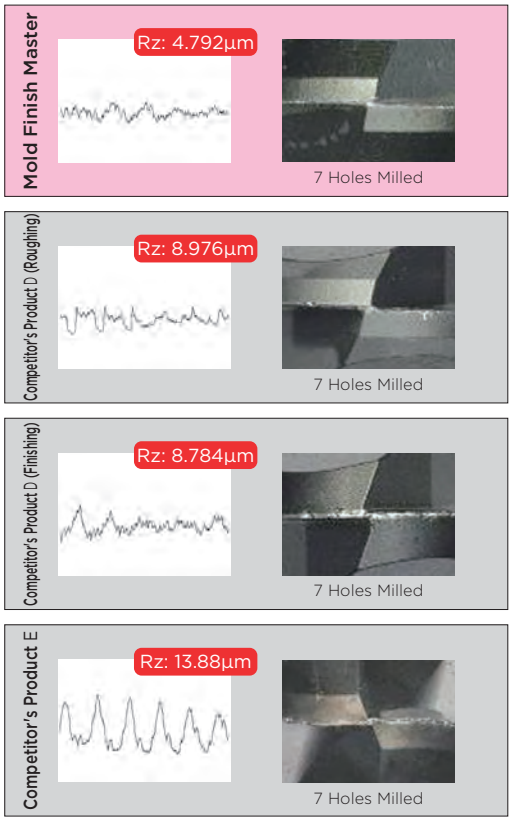


Work Material: Cemented Carbide AF1 (Ultra-Fine Grained Carbide)
Tool: SDCB 2R100-060
Cutting Conditions: n = 30,000min^{-1}, vf = 300mm/min
ae = 0.3mm, ap = 0.1mm, Air Blow

Tool Life



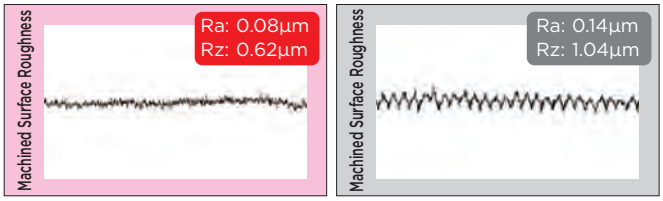
ø2.0 (ball radius R1.0mm) number of workpieces and tool damage (delamination)



SUMIBORON Mold Finish Master BNBR type

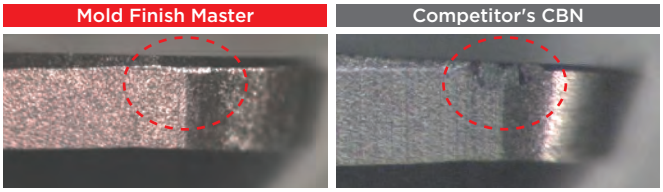
- Improved machined surface quality through use of a wiper edge (available on ø1.0mm endmills and larger)

Machined Surface Comparison



With Wiper Edge | Without Wiper Edge

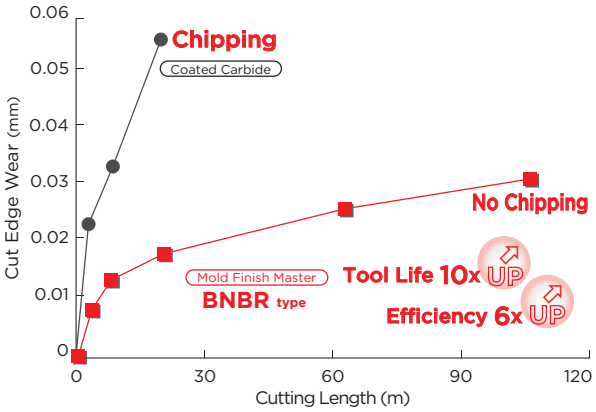
- Achieving longer tool life with the combination of SUMIBORON BNX20, which has excellent wear resistance, and an optimised cutting edge design



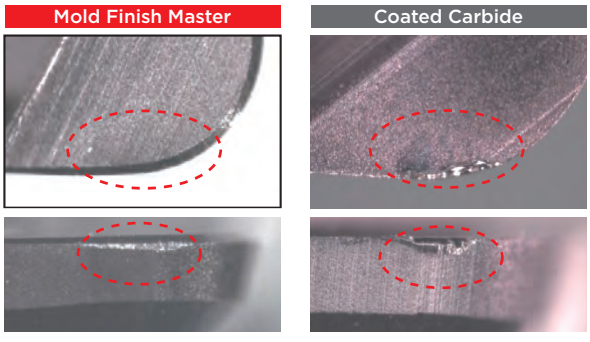
Small amount of wear | Breakage

Work Material: STAVAX (52HRC)
Tool: BNBR 2D200R050-0604 (ø2 x Corner Radius R0.5mm)
Cutting Conditions: n = 20,000min^{-1}, vf = 400mm/min
ap = 0.03mm, pf = 0.70mm Oil Mist

- Excellent wear resistance delivers almost 10 times longer tool life than carbide endmills



Tool Wear Comparison

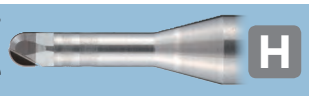


Small amount of wear | Breakage

Work Material: STAVAX (52HRC)
Tool: BNBR 2D200R050-0604 (ø2 x Corner Radius R0.5mm)
Mold Finish Master
Cutting Conditions: n = 20,000min^{-1}, vf = 800mm/min
ap = 0.03mm, pf = 0.70mm Oil Mist
Coated Carbide
Cutting Conditions: n = 4,800min^{-1}, vf = 120mm/min
ap = 0.03mm, pf = 0.70mm Oil Mist

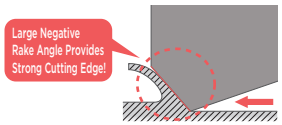
Mold Finish Master series

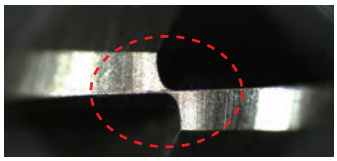
SUMIBORON Mold Finish Master BNBP type



H

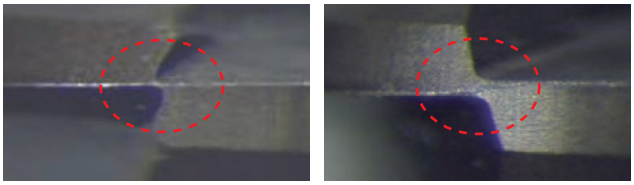
- Achieves high-precision machining with precise ball radius of ±0.005mm.
- Achieving stable interrupted milling with the combination of SUMIBORON BN350, which has excellent fracture resistance, and a cutting edge with a negative rake angle design.





Center cutting edge, stable machined surface quality

- Strong cutting edge enables use in roughing applications

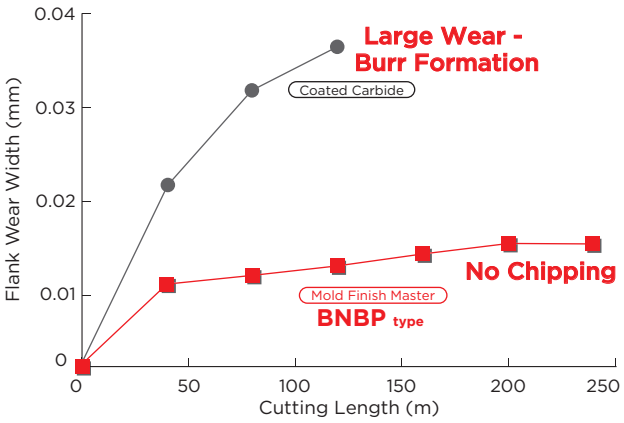


No fracture

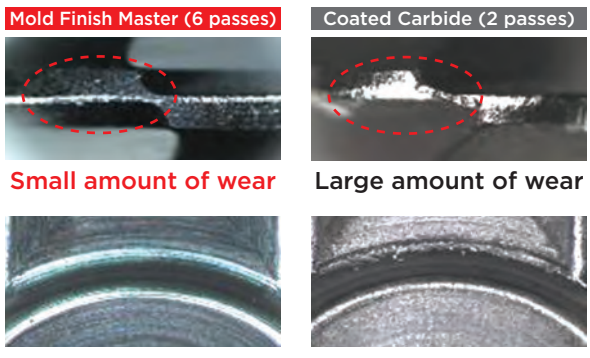
Chipping at center cutting edge

Work Material: STAVAX (52HRC)
Tool: BNBP 2R100-0554 (Ballnose R0.1mm)
Cutting Conditions: n = 25,000min^{-1}, vf = 1,500mm/min
ap = 0.10mm, pf = 0.20mm Oil Mist

- Excellent wear resistance and machined surface quality



Tool Wear Comparison



Small amount of wear

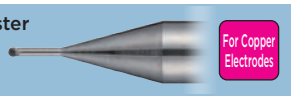
Large amount of wear

Good machined surface

Burr formation

Work Material: STAVAX (52HRC)
Tool: BNBP 2R030-0154 (Ballnose R0.3mm)
Cutting Conditions: n = 25,000min^{-1}, vf = 1,500mm/min
ap = 0.05mm, pf = 0.10mm Oil Mist

SUMIBORON Mold Finish Master BNBC type



For Copper Electrodes

- Ballnose radii of 0.1 to 0.5mm are available in this series.
- Achieves high quality milling with high precision cutting edge.

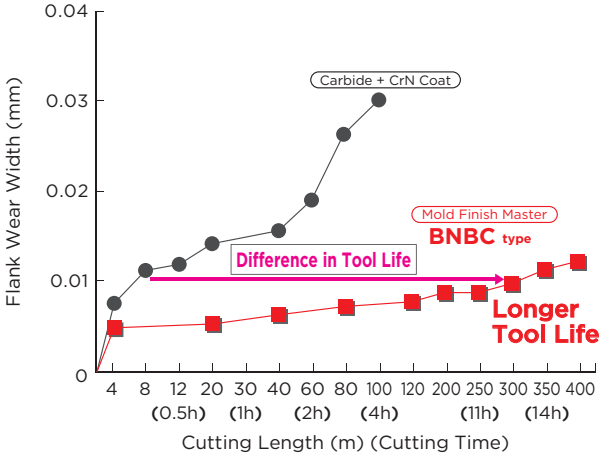
- Achieves further improved tool life

Low Wear (Cutting Length 400mm)

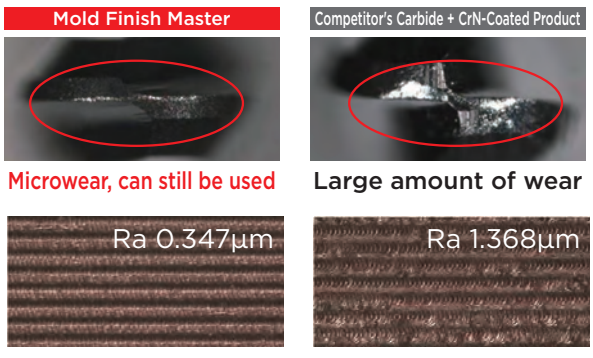
High Wear (Cutting Length 100mm)

Work Material: Tough-pitch Copper (Side Milling)
Tool: BNBC 2R030-0304 (Ballnose R0.3mm)
Cutting Conditions: n = 30,000min^{-1}, vf = 700mm/min
ap = 0.035mm, ae = 0.03mm Oil Mist

- Utilisation of high CBN content grade promotes excellent edge sharpness and wear resistance



Tool Wear Comparison



Microwear, can still be used

Large amount of wear

Good cutter marked surface with BNBC type

Work Material: Tough-pitch Copper
Tool: BNBC 2R030-0304 (Ballnose R0.3mm)
Cutting Conditions: vc = 57m/min, n = 30,000min^{-1}
fz = 0.007mm/t, vf = 400mm/min
ap = 0.005mm, ae = 0.05mm Oil Mist

AVIC type

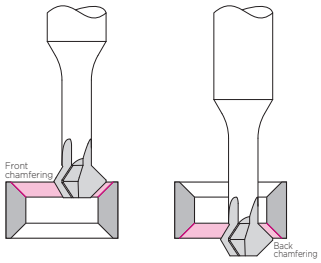
New

■ Features

- **High-raked cutting edge design significantly reduces cutting force**
  Realises burr-free machining and suppresses damage to laminated workpieces during machining
- Dedicated grades for machining titanium alloys (KH26) and nickel-based heat-resistant alloys (ACF07C) to achieve long and stable tool life
- **3-flute design enables high-efficiency machining**
- **Front and back chamfering is possible with a single tool**

■ Tool Shape

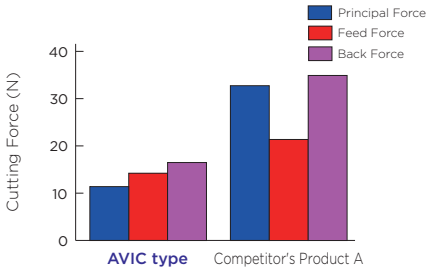
3-flute high-raked design; large rake angle → · Secondary burr control · Improved machined surface quality



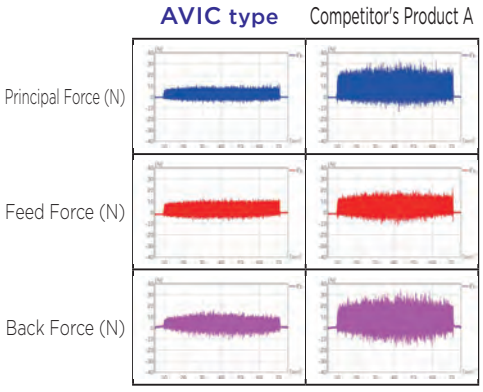
Front and back chamfering is possible with a single tool

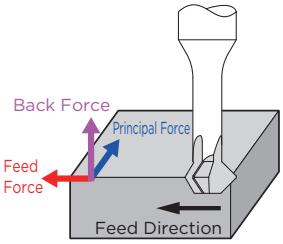
■ Cutting Performance

● Cutting Force



Work Material	:	Ti-6Al-4V
Tool	:	AVIC 306000-45-1.4 (ø6.0, KH26)
Cutting Conditions	:	vc = 27m/min, n = 1,070min^{-1}, vf = 107mm/min
Chamfering	:	C0.3mm

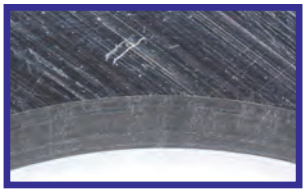




AVIC type effectively suppresses cutting force in chamfering

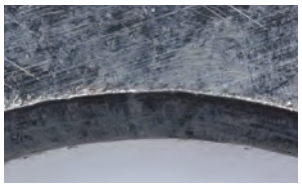
● Machined Surface Quality

AVIC type



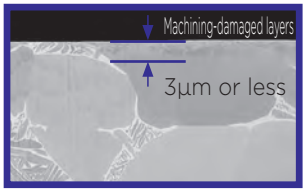
No secondary burrs

Competitor's Product B



Secondary burrs

AVIC type



Good, within specifications

Competitor's Product B

Workpiece laminate damage from machining
- Not acceptable

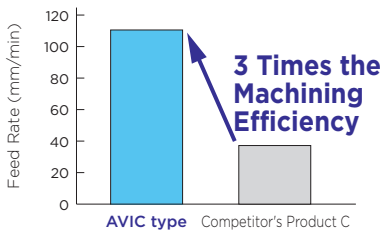
Work Material	:	Ti-6Al-4V
Tool	:	AVIC 306000-45-1.4 (3-flute, KH26 Solid Carbide) Competitor's Product B (1-flute, indexable cutter: Standard Product)
Cutting Conditions	:	vc = 27m/min, n = 1,070min^{-1}, vf = 107mm/min
Chamfering	:	C0.3mm

AVIC type suppresses secondary burr* generation

*Burrs generated during chamfering (deburring)

AVIC type suppresses the generation of the machining-damaged layers which cause problems on the finished surface of machined aerospace components

● Machining Efficiency



AVIC type has 3 flutes for higher-efficiency machining

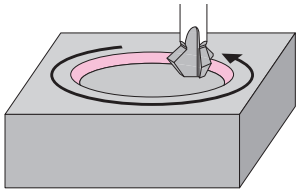


Image of Machining

MEMO

GSX 20000C-1.5D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

2 Flutes | GSX Coat | Gash Land | 30° Helix Angle | Shoulder Milling | Groove Milling | Groove Finishing | Face Milling | Spot Facing | Helical Milling | Ramping

Fig 1

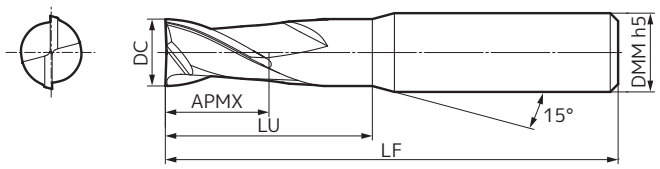
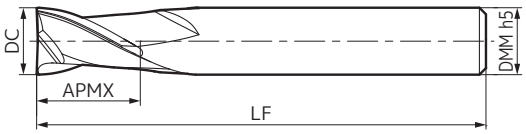


Fig 2



DC	Tolerance
D ≤ 3.0	0 -0.015
3.0 < D ≤ 12	0 -0.020
12.0 < D	0 -0.030

Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX 20050C-1.5D	●	**0.5**	1.0	1.4	40	4	1
20100C-1.5D	●	**1.0**	1.5	2.5	40	4	1
20150C-1.5D	●	**1.5**	2.3	3.3	40	4	1
20200C-1.5D	●	**2.0**	3.0	4.0	40	4	1
20250C-1.5D	●	**2.5**	3.8	4.8	40	4	1
GSX 20300C-1.5D	●	**3.0**	4.5	6.0	45	6	1
20350C-1.5D	●	**3.5**	5.3	6.8	45	6	1
20400C-1.5D	●	**4.0**	6.0	7.5	45	6	1
20450C-1.5D	●	**4.5**	6.8	8.3	50	6	1
20500C-1.5D	●	**5.0**	7.5	9.5	50	6	1
GSX 20550C-1.5D	●	**5.5**	8.3	10.3	50	6	1
20600C-1.5D	●	**6.0**	9.0	—	50	6	2
20650C-1.5D	●	**6.5**	10.0	12.0	60	8	1
20700C-1.5D	●	**7.0**	11.0	13.0	60	8	1
20750C-1.5D	●	**7.5**	12.0	14.0	60	8	1
GSX 20800C-1.5D	●	**8.0**	12.0	—	60	8	2
20850C-1.5D	●	**8.5**	13.0	15.0	70	10	1
20900C-1.5D	●	**9.0**	14.0	16.0	70	10	1
20950C-1.5D	●	**9.5**	15.0	17.0	70	10	1
21000C-1.5D	●	**10.0**	15.0	—	70	10	2
GSX 21050C-1.5D	●	**10.5**	16.0	18.5	75	12	1
21100C-1.5D	●	**11.0**	17.0	19.5	75	12	1
21150C-1.5D	●	**11.5**	18.0	20.5	75	12	1
21200C-1.5D	●	**12.0**	18.0	—	75	12	2
21300C-1.5D	●	**13.0**	20.0	23.5	90	16	1
GSX 21400C-1.5D	●	**14.0**	21.0	24.5	90	16	1
21500C-1.5D	●	**15.0**	23.0	26.5	90	16	1
21600C-1.5D	●	**16.0**	24.0	—	90	16	2
21700C-1.5D	●	**17.0**	26.0	30.5	100	20	1
21800C-1.5D	●	**18.0**	27.0	31.5	100	20	1
GSX 21900C-1.5D	●	**19.0**	29.0	33.5	100	20	1
22000C-1.5D	●	**20.0**	30.0	—	100	20	2
22500C-1.5D	●	**25.0**	38.0	—	120	25	2

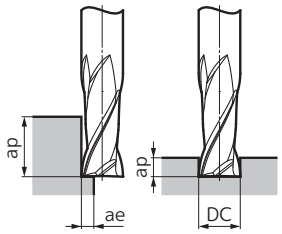
Grade: ACF20

Identification Code

GSX 2 1000 C - 1.5D

Series Code	Number of Flutes	Dia.	Corner Style C: Gash Land	Cutting Edge Length

GSX 20000C-1.5D type



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 maximum spindle speed available.

Side Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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		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		1,080	300	1,080	300	1,080	300	1,040	220	720	130	520	70	640	80	520	60
Standard Depth of Cut	ap	1.5DC										1.0DC					
	ae	0.05DC										0.02DC					

Groove Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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		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		1,080	240	1,080	304	1,080	304	1,040	224	720	128	520	72	640	56	256	24
Standard Depth of Cut	ap	0.2DC		0.5DC						0.2DC		0.05DC		0.2DC			

GSX 20000S-2D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

2 Flutes | GSX Coat | Sharp Corner | 30° Helix Angle | Shoulder Milling | Groove Finishing

Fig 1

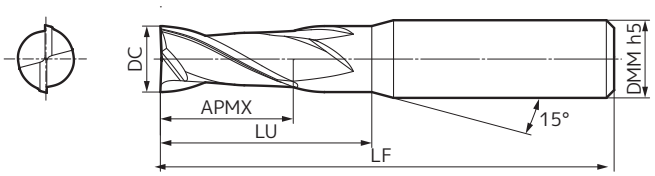
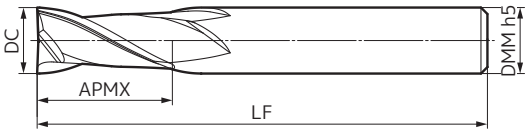


Fig 2



DC	Tolerance
D ≤ 3.0	0 -0.015
3.0 < D ≤ 12	0 -0.020
12.0 < D	0 -0.030

Body (Diameter ø0.3 to 4.3mm)

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX 20030S-2D	●	0.3	0.6	1.0	40	4	1
20040S-2D	●	0.4	0.8	1.2	40	4	1
20050S-2D	●	0.5	1.3	1.7	40	4	1
20060S-2D	●	0.6	1.3	1.8	40	4	1
20070S-2D	●	0.7	1.4	1.9	40	4	1
GSX 20080S-2D	●	0.8	1.6	2.1	40	4	1
20090S-2D	●	0.9	1.8	2.3	40	4	1
20100S-2D	●	1.0	2.5	3.5	40	4	1
20110S-2D	●	1.1	2.5	3.5	40	4	1
20120S-2D	●	1.2	2.5	3.5	40	4	1
GSX 20130S-2D	●	1.3	2.6	3.6	40	4	1
20140S-2D	●	1.4	2.8	3.8	40	4	1
20150S-2D	●	1.5	3.8	4.8	40	4	1
20150S-2D-S3	●	1.5	3.8	4.8	38	3	1
20160S-2D	●	1.6	3.8	4.8	40	4	1
GSX 20170S-2D	●	1.7	3.8	4.8	40	4	1
20180S-2D	●	1.8	3.8	4.8	40	4	1
20190S-2D	●	1.9	3.8	4.8	40	4	1
20200S-2D	●	2.0	5.0	6.0	40	4	1
20200S-2D-S3	●	2.0	5.0	6.0	38	3	1
GSX 20210S-2D	●	2.1	6.0	7.0	40	4	1
20220S-2D	●	2.2	6.0	7.0	40	4	1
20230S-2D	●	2.3	6.0	7.0	40	4	1
20240S-2D	●	2.4	6.0	7.0	40	4	1
20250S-2D	●	2.5	6.3	7.3	40	4	1
GSX 20260S-2D	●	2.6	7.0	8.0	40	4	1
20270S-2D	●	2.7	7.0	8.0	40	4	1
20280S-2D	●	2.8	7.0	8.0	40	4	1
20290S-2D	●	2.9	7.0	8.0	40	4	1
20300S-2D	●	3.0	7.5	9.0	45	6	1
GSX 20300S-2D-S3	●	3.0	7.5	—	38	3	2
20310S-2D	●	3.1	7.5	9.0	45	6	1
20320S-2D	●	3.2	7.5	9.0	45	6	1
20330S-2D	●	3.3	7.5	9.0	45	6	1
20340S-2D	●	3.4	7.5	9.0	45	6	1
GSX 20350S-2D	●	3.5	8.8	10.3	45	6	1
20360S-2D	●	3.6	8.8	10.3	45	6	1
20370S-2D	●	3.7	8.8	10.3	45	6	1
20380S-2D	●	3.8	8.8	10.3	45	6	1
20390S-2D	●	3.9	8.8	10.3	45	6	1
GSX 20400S-2D	●	4.0	11.0	14.0	45	6	1
20400S-2D-S4	●	4.0	11.0	—	45	4	2
20410S-2D	●	4.1	11.0	14.0	45	6	1
20420S-2D	●	4.2	11.0	14.0	45	6	1
20430S-2D	●	4.3	11.0	14.0	45	6	1

Grade: ACF20

GSX 20000S-2D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

2 Flutes | GSX Coat | Sharp Corner | 30° Helix Angle | Shoulder Milling | Groove Finishing

Fig 1

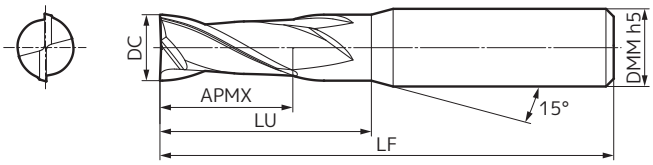
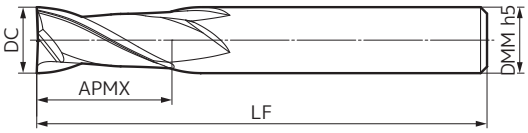


Fig 2



DC	Tolerance
D ≤ 3.0	0 -0.015
3.0 < D ≤ 12	0 -0.020
12.0 < D	0 -0.030

Body (Diameter ø4.4 to 8.8mm)

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX 20440S-2D	●	**4.4**	11.0	14.0	45	6	1
20450S-2D	●	**4.5**	11.3	12.8	50	6	1
20460S-2D	●	**4.6**	11.3	12.8	50	6	1
20470S-2D	●	**4.7**	11.3	12.8	50	6	1
20480S-2D	●	**4.8**	11.3	12.8	50	6	1
GSX 20490S-2D	●	**4.9**	11.3	12.8	50	6	1
20500S-2D	●	**5.0**	13.0	19.6	50	6	1
20510S-2D	●	**5.1**	13.0	19.6	50	6	1
20520S-2D	●	**5.2**	13.0	19.6	50	6	1
20530S-2D	●	**5.3**	13.0	19.6	50	6	1
GSX 20540S-2D	●	**5.4**	13.0	19.6	50	6	1
20550S-2D	●	**5.5**	13.0	19.6	50	6	1
20560S-2D	●	**5.6**	13.0	19.6	50	6	1
20570S-2D	●	**5.7**	13.0	19.6	50	6	1
20580S-2D	●	**5.8**	13.0	19.6	50	6	1
GSX 20590S-2D	●	**5.9**	13.0	19.6	50	6	1
20600S-2D	●	**6.0**	13.0	—	50	6	2
20610S-2D	●	**6.1**	13.0	19.6	50	8	1
20620S-2D	●	**6.2**	13.0	19.6	50	8	1
20630S-2D	●	**6.3**	13.0	19.6	50	8	1
GSX 20640S-2D	●	**6.4**	13.0	19.6	50	8	1
20650S-2D	●	**6.5**	13.0	19.6	60	8	1
20660S-2D	●	**6.6**	13.2	19.8	60	8	1
20670S-2D	●	**6.7**	13.4	20.0	60	8	1
20680S-2D	●	**6.8**	13.6	20.2	60	8	1
GSX 20690S-2D	●	**6.9**	13.8	20.4	60	8	1
20700S-2D	●	**7.0**	16.0	21.1	60	8	1
20710S-2D	●	**7.1**	16.0	21.1	60	8	1
20720S-2D	●	**7.2**	16.0	21.1	60	8	1
20730S-2D	●	**7.3**	16.0	21.1	60	8	1
GSX 20740S-2D	●	**7.4**	16.0	21.1	60	8	1
20750S-2D	●	**7.5**	16.0	21.1	60	8	1
20760S-2D	●	**7.6**	16.0	21.1	60	8	1
20770S-2D	●	**7.7**	16.0	21.1	60	8	1
20780S-2D	●	**7.8**	16.0	21.1	60	8	1
GSX 20790S-2D	●	**7.9**	16.0	21.1	60	8	1
20800S-2D	●	**8.0**	19.0	—	60	8	2
20810S-2D	●	**8.1**	19.0	24.1	60	10	1
20820S-2D	●	**8.2**	19.0	24.1	60	10	1
20830S-2D	●	**8.3**	19.0	24.1	60	10	1
GSX 20840S-2D	●	**8.4**	19.0	24.1	60	10	1
20850S-2D	●	**8.5**	19.0	24.1	70	10	1
20860S-2D	●	**8.6**	19.0	24.1	70	10	1
20870S-2D	●	**8.7**	19.0	24.1	70	10	1
20880S-2D	●	**8.8**	19.0	24.1	70	10	1

Grade: ACF20

GSX 20000S-2D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

2 Flutes | GSX Coat | Sharp Corner | 30° Helix Angle | Shoulder Milling | Groove Finishing

Fig 1

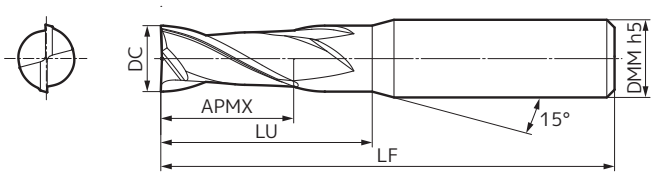
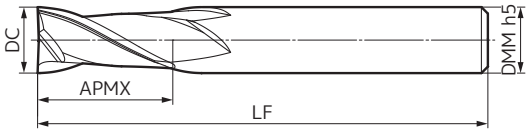


Fig 2



DC	Tolerance
D ≤ 3.0	0 -0.015
3.0 < D ≤ 12	0 -0.020
12.0 < D	0 -0.030

Body (Diameter ø8.9 to 25.0mm)

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX 20890S-2D	●	**8.9**	19.0	24.1	70	10	1
20900S-2D	●	**9.0**	19.0	24.1	70	10	1
20910S-2D	●	**9.1**	19.0	24.1	70	10	1
20920S-2D	●	**9.2**	19.0	24.1	70	10	1
20930S-2D	●	**9.3**	19.0	24.1	70	10	1
GSX 20940S-2D	●	**9.4**	19.0	24.1	70	10	1
20950S-2D	●	**9.5**	20.0	25.1	70	10	1
20960S-2D	●	**9.6**	20.0	25.1	70	10	1
20970S-2D	●	**9.7**	20.0	25.1	70	10	1
20980S-2D	●	**9.8**	20.0	25.1	70	10	1
GSX 20990S-2D	●	**9.9**	20.0	25.1	70	10	1
21000S-2D	●	**10.0**	22.0	—	70	10	2
21050S-2D	●	**10.5**	22.0	24.5	75	12	1
21100S-2D	●	**11.0**	22.0	24.5	75	12	1
21150S-2D	●	**11.5**	23.0	25.5	75	12	1
GSX 21200S-2D	●	**12.0**	26.0	—	75	12	2
21250S-2D	●	**12.5**	26.0	29.5	75	16	1
21300S-2D	●	**13.0**	26.0	29.5	90	16	1
21400S-2D	●	**14.0**	28.0	31.5	90	16	1
21500S-2D	●	**15.0**	30.0	33.5	90	16	1
GSX 21600S-2D	●	**16.0**	32.0	—	90	16	2
21700S-2D	●	**17.0**	35.0	39.5	100	20	1
21800S-2D	●	**18.0**	40.0	44.5	100	20	1
21900S-2D	●	**19.0**	40.0	44.5	100	20	1
22000S-2D	●	**20.0**	40.0	—	100	20	2
GSX 22100S-2D	●	**21.0**	42.0	47.0	110	25	1
22200S-2D	●	**22.0**	44.0	49.0	110	25	1
22300S-2D	●	**23.0**	46.0	51.0	120	25	1
22400S-2D	●	**24.0**	48.0	53.0	120	25	1
22500S-2D	●	**25.0**	50.0	—	120	25	2

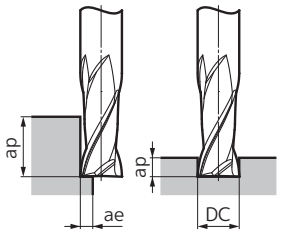
Grade: ACF20

Identification Code

GSX 2 0150 S - 2D - S3

Series Code	Number of Flutes	Dia.	Corner Style S: Sharp Edge	Cutting Edge Length	Shank Dia.

GSX 20000S-2D type



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 chatter 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 maximum spindle speed available.

Side Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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		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
25.0		960	220	960	220	960	220	880	170	600	85	440	50	520	60	440	45
Standard Depth of Cut	ap	2.0DC															
	ae	0.02DC										0.01DC					

Groove Finishing

Work Material / Cutting Conditions		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-Resistant Alloy 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		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
25.0		960	220	960	220	960	220	880	170	600	85	440	50	520	60	440	45
Standard Depth of Cut	ap	1.5DC															
	ae	Below 0.02DC															

GSX 20000C-2D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

2 Flutes | GSX Coat | Gash Land | 30° Helix Angle | Shoulder Milling | Groove Milling | Groove Finishing | Face Milling | Spot Facing | Helical Milling | Ramping

Fig 1

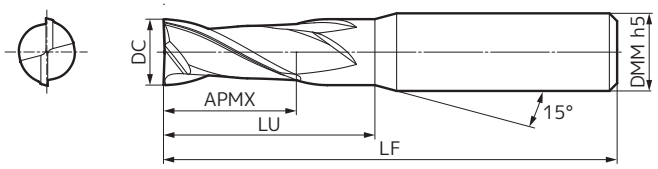
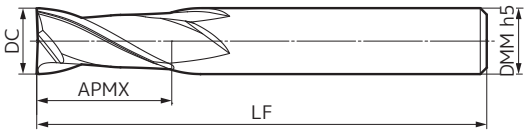


Fig 2



DC	Tolerance
D ≤ 3.0	0 -0.015
3.0 < D ≤ 12	0 -0.020
12.0 < D	0 -0.030

Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX 20050C-2D	●	**0.5**	1.0	1.4	40	4	1
20100C-2D	●	**1.0**	2.0	3.0	40	4	1
20150C-2D	●	**1.5**	3.0	4.0	40	4	1
20200C-2D	●	**2.0**	4.0	5.0	40	4	1
20250C-2D	●	**2.5**	5.0	6.0	40	4	1
GSX 20300C-2D	●	**3.0**	6.0	7.5	45	6	1
20350C-2D	●	**3.5**	7.0	8.5	45	6	1
20400C-2D	●	**4.0**	8.0	9.5	45	6	1
20450C-2D	●	**4.5**	9.0	10.5	50	6	1
20500C-2D	●	**5.0**	10.0	12.0	50	6	1
GSX 20550C-2D	●	**5.5**	11.0	13.0	50	6	1
20600C-2D	●	**6.0**	12.0	—	50	6	2
20650C-2D	●	**6.5**	13.0	15.0	60	8	1
20700C-2D	●	**7.0**	14.0	16.0	60	8	1
20750C-2D	●	**7.5**	15.0	17.0	60	8	1
GSX 20800C-2D	●	**8.0**	16.0	—	60	8	2
20850C-2D	●	**8.5**	17.0	19.0	70	10	1
20900C-2D	●	**9.0**	18.0	20.0	70	10	1
20950C-2D	●	**9.5**	19.0	21.0	70	10	1
21000C-2D	●	**10.0**	20.0	—	70	10	2
GSX 21050C-2D	●	**10.5**	21.0	23.5	75	12	1
21100C-2D	●	**11.0**	22.0	24.5	75	12	1
21150C-2D	●	**11.5**	23.0	25.5	75	12	1
21200C-2D	●	**12.0**	24.0	—	75	12	2
21300C-2D	●	**13.0**	26.0	29.5	90	16	1
GSX 21400C-2D	●	**14.0**	28.0	31.5	90	16	1
21500C-2D	●	**15.0**	30.0	33.5	90	16	1
21600C-2D	●	**16.0**	32.0	—	90	16	2
21700C-2D	●	**17.0**	34.0	38.5	100	20	1
21800C-2D	●	**18.0**	36.0	40.5	100	20	1
GSX 21900C-2D	●	**19.0**	38.0	42.5	100	20	1
22000C-2D	●	**20.0**	40.0	—	100	20	2
22500C-2D	●	**25.0**	50.0	—	120	25	2

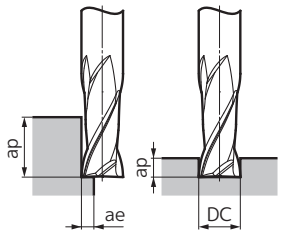
Grade: ACF20

Identification Code

GSX 2 0050 C - 2D

Series Code	Number of Flutes	Dia.	Corner Style C: Gash Land	Cutting Edge Length

GSX 20000C-2D type



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 chatter 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 maximum spindle speed available.

Side Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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		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	ap	1.5DC										1.0DC					
	ae	0.05DC										0.02DC					

Groove Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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		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	ap	0.2DC		0.5DC						0.2DC		0.05DC		0.2DC			

GSX 20000S-3D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

2 Flutes | GSX Coat | Sharp Corner | 30° Helix Angle | Shoulder Milling | Groove Finishing

Fig 1

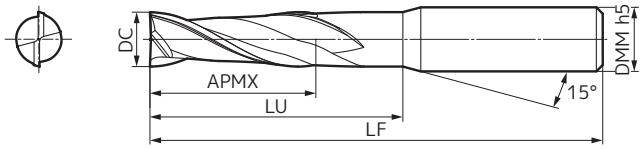
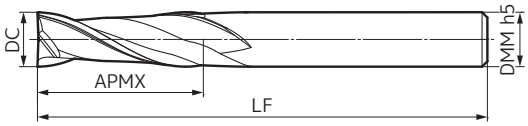


Fig 2



DC	Tolerance
D ≤ 3.0	0 -0.015
3.0 < D ≤ 12	0 -0.020
12.0 < D	0 -0.030

Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX 20050S-3D	●	0.5	1.5	1.9	40	4	1
20100S-3D	●	1.0	3.0	4.0	40	4	1
20150S-3D	●	1.5	4.5	5.5	40	4	1
20200S-3D	●	2.0	6.0	7.0	40	4	1
20250S-3D	●	2.5	7.5	8.5	40	4	1
GSX 20260S-3D	●	2.6	8.0	9.5	50	4	1
20270S-3D	●	2.7	8.5	10.0	50	4	1
20280S-3D	●	2.8	9.0	10.5	50	4	1
20290S-3D	●	2.9	9.0	10.5	50	4	1
20300S-3D	●	3.0	9.0	10.5	50	6	1
GSX 20350S-3D	●	3.5	12.0	13.5	50	6	1
20400S-3D	●	4.0	12.0	13.5	50	6	1
20450S-3D	●	4.5	15.0	16.5	50	6	1
20500S-3D	●	5.0	15.0	17.0	50	6	1
20550S-3D	●	5.5	18.0	20.0	50	6	1
GSX 20600S-3D	●	6.0	18.0	—	50	6	2
20650S-3D	●	6.5	20.0	22.0	70	8	1
20700S-3D	●	7.0	21.0	23.0	70	8	1
20750S-3D	●	7.5	23.0	25.0	70	8	1
20800S-3D	●	8.0	24.0	—	70	8	2
GSX 20850S-3D	●	8.5	26.0	28.0	75	10	1
20900S-3D	●	9.0	27.0	29.0	75	10	1
20950S-3D	●	9.5	29.0	31.0	75	10	1
21000S-3D	●	10.0	30.0	—	90	10	2
21050S-3D	●	10.5	32.0	34.5	90	12	1
GSX 21100S-3D	●	11.0	33.0	35.5	90	12	1
21150S-3D	●	11.5	35.0	37.5	90	12	1
21200S-3D	●	12.0	36.0	—	90	12	2
21300S-3D	●	13.0	39.0	42.5	100	16	1
21400S-3D	●	14.0	42.0	45.5	110	16	1
GSX 21500S-3D	●	15.0	45.0	48.5	110	16	1
21600S-3D	●	16.0	48.0	—	110	16	2
21700S-3D	●	17.0	51.0	55.5	110	20	1
21800S-3D	●	18.0	54.0	58.5	120	20	1
21900S-3D	●	19.0	57.0	61.5	120	20	1
GSX 22000S-3D	●	20.0	60.0	—	120	20	2
22400S-3D	●	24.0	72.0	77.0	130	25	1
22500S-3D	●	25.0	75.0	—	130	25	2

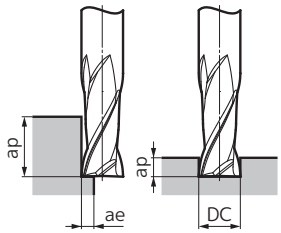
Grade: ACF20

Identification Code

GSX 2 0050 S - 3D

Series Code	Number of Flutes	Dia.	Corner Style S: Sharp Edge	Cutting Edge Length

GSX 20000S-3D type



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 chatter 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 maximum spindle speed available.

Side Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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		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
25.0		680	130	680	130	680	130	640	100	480	80	280	40	320	45	280	35
Standard Depth of Cut	ap	2.5DC								2.0DC							
	ae	Below ø3: 0.02DC Above ø3: 0.05DC								0.01DC							

Groove Finishing

Work Material / Cutting Conditions		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-Resistant Alloy 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		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
25.0		680	130	680	130	680	130	640	100	480	80	280	40	320	45	280	35
Standard Depth of Cut	ap	1.5DC															
	ae	Below 0.02DC															

GSX 20000C-3D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

2 Flutes | GSX Coat | Gash Land | 30° Helix Angle | Shoulder Milling | Groove Milling | Groove Finishing | Face Milling | Spot Facing

Fig 1

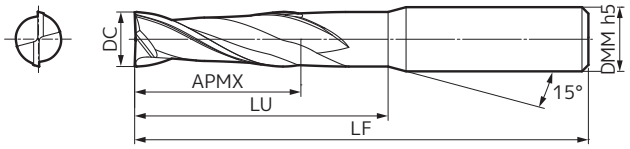
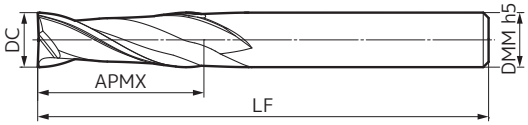


Fig 2



DC	Tolerance
D ≤ 3.0	0 -0.015
3.0 < D ≤ 12	0 -0.020
12.0 < D	0 -0.030

Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX 20050C-3D	●	**0.5**	1.5	1.9	40	4	1
20100C-3D	●	**1.0**	3.0	4.0	40	4	1
20150C-3D	●	**1.5**	4.5	5.5	40	4	1
20200C-3D	●	**2.0**	6.0	7.0	40	4	1
20250C-3D	●	**2.5**	7.5	8.5	40	4	1
GSX 20300C-3D	●	**3.0**	9.0	10.5	50	6	1
20350C-3D	●	**3.5**	11.0	12.5	50	6	1
20400C-3D	●	**4.0**	12.0	13.5	50	6	1
20450C-3D	●	**4.5**	14.0	15.5	50	6	1
20500C-3D	●	**5.0**	15.0	17.0	50	6	1
GSX 20550C-3D	●	**5.5**	17.0	19.0	50	6	1
20600C-3D	●	**6.0**	18.0	—	50	6	2
20650C-3D	●	**6.5**	20.0	22.0	70	8	1
20700C-3D	●	**7.0**	21.0	23.0	70	8	1
20750C-3D	●	**7.5**	23.0	25.0	70	8	1
GSX 20800C-3D	●	**8.0**	24.0	—	70	8	2
20850C-3D	●	**8.5**	26.0	28.0	75	10	1
20900C-3D	●	**9.0**	27.0	29.0	75	10	1
20950C-3D	●	**9.5**	29.0	31.0	75	10	1
21000C-3D	●	**10.0**	30.0	—	90	10	2
GSX 21050C-3D	●	**10.5**	32.0	34.5	90	12	1
21100C-3D	●	**11.0**	33.0	35.5	90	12	1
21150C-3D	●	**11.5**	35.0	37.5	90	12	1
21200C-3D	●	**12.0**	36.0	—	90	12	2
21300C-3D	●	**13.0**	39.0	42.5	100	16	1
GSX 21400C-3D	●	**14.0**	42.0	45.5	110	16	1
21500C-3D	●	**15.0**	45.0	48.5	110	16	1
21600C-3D	●	**16.0**	48.0	—	110	16	2
21700C-3D	●	**17.0**	51.0	55.5	110	20	1
21800C-3D	●	**18.0**	54.0	58.5	120	20	1
GSX 21900C-3D	●	**19.0**	57.0	61.5	120	20	1
22000C-3D	●	**20.0**	60.0	—	120	20	2
22500C-3D	●	**25.0**	75.0	—	130	25	2

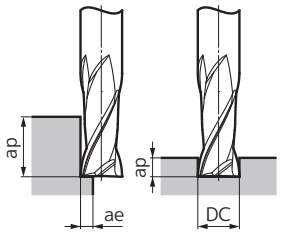
Grade: ACF20

Identification Code

GSX 2 0100 C - 3D

Series Code	Number of Flutes	Dia.	Corner Style C: Gash Land	Cutting Edge Length

GSX 20000C-3D type



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 some cases, chattering may occur in early stages of milling but will cease after 2m of cutting.
5. If chatter 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 maximum spindle speed available.

Side Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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		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
25.0		840	180	840	180	840	180	760	140	600	110	360	55	400	60	360	45
Standard Depth of Cut	ap	2.5DC								2.0DC							
	ae	Below ø3: 0.05DC Above ø3: 0.1DC								0.02DC							

Groove Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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		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
25.0		840	80	840	96	840	96	760	80	600	56	360	32	400	32	224	12
Standard Depth of Cut	ap	0.1DC		0.2DC								0.05DC		0.1DC			

GSX 20000S-4D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

2 Flutes | GSX Coat | Sharp Corner | 30° Helix Angle | Shoulder Milling | Groove Finishing

Fig 1

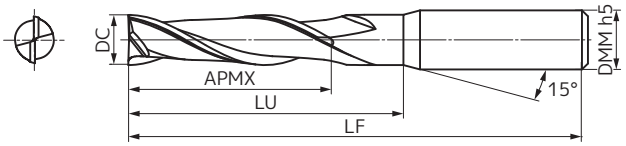
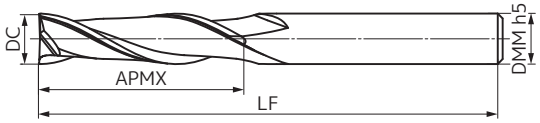


Fig 2



DC	Tolerance
D ≤ 3.0	0 -0.015
3.0 < D ≤ 12	0 -0.020
12.0 < D	0 -0.030

Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX 20050S-4D	●	**0.5**	2.0	2.4	40	4	1
20100S-4D	●	**1.0**	5.0	6.0	40	4	1
20150S-4D	●	**1.5**	7.0	8.0	40	4	1
20200S-4D	●	**2.0**	9.0	10.0	40	4	1
20250S-4D	●	**2.5**	12.0	13.0	50	4	1
GSX 20300S-4D	●	**3.0**	12.0	13.5	50	6	1
20350S-4D	●	**3.5**	14.0	15.5	50	6	1
20400S-4D	●	**4.0**	16.0	17.5	50	6	1
20450S-4D	●	**4.5**	18.0	19.5	60	6	1
20500S-4D	●	**5.0**	20.0	22.0	60	6	1
GSX 20550S-4D	●	**5.5**	22.0	24.0	60	6	1
20600S-4D	●	**6.0**	24.0	—	60	6	2
20650S-4D	●	**6.5**	26.0	28.0	70	8	1
20700S-4D	●	**7.0**	28.0	30.0	80	8	1
20750S-4D	●	**7.5**	30.0	32.0	80	8	1
GSX 20800S-4D	●	**8.0**	32.0	—	80	8	2
20850S-4D	●	**8.5**	34.0	36.0	90	10	1
20900S-4D	●	**9.0**	36.0	38.0	90	10	1
20950S-4D	●	**9.5**	38.0	40.0	90	10	1
21000S-4D	●	**10.0**	40.0	—	90	10	2
GSX 21050S-4D	●	**10.5**	42.0	44.5	100	12	1
21100S-4D	●	**11.0**	44.0	46.5	100	12	1
21150S-4D	●	**11.5**	46.0	48.5	100	12	1
21200S-4D	●	**12.0**	48.0	—	100	12	2
21300S-4D	●	**13.0**	52.0	55.5	110	16	1
GSX 21400S-4D	●	**14.0**	56.0	59.5	110	16	1
21500S-4D	●	**15.0**	60.0	63.5	120	16	1
21600S-4D	●	**16.0**	64.0	—	120	16	2
21700S-4D	●	**17.0**	68.0	72.5	130	20	1
21800S-4D	●	**18.0**	72.0	76.5	130	20	1
GSX 21900S-4D	●	**19.0**	76.0	80.5	140	20	1
22000S-4D	●	**20.0**	80.0	—	140	20	2
22500S-4D	●	**25.0**	100.0	—	160	25	2

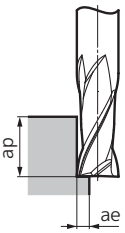
Grade: ACF20

Identification Code

GSX 2 0100 S - 4D

Series Code	Number of Flutes	Dia.	Corner Style S: Sharp Edge	Cutting Edge Length

GSX 20000S-4D type



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 chatter 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 maximum spindle speed available.

Side Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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		7,600	110	7,600	110	7,600	110	6,000	80	5,500	40	3,800	25	4,600	35	3,800	20
2.0		3,850	150	3,850	150	3,850	150	2,950	100	2,750	60	1,900	30	2,300	40	1,950	30
4.0		1,900	200	1,900	200	1,900	200	1,450	130	1,350	80	1,000	50	1,150	55	1,000	35
6.0		1,250	250	1,250	250	1,250	250	970	140	860	90	640	60	740	60	640	40
8.0		930	220	930	220	930	220	700	140	670	90	500	60	560	60	490	40
10.0		770	210	770	210	770	210	190	130	560	95	380	60	460	60	380	40
12.0		650	200	650	200	650	200	470	130	420	85	330	60	370	60	320	40
16.0		450	170	450	170	450	170	370	120	340	80	250	45	280	50	250	35
20.0		360	140	360	140	360	140	300	100	260	70	190	35	220	40	190	30
25.0		190	120	190	120	190	120	230	80	200	55	150	30	170	30	150	25
Standard Depth of Cut	ap	2.5DC								2.0DC							
	ae	Below ø3: 0.02DC Above ø3: 0.05DC								0.01DC							

GSX 20000C-4D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

2 Flutes | GSX Coat | Gash Land | 30° Helix Angle | Shoulder Milling | Groove Finishing | Face Milling | Spot Facing

Fig 1

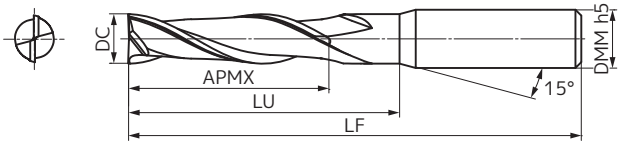
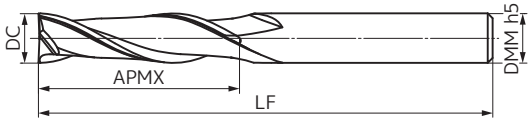


Fig 2



DC	Tolerance
D ≤ 3.0	0 -0.015
3.0 < D ≤ 12	0 -0.020
12.0 < D	0 -0.030

Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX 20050C-4D	●	**0.5**	2.0	2.4	40	4	1
20100C-4D	●	**1.0**	4.0	5.0	40	4	1
20150C-4D	●	**1.5**	6.0	7.0	40	4	1
20200C-4D	●	**2.0**	8.0	9.0	40	4	1
20250C-4D	●	**2.5**	10.0	11.0	50	4	1
GSX 20300C-4D	●	**3.0**	12.0	13.5	50	6	1
20350C-4D	●	**3.5**	14.0	15.5	50	6	1
20400C-4D	●	**4.0**	16.0	17.5	50	6	1
20450C-4D	●	**4.5**	18.0	19.5	60	6	1
20500C-4D	●	**5.0**	20.0	22.0	60	6	1
GSX 20550C-4D	●	**5.5**	22.0	24.0	60	6	1
20600C-4D	●	**6.0**	24.0	—	60	6	2
20650C-4D	●	**6.5**	26.0	28.0	70	8	1
20700C-4D	●	**7.0**	28.0	30.0	80	8	1
20750C-4D	●	**7.5**	30.0	32.0	80	8	1
GSX 20800C-4D	●	**8.0**	32.0	—	80	8	2
20850C-4D	●	**8.5**	34.0	36.0	90	10	1
20900C-4D	●	**9.0**	36.0	38.0	90	10	1
20950C-4D	●	**9.5**	38.0	40.0	90	10	1
21000C-4D	●	**10.0**	40.0	—	90	10	2
GSX 21050C-4D	●	**10.5**	42.0	44.5	100	12	1
21100C-4D	●	**11.0**	44.0	46.5	100	12	1
21150C-4D	●	**11.5**	46.0	48.5	100	12	1
21200C-4D	●	**12.0**	48.0	—	100	12	2
21300C-4D	●	**13.0**	52.0	55.5	110	16	1
GSX 21400C-4D	●	**14.0**	56.0	59.5	110	16	1
21500C-4D	●	**15.0**	60.0	63.5	120	16	1
21600C-4D	●	**16.0**	64.0	—	120	16	2
21700C-4D	●	**17.0**	68.0	72.5	130	20	1
21800C-4D	●	**18.0**	72.0	76.5	130	20	1
GSX 21900C-4D	●	**19.0**	76.0	80.5	140	20	1
22000C-4D	●	**20.0**	80.0	—	140	20	2
22500C-4D	●	**25.0**	100.0	—	160	25	2

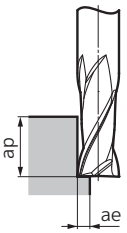
Grade: ACF20

Identification Code

GSX 2 0100 C - 4D

Series Code	Number of Flutes	Dia.	Corner Style C: Gash Land	Cutting Edge Length

GSX 20000C-4D type



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 some cases, chattering may occur in early stages of milling but will cease after 2m of cutting.
5. If chatter 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 groove milling.
7. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.

Side Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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	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
25.0		360	140	360	140	360	140	280	95	250	65	190	35	210	40	192	30
Standard Depth of Cut	ap	3.5DC										3.0DC					
	ae	0.08DC						0.04DC									

GSX 30000C-1.5D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

3 Flutes | GSX Coat | Gash Land | 30° Helix Angle | Shoulder Milling | Groove Milling | Groove Finishing | Face Milling | Spot Facing | Helical Milling | Ramping

Fig 1

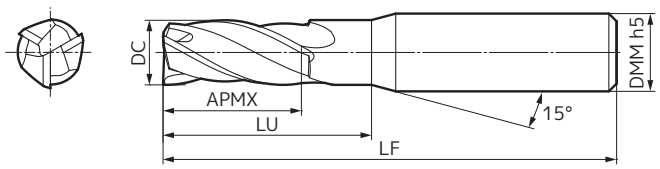
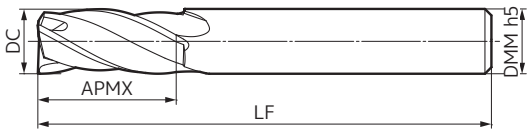


Fig 2



DC	Tolerance
D ≤ 3.0	0 -0.015
3.0 < D ≤ 12	0 -0.020
12.0 < D	0 -0.030

Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX 30100C-1.5D	●	**1.0**	1.5	2.5	40	4	1
30150C-1.5D	●	**1.5**	2.3	3.3	40	4	1
30200C-1.5D	●	**2.0**	3.0	4.0	40	4	1
30250C-1.5D	●	**2.5**	3.8	4.8	40	4	1
30300C-1.5D	●	**3.0**	4.5	6.0	45	6	1
GSX 30400C-1.5D	●	**4.0**	6.0	7.5	45	6	1
30500C-1.5D	●	**5.0**	7.5	9.5	50	6	1
30600C-1.5D	●	**6.0**	9.0	—	50	6	2
30700C-1.5D	●	**7.0**	11.0	13.0	60	8	1
30800C-1.5D	●	**8.0**	12.0	—	60	8	2
GSX 30900C-1.5D	●	**9.0**	14.0	16.0	70	10	1
31000C-1.5D	●	**10.0**	15.0	—	70	10	2
31200C-1.5D	●	**12.0**	18.0	—	75	12	2

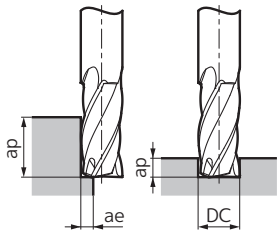
Grade: ACF20

Identification Code

GSX 3 0100 C - 1.5D

Series Code	Number of Flutes	Dia.	Corner Style C: Gash Land	Cutting Edge Length

GSX 30000C-1.5D type



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 maximum spindle speed available.

Side Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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		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
Standard Depth of Cut	ap	1.5DC										1.0DC					
	ae	0.05DC										0.02DC					

Groove Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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		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
Standard Depth of Cut	ap	0.2DC		0.5DC						0.2DC		0.05DC		0.2DC			

GSX 30000C-2D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

3 Flutes | GSX Coat | Gash Land | 30° Helix Angle | Shoulder Milling | Groove Milling | Groove Finishing | Face Milling | Spot Facing | Helical Milling | Ramping

Fig 1

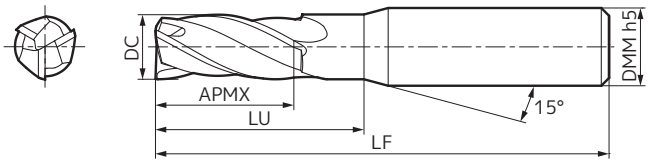
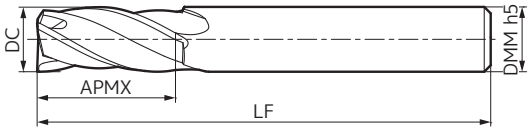


Fig 2



DC	Tolerance
D ≤ 3.0	0 -0.015
3.0 < D ≤ 12	0 -0.020
12.0 < D	0 -0.030

Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX 30100C-2D	●	**1.0**	2.5	3.5	40	4	1
30150C-2D	●	**1.5**	3.8	4.8	40	4	1
30200C-2D	●	**2.0**	5.0	6.0	40	4	1
30250C-2D	●	**2.5**	6.3	7.3	40	4	1
30300C-2D	●	**3.0**	7.5	9.0	45	6	1
GSX 30400C-2D	●	**4.0**	11.0	12.5	45	6	1
30500C-2D	●	**5.0**	13.0	15.0	50	6	1
30600C-2D	●	**6.0**	13.0	—	50	6	2
30700C-2D	●	**7.0**	16.0	18.0	60	8	1
30800C-2D	●	**8.0**	19.0	—	60	8	2
GSX 30900C-2D	●	**9.0**	19.0	21.0	70	10	1
31000C-2D	●	**10.0**	22.0	—	70	10	2
31200C-2D	●	**12.0**	26.0	—	75	12	2

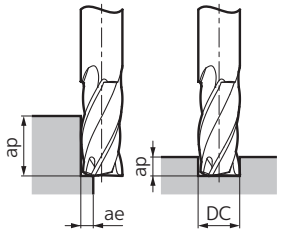
Grade: ACF20

Identification Code

GSX 3 0100 C - 2D

Series Code	Number of Flutes	Dia.	Corner Style C: Gash Land	Cutting Edge Length

GSX 30000C-2D type



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 maximum spindle speed available.

Side Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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		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
Standard Depth of Cut	ap	1.5DC										1.0DC					
	ae	0.05DC										0.02DC					

Groove Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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		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
Standard Depth of Cut	ap	0.2DC		0.5DC						0.2DC		0.05DC		0.2DC			

GSX 40000C-1.5D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

4 Flutes | GSX Coat | Gash Land | 30° Helix Angle | Shoulder Milling | Groove Milling | Groove Finishing | Face Milling | Helical Milling | Ramping

Fig 1

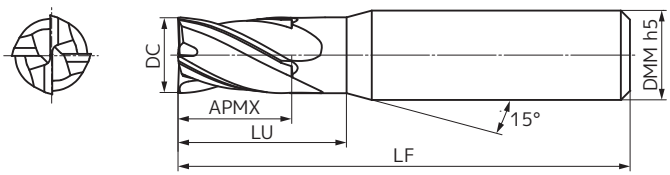
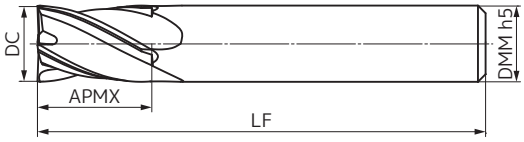


Fig 2



DC	Tolerance
D ≤ 3.0	0 -0.015
3.0 < D ≤ 12	0 -0.020
12.0 < D	0 -0.030

Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX 40100C-1.5D	●	**1.0**	1.5	2.5	40	4	1
40150C-1.5D	●	**1.5**	2.3	3.3	40	4	1
40200C-1.5D	●	**2.0**	3.0	4.0	40	4	1
40250C-1.5D	●	**2.5**	3.8	4.8	40	4	1
40300C-1.5D	●	**3.0**	4.5	6.0	45	6	1
GSX 40350C-1.5D	●	**3.5**	5.3	6.8	45	6	1
40400C-1.5D	●	**4.0**	6.0	7.5	45	6	1
40450C-1.5D	●	**4.5**	6.8	8.3	50	6	1
40500C-1.5D	●	**5.0**	7.5	9.5	50	6	1
40550C-1.5D	●	**5.5**	8.3	10.3	50	6	1
GSX 40600C-1.5D	●	**6.0**	9.0	—	50	6	2
40650C-1.5D	●	**6.5**	10.0	12.0	60	8	1
40700C-1.5D	●	**7.0**	11.0	13.0	60	8	1
40750C-1.5D	●	**7.5**	12.0	14.0	60	8	1
40800C-1.5D	●	**8.0**	12.0	—	60	8	2
GSX 40850C-1.5D	●	**8.5**	13.0	15.0	70	10	1
40900C-1.5D	●	**9.0**	14.0	16.0	70	10	1
40950C-1.5D	●	**9.5**	15.0	17.0	70	10	1
41000C-1.5D	●	**10.0**	15.0	—	70	10	2
41050C-1.5D	●	**10.5**	16.0	18.5	75	12	1
GSX 41100C-1.5D	●	**11.0**	17.0	19.5	75	12	1
41150C-1.5D	●	**11.5**	18.0	20.5	75	12	1
41200C-1.5D	●	**12.0**	18.0	—	75	12	2
41300C-1.5D	●	**13.0**	20.0	23.5	90	16	1
41400C-1.5D	●	**14.0**	21.0	24.5	90	16	1
GSX 41500C-1.5D	●	**15.0**	23.0	26.5	90	16	1
41600C-1.5D	●	**16.0**	24.0	—	90	16	2
41700C-1.5D	●	**17.0**	26.0	30.5	100	20	1
41800C-1.5D	●	**18.0**	27.0	31.5	100	20	1
41900C-1.5D	●	**19.0**	29.0	33.5	100	20	1
GSX 42000C-1.5D	●	**20.0**	30.0	—	100	20	2
42500C-1.5D	●	**25.0**	38.0	—	120	25	2

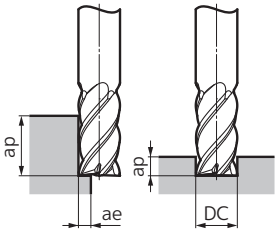
Grade: ACF20

Identification Code

GSX 4 0100 C - 1.5D

Series Code	Number of Flutes	Dia.	Corner Style C: Gash Land	Cutting Edge Length

GSX 40000C-1.5D type



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 maximum spindle speed available.

Side Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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		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		1,050	470	1,050	470	1,050	470	1,050	300	720	210	520	120	640	130	520	80
Standard Depth of Cut	ap	1.5DC										1.0DC					
	ae	0.05DC										0.02DC					

Side Milling (Using High Speed Machining Centre)

Work Material / Cutting Conditions		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-Resistant Alloy 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		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	—	—
25.0		3,800	1,500	3,800	1,500	3,800	1,500	3,800	1,150	3,200	850	2,600	600	1,300	300	—	—
Standard Depth of Cut	ap	1.5DC										1.0DC				—	
	ae	0.05DC										0.02DC				—	

Groove Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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		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		1,080	384	1,080	480	1,080	480	1,040	304	720	208	520	120	640	88	256	40
Standard Depth of Cut	ap	0.2DC		0.5DC						0.2DC		0.05DC		0.2DC			

GSX 40000S-2D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

4 Flutes | GSX Coat | Sharp Corner | 30° Helix Angle | Shoulder Milling | Groove Finishing

Fig 1

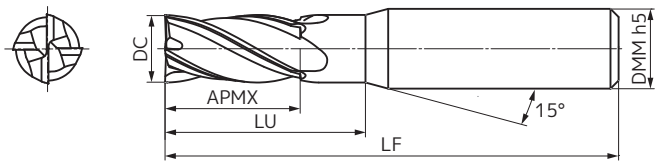
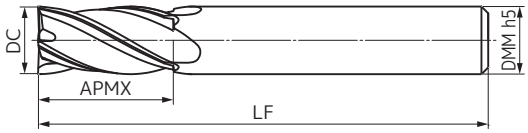


Fig 2



DC	Tolerance
D ≤ 3.0	0 -0.015
3.0 < D ≤ 12	0 -0.020
12.0 < D	0 -0.030

Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX 40100S-2D	●	1.0	2.5	3.5	40	4	1
40100S-2D-S3	●	1.0	2.5	3.5	38	3	1
40150S-2D	●	1.5	3.8	4.8	40	4	1
40200S-2D	●	2.0	5.0	6.0	40	4	1
40200S-2D-S3	●	2.0	5.0	6.0	38	3	1
GSX 40250S-2D	●	2.5	6.3	7.3	40	4	1
40300S-2D	●	3.0	7.5	9.0	45	6	1
40300S-2D-S3	●	3.0	7.5	—	38	3	2
40350S-2D	●	3.5	8.8	10.0	45	6	1
40400S-2D	●	4.0	11.0	14.0	45	6	1
GSX 40400S-2D-S4	●	4.0	11.0	—	45	4	2
40450S-2D	●	4.5	11.3	12.8	50	6	1
40500S-2D	●	5.0	13.0	19.6	50	6	1
40550S-2D	●	5.5	13.0	19.6	50	6	1
40600S-2D	●	6.0	13.0	—	50	6	2
GSX 40650S-2D	●	6.5	13.0	19.6	60	8	1
40700S-2D	●	7.0	16.0	21.1	60	8	1
40750S-2D	●	7.5	16.0	21.1	60	8	1
40800S-2D	●	8.0	19.0	—	60	8	2
40850S-2D	●	8.5	19.0	24.1	70	10	1
GSX 40900S-2D	●	9.0	19.0	24.1	70	10	1
40950S-2D	●	9.5	19.0	24.1	70	10	1
41000S-2D	●	10.0	22.0	—	70	10	2
41050S-2D	●	10.5	22.0	24.5	75	12	1
41100S-2D	●	11.0	22.0	24.5	75	12	1
GSX 41150S-2D	●	11.5	23.0	25.5	75	12	1
41200S-2D	●	12.0	26.0	—	75	12	2
41300S-2D	●	13.0	26.0	29.5	90	16	1
41350S-2D	●	13.5	27.0	30.5	90	16	1
41400S-2D	●	14.0	28.0	31.5	90	16	1
GSX 41500S-2D	●	15.0	30.0	33.5	90	16	1
41600S-2D	●	16.0	32.0	—	90	16	2
41700S-2D	●	17.0	35.0	39.5	100	20	1
41800S-2D	●	18.0	40.0	44.5	100	20	1
41900S-2D	●	19.0	40.0	44.5	100	20	1
GSX 42000S-2D	●	20.0	40.0	—	100	20	2
42200S-2D	●	22.0	44.0	49.0	110	25	1
42400S-2D	●	24.0	48.0	53.0	120	25	1
42500S-2D	●	25.0	50.0	—	120	25	2

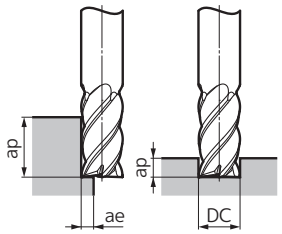
Grade: ACF20

Identification Code

GSX 4 0100 S - 2D - S3

Series Code	Number of Flutes	Dia.	Corner Style S: Sharp Edge	Cutting Edge Length	Shank Dia.

GSX 40000S-2D type



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 chatter 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 maximum spindle speed available.

Side Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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		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
25.0		960	370	960	370	960	370	920	230	640	160	480	85	560	95	480	60
Standard Depth of Cut	ap	2.0DC															
	ae	0.03DC										0.01DC					

Groove Finishing

Work Material / Cutting Conditions		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-Resistant Alloy 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		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
25.0		960	370	960	370	960	370	920	230	640	160	480	85	560	95	480	60
Standard Depth of Cut	ap	1.5DC															
	ae	Below 0.02DC															

GSX 40000C-2D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

4 Flutes | GSX Coat | Gash Land | 30° Helix Angle | Shoulder Milling | Groove Milling | Groove Finishing | Face Milling | Helical Milling | Ramping

Fig 1

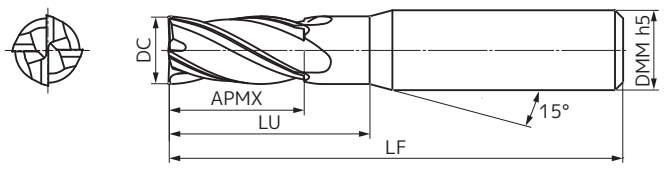
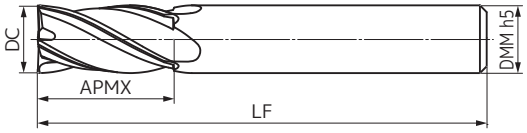


Fig 2



DC	Tolerance
D ≤ 3.0	0 -0.015
3.0 < D ≤ 12	0 -0.020
12.0 < D	0 -0.030

Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX 40100C-2D	●	**1.0**	2.0	3.0	40	4	1
40150C-2D	●	**1.5**	3.0	4.0	40	4	1
40200C-2D	●	**2.0**	4.0	5.0	40	4	1
40250C-2D	●	**2.5**	5.0	6.0	40	4	1
40300C-2D	●	**3.0**	6.0	7.5	45	6	1
GSX 40350C-2D	●	**3.5**	7.0	8.5	45	6	1
40400C-2D	●	**4.0**	8.0	9.5	45	6	1
40450C-2D	●	**4.5**	9.0	10.5	50	6	1
40500C-2D	●	**5.0**	10.0	12.0	50	6	1
40550C-2D	●	**5.5**	11.0	13.0	50	6	1
GSX 40600C-2D	●	**6.0**	12.0	—	50	6	2
40650C-2D	●	**6.5**	13.0	15.0	60	8	1
40700C-2D	●	**7.0**	14.0	16.0	60	8	1
40750C-2D	●	**7.5**	15.0	17.0	60	8	1
40800C-2D	●	**8.0**	16.0	—	60	8	2
GSX 40850C-2D	●	**8.5**	17.0	19.0	70	10	1
40900C-2D	●	**9.0**	18.0	20.0	70	10	1
40950C-2D	●	**9.5**	19.0	21.0	70	10	1
41000C-2D	●	**10.0**	20.0	—	70	10	2
41050C-2D	●	**10.5**	21.0	23.5	75	12	1
GSX 41100C-2D	●	**11.0**	22.0	24.5	75	12	1
41150C-2D	●	**11.5**	23.0	25.5	75	12	1
41200C-2D	●	**12.0**	24.0	—	75	12	2
41300C-2D	●	**13.0**	26.0	29.5	90	16	1
41400C-2D	●	**14.0**	28.0	31.5	90	16	1
GSX 41500C-2D	●	**15.0**	30.0	33.5	90	16	1
41600C-2D	●	**16.0**	32.0	—	90	16	2
41700C-2D	●	**17.0**	34.0	39.5	100	20	1
41800C-2D	●	**18.0**	36.0	40.5	100	20	1
41900C-2D	●	**19.0**	38.0	42.5	100	20	1
GSX 42000C-2D	●	**20.0**	40.0	—	100	20	2
42500C-2D	●	**25.0**	50.0	—	120	25	2

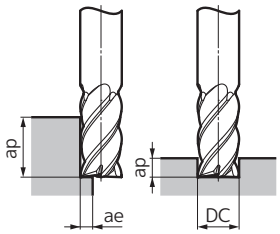
Grade: ACF20

Identification Code

GSX 4 0100 C - 2D

Series Code	Number of Flutes	Dia.	Corner Style C: Gash Land	Cutting Edge Length

GSX 40000C-2D type



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 chatter 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 maximum spindle speed available.

Side Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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		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	ap	1.5DC										1.0DC					
	ae	0.05DC										0.02DC					

Side Milling (Using High Speed Machining Centre)

Work Material / Cutting Conditions		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-Resistant Alloy 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		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	—	—
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	—	—
Standard Depth of Cut	ap	1.5DC										1.0DC					
	ae	0.05DC										0.02DC					

Groove Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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		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	ap	0.2DC		0.5DC						0.2DC		0.05DC		0.2DC			

GSX 40000S-3D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

4 Flutes | GSX Coat | Sharp Corner | 30° Helix Angle | Shoulder Milling | Groove Finishing

Fig 1

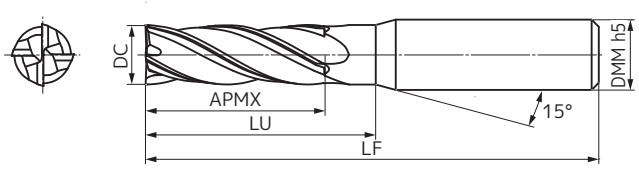
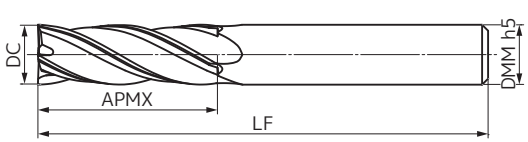


Fig 2



DC	Tolerance
D ≤ 3.0	0 -0.015
3.0 < D ≤ 12	0 -0.020
12.0 < D	0 -0.030

Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX 40100S-3D	●	**1.0**	3.0	4.0	40	4	1
40150S-3D	●	**1.5**	4.5	5.5	40	4	1
40200S-3D	●	**2.0**	6.0	7.0	40	4	1
40250S-3D	●	**2.5**	8.0	9.0	40	4	1
40300S-3D	●	**3.0**	9.0	10.5	50	6	1
GSX 40350S-3D	●	**3.5**	11.0	12.5	50	6	1
40400S-3D	●	**4.0**	12.0	13.5	50	6	1
40450S-3D	●	**4.5**	15.0	16.5	50	6	1
40500S-3D	●	**5.0**	15.0	17.0	50	6	1
40550S-3D	●	**5.5**	18.0	20.0	50	6	1
GSX 40600S-3D	●	**6.0**	18.0	—	50	6	2
40650S-3D	●	**6.5**	20.0	22.0	70	8	1
40700S-3D	●	**7.0**	21.0	23.0	70	8	1
40750S-3D	●	**7.5**	23.0	25.0	70	8	1
40800S-3D	●	**8.0**	24.0	—	70	8	2
GSX 40850S-3D	●	**8.5**	26.0	28.0	75	10	1
40900S-3D	●	**9.0**	27.0	29.0	75	10	1
40950S-3D	●	**9.5**	29.0	31.0	75	10	1
41000S-3D	●	**10.0**	30.0	—	90	10	2
41050S-3D	●	**10.5**	32.0	34.5	90	12	1
GSX 41100S-3D	●	**11.0**	33.0	35.5	90	12	1
41150S-3D	●	**11.5**	35.0	37.5	90	12	1
41200S-3D	●	**12.0**	36.0	—	90	12	2
41300S-3D	●	**13.0**	39.0	42.5	100	16	1
41400S-3D	●	**14.0**	42.0	45.5	110	16	1
GSX 41500S-3D	●	**15.0**	45.0	48.5	110	16	1
41600S-3D	●	**16.0**	48.0	—	110	16	2
41700S-3D	●	**17.0**	51.0	55.5	110	20	1
41800S-3D	●	**18.0**	54.0	58.5	120	20	1
41900S-3D	●	**19.0**	57.0	61.5	120	20	1
GSX 42000S-3D	●	**20.0**	60.0	—	120	20	2
42200S-3D	●	**22.0**	66.0	71.0	130	25	1
42500S-3D	●	**25.0**	75.0	—	130	25	2

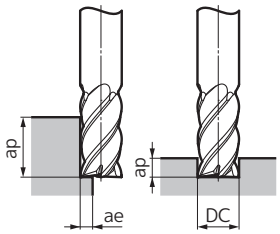
Grade: ACF20

Identification Code

GSX 4 0100 S - 3D

Series Code	Number of Flutes	Dia.	Corner Style S: Sharp Edge	Cutting Edge Length

GSX 40000S-3D type



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 some cases, chattering may occur in early stages of milling but will cease after 2m of cutting.
5. If chatter 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 maximum spindle speed available.

Side Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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		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
25.0		720	220	720	220	720	220	680	170	560	130	320	60	352	70	320	50
Standard Depth of Cut	ap	2.5DC								2.0DC							
	ae	Below ø3: 0.02DC, Above ø3 to Below ø8: 0.05DC, Above ø8: 0.07DC								0.01DC							

Groove Finishing

Work Material / Cutting Conditions		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-Resistant Alloy 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		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
25.0		720	220	720	220	720	220	680	170	560	130	320	60	352	70	320	50
Standard Depth of Cut	ap	1.5DC															
	ae	Below 0.02DC															

GSX 40000C-3D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

4 Flutes | GSX Coat | Gash Land | 30° Helix Angle | Shoulder Milling | Groove Milling | Groove Finishing | Face Milling

Fig 1

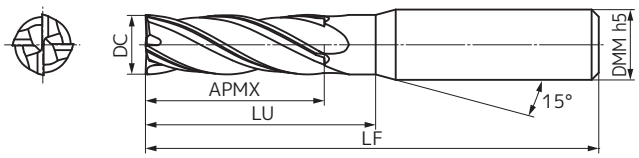
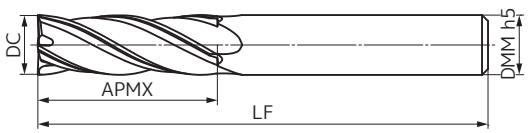


Fig 2



DC	Tolerance
D ≤ 3.0	0 -0.015
3.0 < D ≤ 12	0 -0.020
12.0 < D	0 -0.030

Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX 40100C-3D	●	**1.0**	3.0	4.0	40	4	1
40150C-3D	●	**1.5**	4.5	5.5	40	4	1
40200C-3D	●	**2.0**	6.0	7.0	40	4	1
40250C-3D	●	**2.5**	7.5	8.5	40	4	1
40300C-3D	●	**3.0**	9.0	10.5	50	6	1
GSX 40350C-3D	●	**3.5**	11.0	12.5	50	6	1
40400C-3D	●	**4.0**	12.0	13.5	50	6	1
40450C-3D	●	**4.5**	14.0	15.5	50	6	1
40500C-3D	●	**5.0**	15.0	17.0	50	6	1
40550C-3D	●	**5.5**	17.0	19.0	50	6	1
GSX 40600C-3D	●	**6.0**	18.0	—	50	6	2
40650C-3D	●	**6.5**	20.0	22.0	70	8	1
40700C-3D	●	**7.0**	21.0	23.0	70	8	1
40750C-3D	●	**7.5**	23.0	25.0	70	8	1
40800C-3D	●	**8.0**	24.0	—	70	8	2
GSX 40850C-3D	●	**8.5**	26.0	28.0	75	10	1
40900C-3D	●	**9.0**	27.0	29.0	75	10	1
40950C-3D	●	**9.5**	29.0	31.0	75	10	1
41000C-3D	●	**10.0**	30.0	—	90	10	2
41050C-3D	●	**10.5**	32.0	34.5	90	12	1
GSX 41100C-3D	●	**11.0**	33.0	35.5	90	12	1
41150C-3D	●	**11.5**	35.0	37.5	90	12	1
41200C-3D	●	**12.0**	36.0	—	90	12	2
41300C-3D	●	**13.0**	39.0	42.5	100	16	1
41400C-3D	●	**14.0**	42.0	45.5	110	16	1
GSX 41500C-3D	●	**15.0**	45.0	48.5	110	16	1
41600C-3D	●	**16.0**	48.0	—	110	16	2
41700C-3D	●	**17.0**	51.0	55.5	110	20	1
41800C-3D	●	**18.0**	54.0	58.5	120	20	1
41900C-3D	●	**19.0**	57.0	61.5	120	20	1
GSX 42000C-3D	●	**20.0**	60.0	—	120	20	2
42500C-3D	●	**25.0**	75.0	—	130	25	2

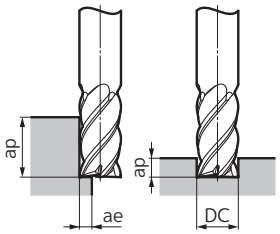
Grade: ACF20

Identification Code

GSX 4 0100 C - 3D

Series Code	Number of Flutes	Dia.	Corner Style C: Gash Land	Cutting Edge Length

GSX 40000C-3D type



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 some cases, chattering may occur in early stages of milling but will cease after 2m of cutting.
5. If chatter 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 maximum spindle speed available.

Side Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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		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
25.0		840	300	840	300	840	300	760	230	640	180	360	85	400	95	360	70
Standard Depth of Cut	ap	2.5DC										2.0DC					
	ae	Below ø3: 0.05DC, Above ø3 to Below ø8: 0.1DC, Above ø8: 0.15DC								0.02DC							

Groove Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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		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	55
25.0		840	128	840	160	840	160	760	128	600	96	360	52	400	56	224	44
Standard Depth of Cut	ap	0.1DC		0.2DC								0.05DC		0.1DC			

GSX 40000S-4D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

4 Flutes | GSX Coat | Sharp Corner | 30° Helix Angle | Shoulder Milling | Groove Finishing

Fig 1

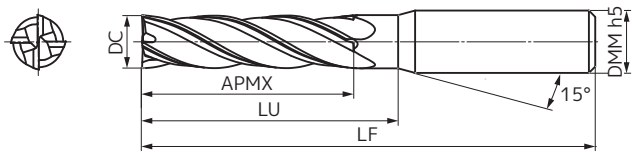
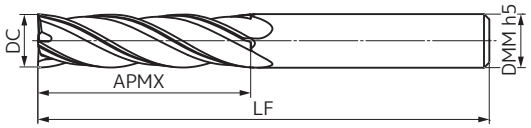


Fig 2



DC	Tolerance
D ≤ 3.0	0 -0.015
3.0 < D ≤ 12	0 -0.020
12.0 < D	0 -0.030

Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX 40100S-4D	●	**1.0**	4.0	5.0	40	4	1
40150S-4D	●	**1.5**	6.0	7.0	40	4	1
40200S-4D	●	**2.0**	8.0	9.0	40	4	1
40250S-4D	●	**2.5**	10.0	11.0	50	4	1
40300S-4D	●	**3.0**	12.0	13.5	50	6	1
GSX 40350S-4D	●	**3.5**	14.0	15.5	50	6	1
40400S-4D	●	**4.0**	16.0	17.5	50	6	1
40450S-4D	●	**4.5**	18.0	19.5	60	6	1
40500S-4D	●	**5.0**	20.0	22.0	60	6	1
40550S-4D	●	**5.5**	22.0	24.0	60	6	1
GSX 40600S-4D	●	**6.0**	24.0	—	60	6	2
40650S-4D	●	**6.5**	26.0	28.0	70	8	1
40700S-4D	●	**7.0**	28.0	30.0	80	8	1
40750S-4D	●	**7.5**	30.0	32.0	80	8	1
40800S-4D	●	**8.0**	32.0	—	80	8	2
GSX 40850S-4D	●	**8.5**	34.0	36.0	90	10	1
40900S-4D	●	**9.0**	36.0	38.0	90	10	1
40950S-4D	●	**9.5**	39.0	41.0	90	10	1
41000S-4D	●	**10.0**	40.0	—	90	10	2
41050S-4D	●	**10.5**	42.0	44.5	100	12	1
GSX 41100S-4D	●	**11.0**	44.0	46.5	100	12	1
41150S-4D	●	**11.5**	46.0	48.5	100	12	1
41200S-4D	●	**12.0**	48.0	—	100	12	2
41300S-4D	●	**13.0**	52.0	55.5	110	16	1
41400S-4D	●	**14.0**	56.0	59.5	110	16	1
GSX 41500S-4D	●	**15.0**	60.0	63.5	120	16	1
41600S-4D	●	**16.0**	64.0	—	120	16	2
41700S-4D	●	**17.0**	68.0	72.5	130	20	1
41800S-4D	●	**18.0**	72.0	76.5	130	20	1
41900S-4D	●	**19.0**	76.0	80.5	140	20	1
GSX 42000S-4D	●	**20.0**	80.0	—	140	20	2
42500S-4D	●	**25.0**	100.0	—	160	25	2

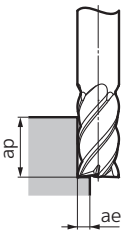
Grade: ACF20

Identification Code

GSX 4 0100 S - 4D

Series Code	Number of Flutes	Dia.	Corner Style S: Sharp Edge	Cutting Edge Length

GSX 40000S-4D type



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 some cases, chattering may occur in early stages of milling but will cease after 2m of cutting.
5. If chatter 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 maximum spindle speed available.

Side Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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		7,950	120	7,950	120	7,950	120	6,250	70	5,750	50	4,000	35	4,850	35	4,000	35
2.0		4,050	120	4,050	120	4,050	120	3,100	90	2,850	70	2,050	50	2,400	50	2,050	35
4.0		1,950	170	1,950	170	1,950	170	1,650	100	1,400	90	710	35	1,200	45	1,050	30
6.0		1,350	130	1,350	130	1,350	130	1,000	140	930	120	700	55	800	40	700	30
8.0		970	190	970	190	970	190	740	140	720	120	520	55	560	40	490	30
10.0		770	180	770	180	770	180	630	120	570	100	360	50	490	40	410	30
12.0		640	170	640	170	640	170	500	120	460	100	350	55	400	40	350	30
16.0		460	140	460	140	460	140	370	100	360	90	260	50	280	40	270	30
20.0		390	130	390	130	390	130	310	90	280	70	210	45	240	40	210	30
25.0		310	100	310	100	310	100	250	70	220	55	170	35	190	30	170	25
Standard Depth of Cut	ap	2.5DC								2.0DC							
	ae	Below ø3: 0.02DC, Above ø3 to Below ø8: 0.05DC, Above ø8: 0.07DC								0.01DC							

GSX 40000C-4D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

4 Flutes | GSX Coat | Gash Land | 30° Helix Angle | Shoulder Milling | Groove Finishing | Face Milling

Fig 1

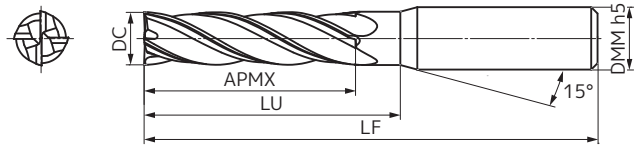
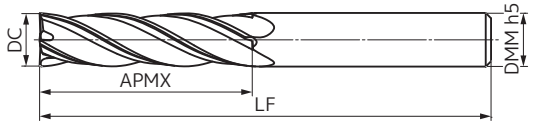


Fig 2



DC	Tolerance
D ≤ 3.0	0 -0.015
3.0 < D ≤ 12	0 -0.020
12.0 < D	0 -0.030

Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX 40100C-4D	●	**1.0**	4.0	5.0	40	4	1
40150C-4D	●	**1.5**	6.0	7.0	40	4	1
40200C-4D	●	**2.0**	8.0	9.0	40	4	1
40250C-4D	●	**2.5**	10.0	11.0	50	4	1
40300C-4D	●	**3.0**	12.0	13.5	50	6	1
GSX 40350C-4D	●	**3.5**	14.0	15.5	50	6	1
40400C-4D	●	**4.0**	16.0	17.5	50	6	1
40450C-4D	●	**4.5**	18.0	19.5	60	6	1
40500C-4D	●	**5.0**	20.0	22.0	60	6	1
40550C-4D	●	**5.5**	22.0	24.0	60	6	1
GSX 40600C-4D	●	**6.0**	24.0	—	60	6	2
40650C-4D	●	**6.5**	26.0	28.0	70	8	1
40700C-4D	●	**7.0**	28.0	30.0	80	8	1
40750C-4D	●	**7.5**	30.0	32.0	80	8	1
40800C-4D	●	**8.0**	32.0	—	80	8	2
GSX 40850C-4D	●	**8.5**	34.0	36.0	90	10	1
40900C-4D	●	**9.0**	36.0	28.0	90	10	1
40950C-4D	●	**9.5**	39.0	41.0	90	10	1
41000C-4D	●	**10.0**	40.0	—	90	10	2
41050C-4D	●	**10.5**	42.0	44.5	100	12	1
GSX 41100C-4D	●	**11.0**	44.0	46.5	100	12	1
41150C-4D	●	**11.5**	46.0	48.5	100	12	1
41200C-4D	●	**12.0**	48.0	—	100	12	2
41300C-4D	●	**13.0**	52.0	55.5	110	16	1
41400C-4D	●	**14.0**	56.0	59.5	110	16	1
GSX 41500C-4D	●	**15.0**	60.0	63.5	120	16	1
41600C-4D	●	**16.0**	64.0	—	120	16	2
41700C-4D	●	**17.0**	68.0	72.5	130	20	1
41800C-4D	●	**18.0**	72.0	76.5	130	20	1
41900C-4D	●	**19.0**	76.0	80.5	140	20	1
GSX 42000C-4D	●	**20.0**	80.0	—	140	20	2
42500C-4D	●	**25.0**	100.0	—	160	25	2

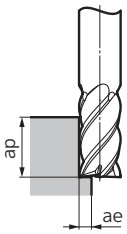
Grade: ACF20

Identification Code

GSX 4 0100 C - 4D

Series Code	Number of Flutes	Dia.	Corner Style C: Gash Land	Cutting Edge Length

GSX 40000C-4D type



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 some cases, chattering may occur in early stages of milling but will cease after 2m of cutting.
5. If chatter 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 groove milling.
7. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.

Side Milling

Work Material / Cutting Conditions		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-Resistant Alloy 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
25.0		360	120	360	120	360	120	280	80	250	60	190	40	210	35	190	30
Standard Depth of Cut	ap	3.5DC										3.0DC					
	ae	Below ø3: 0.04DC, Above ø3 to Below ø8: 0.08DC, Above ø8: 0.1DC										0.02DC					

GSV 4000-2.5D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

4 Flutes | GSX Coat | Gash Land | 40° Helix Angle | Shoulder Milling | Groove Milling | Groove Finishing | Face Milling | Helical Milling | Ramping

Fig 1

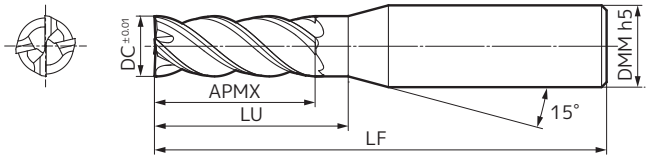
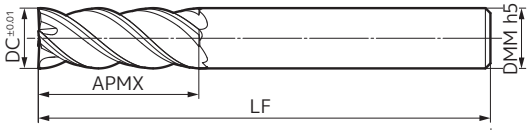


Fig 2



Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSV 4020-2.5D	●	**2.0**	5	6.5	50	4	1
4030-2.5D	●	**3.0**	8	9.5	50	6	1
4040-2.5D	●	**4.0**	10	11.5	50	6	1
4050-2.5D	●	**5.0**	13	14.5	60	6	1
4060-2.5D	●	**6.0**	15	—	60	6	2
GSV 4070-2.5D	●	**7.0**	18	20.0	70	8	1
4080-2.5D	●	**8.0**	20	—	80	8	2
4090-2.5D	●	**9.0**	23	25.0	90	10	1
4100-2.5D	●	**10.0**	25	—	90	10	2
4110-2.5D	●	**11.0**	28	30.5	90	12	1
GSV 4120-2.5D	●	**12.0**	30	—	90	12	2
4140-2.5D	●	**14.0**	35	37.5	110	16	1
4150-2.5D	●	**15.0**	38	41.0	110	16	1
4160-2.5D	●	**16.0**	40	—	115	16	2
4180-2.5D	●	**18.0**	45	48.0	120	20	1
GSV 4200-2.5D	●	**20.0**	50	—	125	20	2
4250-2.5D	●	**25.0**	63	—	140	25	2

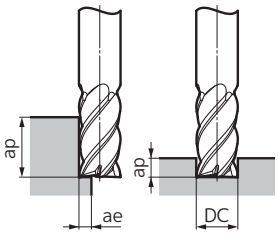
Grade: ACF20

Identification Code

GSV 4 120 - 2.5D

Series Code	Number of Flutes	Dia.	Cutting Edge Length

GSV 4000-2.5D type



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 maximum spindle speed available.

Side Milling

Work Material / Cutting Conditions		Carbon Steel, Cast Iron SS, SC, FC (150 to 250HB)		Alloy Steel SCM (25 to 35HRC)		Tempered Steel / Hardened Steel NAK, HPM (40 to 50HRC)		Stainless Steel SUS304, SUS316		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)
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	ap	1.5DC									
	ae	0.2DC				0.05DC		0.1DC		0.05DC	

Groove Milling

Work Material / Cutting Conditions		Carbon Steel, Cast Iron SS, SC, FC (150 to 250HB)		Alloy Steel SCM (25 to 35HRC)		Tempered Steel / Hardened Steel NAK, HPM (40 to 50HRC)		Stainless Steel SUS304, SUS316		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)
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	ap	0.8DC				0.16DC		0.4DC		0.16DC	

GSXVL 4000-2.5D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

4 Flutes | GSX Coat | Gash Land | 40° 43° Helix Angle | Shoulder Milling | Groove Milling | Groove Finishing | Face Milling | Helical Milling | Ramping

Fig 1

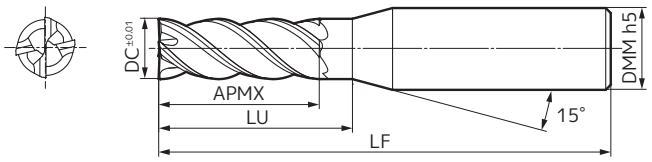
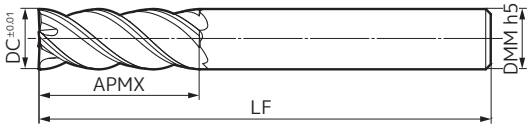


Fig 2



Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSXVL 4020-2.5D	●	**2.0**	5	6.5	50	4	1
4030-2.5D	●	**3.0**	8	9.5	50	6	1
4040-2.5D	●	**4.0**	10	11.5	50	6	1
4050-2.5D	●	**5.0**	13	14.5	60	6	1
4060-2.5D	●	**6.0**	15	—	60	6	2
GSXVL 4070-2.5D	●	**7.0**	18	20.0	70	8	1
4080-2.5D	●	**8.0**	20	—	80	8	2
4090-2.5D	●	**9.0**	23	25.0	90	10	1
4100-2.5D	●	**10.0**	25	—	90	10	2
4110-2.5D	●	**11.0**	28	30.5	90	12	1
GSXVL 4120-2.5D	●	**12.0**	30	—	90	12	2
4140-2.5D	●	**14.0**	35	37.5	110	16	1
4150-2.5D	●	**15.0**	38	41.0	110	16	1
4160-2.5D	●	**16.0**	40	—	115	16	2
4180-2.5D	●	**18.0**	45	48.0	120	20	1
GSXVL 4200-2.5D	●	**20.0**	50	—	125	20	2
4250-2.5D		**25.0**	63	—	140	25	2

Grade: ACF20

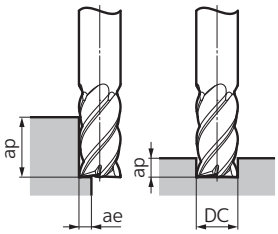
Identification Code

GSXVL 4 020 - 2.5D

- GSXVL: Series Code
- 4: Number of Flutes
- 020: Dia.
- 2.5D: Cutting Edge Length

For the regrinding procedure, please download the details from our website.
https://www.sumitool.com/en/products/cutting-tools/endmills/pdf/gsxvl-regrinding_en.pdf

GSXVL 4000-2.5D type



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 maximum spindle speed available.

Side Milling

Work Material / Cutting Conditions		Carbon Steel, Cast Iron SS, SC, FC (150 to 250HB)		Alloy Steel SCM (25 to 35HRC)		Tempered Steel / Hardened Steel NAK, HPM (40 to 50HRC)		Stainless Steel SUS304, SUS316		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)
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	ap	1.5DC									
	ae	0.2DC				0.05DC		0.1DC		0.05DC	

Groove Milling

Work Material / Cutting Conditions		Carbon Steel, Cast Iron SS, SC, FC (150 to 250HB)		Alloy Steel SCM (25 to 35HRC)		Tempered Steel / Hardened Steel NAK, HPM (40 to 50HRC)		Stainless Steel SUS304, SUS316		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)
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	ap	1.0DC				0.2DC		0.5DC		0.2DC	

SSUP 4000ZX type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

4 Flutes | ZX Coat | Gash Land | 40° Helix Angle | Shoulder Milling | Groove Milling | Groove Finishing | Face Milling | Helical Milling | Ramping

Fig 1

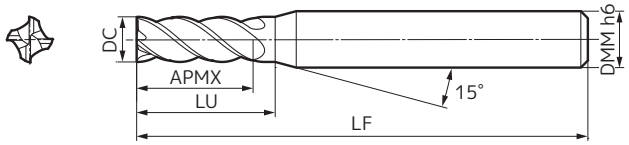
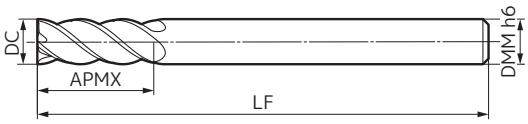


Fig 2



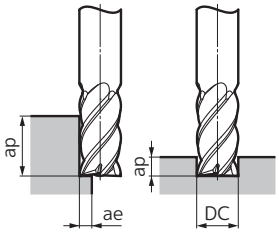
DC	Tolerance
D ≤ 3.0	-0.014 -0.028
3.0 < D ≤ 6.0	-0.020 -0.038
6.0 < D	-0.025 -0.047

Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
SSUP 4020ZX	●	**2.0**	6.0	7.0	50	4	1
4030ZX	●	**3.0**	8.0	9.5	50	6	1
4040ZX	●	**4.0**	11.0	12.5	50	6	1
4050ZX	●	**5.0**	13.0	14.5	60	6	1
4060ZX	●	**6.0**	13.0	—	60	6	2
SSUP 4070ZX	●	**7.0**	16.0	18.0	70	8	1
4080ZX	●	**8.0**	19.0	—	80	8	2
4090ZX	●	**9.0**	19.0	21.5	90	10	1
4100ZX	●	**10.0**	22.0	—	90	10	2
4110ZX	●	**11.0**	22.0	24.5	90	12	1
SSUP 4120ZX	●	**12.0**	26.0	—	90	12	2
4140ZX	●	**14.0**	26.0	28.5	110	16	1
4150ZX	●	**15.0**	26.0	28.5	110	16	1
4160ZX	●	**16.0**	32.0	—	115	16	2
4180ZX	●	**18.0**	32.0	34.5	120	20	1
SSUP 4200ZX	●	**20.0**	38.0	—	125	20	2

Grade: ACZ50M



Recommended Cutting Conditions

1. For groove milling of stainless steel, use 60% of the recommended spindle speed and 40% of the recommended feed rate. (*)
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.

Side Milling and Groove Milling

Work Material / Cutting Conditions		Carbon Steel, Cast Iron SS, SC, FC (150 to 250HB)		Alloy Steel SCM (25 to 35HRC)		Tempered Steel / Hardened Steel NAK, HPM (40 to 50HRC)		Stainless Steel (*)		Heat-Resistant Alloy Titanium Alloy (20 to 45HRC)	
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)
2.0		9,000	720	6,000	430	4,000	320	5,500	320	2,600	120
4.0		6,600	800	4,500	450	3,000	380	4,000	320	2,000	120
6.0		4,800	960	3,000	480	2,500	380	3,000	480	1,200	120
8.0		3,600	1,000	2,200	610	2,000	400	2,000	520	1,000	140
10.0		2,800	1,000	1,800	610	1,500	400	1,700	550	800	160
12.0		2,400	950	1,500	550	1,200	380	1,500	500	700	140
14.0		2,200	880	1,300	490	1,000	360	1,200	430	600	130
16.0		1,800	650	1,100	420	800	300	1,000	360	500	120
18.0		1,600	580	1,000	360	750	270	900	340	450	110
20.0		1,400	500	900	330	700	250	820	300	400	100
Side Milling	ap	1.5DC									
	ae	0.1DC				0.05DC		0.1DC		0.05DC	
Groove Milling	ap	1.0DC				0.2DC		0.3DC		0.2DC	

SSUPR 4000ZX type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

4 Flutes | ZX Coat | Gash Land | 45° Helix Angle | Shoulder Milling | Groove Finishing | Face Milling

Fig 1

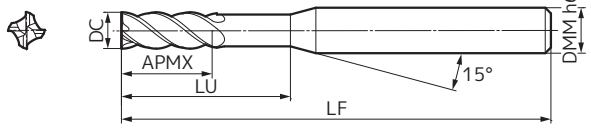


Fig 2

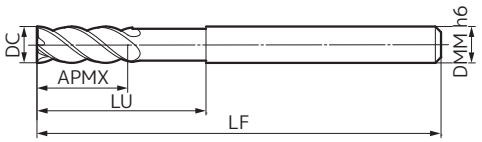
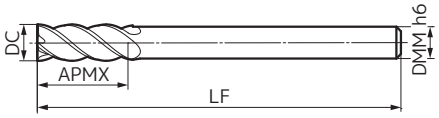


Fig 3



DC	Tolerance
D ≤ 3.0	-0.014 -0.028
3.0 < D ≤ 6.0	-0.020 -0.038
6.0 < D	-0.025 -0.047

Body

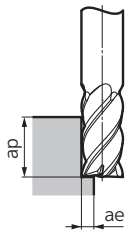
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
SSUPR 4030ZX	●	**3.0**	4.5	12	60	6	1
4040ZX	●	**4.0**	6.0	16	60	6	1
4050ZX	●	**5.0**	7.5	20	60	6	1
4060ZX	●	**6.0**	9.0	24	60	6	2
4070ZX	●	**7.0**	10.5	—	80	6	3
SSUPR 4080ZX	●	**8.0**	12.0	34	80	8	2
4090ZX	●	**9.0**	13.5	—	90	8	3
4100ZX	●	**10.0**	15.0	42	100	10	2
4110ZX	●	**11.0**	16.5	—	120	10	3
4120ZX	●	**12.0**	18.0	50	120	12	2
SSUPR 4130ZX	●	**13.0**	19.5	—	130	12	3
4160ZX	●	**16.0**	24.0	66	160	16	2
4170ZX	●	**17.0**	25.5	—	170	16	3
4200ZX	●	**20.0**	30.0	82	200	20	2

Grade: ACZ50M

Recommended Cutting Conditions

1. The conditions recommended are for endmills with standard overhang lengths of 4xD. For overhangs of 5xD or more, please use 70% (max) of recommended conditions.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Side Milling

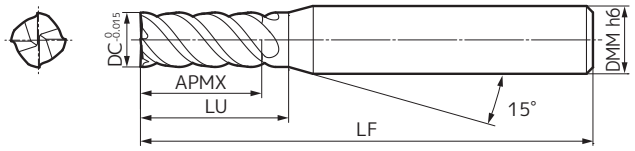
Work Material / Cutting Conditions		Carbon Steel, Cast Iron (150 to 250HB)		Alloy Steel SCM (25 to 35HRC)		Tempered Steel / Hardened Steel NAK, HPM (40 to 50HRC)		Stainless Steel		Heat-Resistant Alloy Titanium Alloy (20 to 45HRC)	
DC(mm)		Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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)
3.0		9,000	600	5,300	400	3,100	200	4,200	350	2,600	160
4.0		6,600	600	4,000	400	2,400	200	3,200	350	2,000	160
6.0		4,200	600	2,600	400	1,600	200	2,100	350	1,300	160
8.0		3,200	650	2,000	450	1,200	200	1,600	350	1,000	160
10.0		2,500	650	1,600	450	950	200	1,200	400	800	180
12.0		2,100	650	1,300	450	800	200	1,000	400	650	180
13.0		1,900	650	1,200	450	700	200	950	400	600	180
16.0		1,600	650	1,000	400	600	200	800	350	500	160
17.0		1,500	600	900	400	550	200	750	350	450	160
20.0		1,200	600	800	400	500	200	650	350	400	160
Standard Depth of Cut	ap	1.2DC									
	ae	0.1DC				0.05DC		0.1DC		0.05DC	

GSH 4000SF type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC

4 Flutes | GS HARD Coat | Gash Land | 50° Helix Angle | Shoulder Milling | Groove Finishing | Face Milling

Fig 1



Body (4 Flutes)

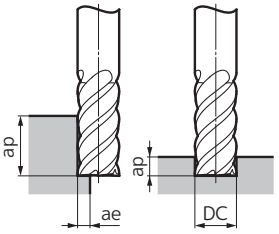
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSH 4010SF	●	**1.0**	3.0	4.0	50	6	1
4015SF	●	**1.5**	4.0	5.0	50	6	1
4020SF	●	**2.0**	6.0	7.0	50	6	1

Grade: ACF07C

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Side Milling and Groove Milling

Work Material / Cutting Conditions		Low Hardened Steel Carbon Steel, Alloy Steel (up to 35HRC)		Medium Hardened Steel Pre-hardened Steel, Die Steel (35 to 45HRC)		Hardened Steel SKD61 (45 to 55HRC)		Hardened Steel SKD11 (55 to 60HRC)		Hardened Steel SKH51 (60 to 65HRC)		Hardened Steel SKH55 (65HRC up)	
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)
1.0		20,000	540	20,000	390	15,600	260	12,300	160	11,100	140	7,800	95
2.0		19,000	1,100	17,200	770	13,400	530	10,500	320	9,500	270	6,700	190
Side Milling	ap	1 to 1.5DC		1 to 1.5DC		1 to 1.5DC		1 to 1.5DC		1 to 1.5DC		1 to 1.5DC	
	ae	0.1DC		0.1DC		0.05DC		0.05DC		0.02DC		0.02DC	
Groove Milling	ap	0.1DC		0.1DC		0.05DC		0.05DC		Up to 0.05DC Max. 0.5mm		Up to 0.05DC Max. 0.5mm	

Side Milling (Using High Speed Machining Centre)

Work Material / Cutting Conditions		Low Hardened Steel Carbon Steel, Alloy Steel (up to 35HRC)		Medium Hardened Steel Pre-hardened Steel, Die Steel (35 to 45HRC)		Hardened Steel SKD61 (45 to 55HRC)		Hardened Steel SKD11 (55 to 60HRC)		Hardened Steel SKH51 (60 to 65HRC)	
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)
1.0		48,000	1,250	48,000	1,250	48,000	1,250	48,000	930	38,000	700
2.0		48,000	2,850	48,000	2,850	48,000	2,850	36,000	1,600	24,000	1,000
Standard Depth of Cut	ap	1 to 1.5DC		1 to 1.5DC		1 to 1.5DC		1 to 1.5DC		1 to 1.5DC	
	ae	0.1DC		0.05DC		0.05DC		0.02DC		0.01DC	

GSH 6000SF type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC

6 Flutes | GS HARD Coat | Gash Land | 50° Helix Angle | Shoulder Milling | Groove Finishing | Face Milling

Fig 1

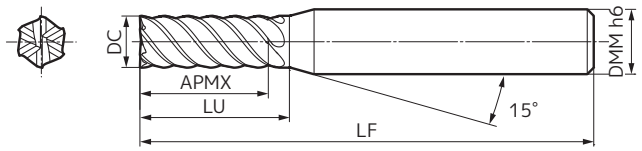
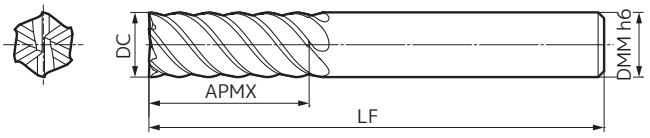


Fig 2



DC	Tolerance
D ≤ 3.0	0 -0.015
3.0 < D	0 -0.030

Body (6 Flutes)

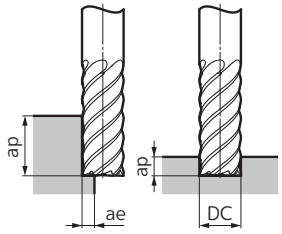
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSH 6030SF	●	**3.0**	8.0	9.0	50	6	1
6040SF	●	**4.0**	11.0	12.0	50	6	1
6050SF	●	**5.0**	13.0	14.0	50	6	1
6060SF	●	**6.0**	13.0	—	50	6	2
6080SF	●	**8.0**	19.0	—	60	8	2
GSH 6100SF	●	**10.0**	22.0	—	70	10	2
6120SF	●	**12.0**	26.0	—	75	12	2

Grade: ACF07C

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Side Milling and Groove Milling

Work Material / Cutting Conditions		Low Hardened Steel Carbon Steel, Alloy Steel (up to 35HRC)		Medium Hardened Steel Pre-hardened Steel, Die Steel (35 to 45HRC)		Hardened Steel SKD61 (45 to 55HRC)		Hardened Steel SKD11 (55 to 60HRC)		Hardened Steel SKH51 (60 to 65HRC)		Hardened Steel SKH55 (65HRC up)	
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)
3.0		15,000	2,150	13,400	1,540	10,400	1,050	8,200	650	7,400	540	5,200	380
4.0		11,200	2,400	10,000	1,740	7,800	1,180	6,100	730	5,600	600	3,900	420
5.0		9,000	2,700	8,000	1,930	6,200	1,300	4,900	810	4,400	670	3,100	470
6.0		7,500	2,700	6,700	1,930	5,200	1,300	4,100	810	3,700	670	2,600	470
8.0		5,600	2,700	5,000	1,930	3,900	1,300	3,050	810	2,800	670	1,950	470
10.0		4,500	2,700	4,000	1,930	3,100	1,300	2,450	810	2,200	670	1,550	470
12.0		3,750	2,700	3,350	1,930	2,600	1,300	2,050	810	1,850	670	1,300	470
Side Milling	ap	1 to 1.5DC		1 to 1.5DC		1 to 1.5DC		1 to 1.5DC		1 to 1.5DC		1 to 1.5DC	
	ae	0.1DC		0.1DC		0.05DC		0.05DC		0.02DC		0.02DC	
Groove Milling	ap	0.1DC		0.1DC		0.05DC		0.05DC		Up to 0.05DC Max. 0.5mm		Up to 0.05DC Max. 0.5mm	

Side Milling (Using High Speed Machining Centre)

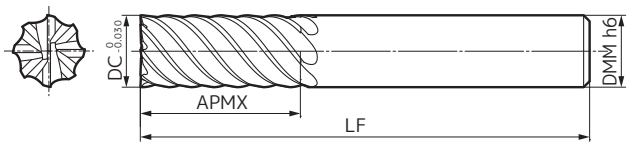
Work Material / Cutting Conditions		Low Hardened Steel Carbon Steel, Alloy Steel (up to 35HRC)		Medium Hardened Steel Pre-hardened Steel, Die Steel (35 to 45HRC)		Hardened Steel SKD61 (45 to 55HRC)		Hardened Steel SKD11 (55 to 60HRC)		Hardened Steel SKH51 (60 to 65HRC)	
DC(mm)		Spindle Speed (min⁻¹)	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)
3.0		32,000	4,900	32,000	4,900	32,000	4,900	24,000	2,740	16,000	1,700
4.0		24,000	5,200	24,000	5,200	24,000	5,200	18,000	2,900	12,000	1,800
5.0		19,200	5,800	19,200	5,800	19,200	5,800	14,300	3,200	9,600	2,000
6.0		16,000	5,800	16,000	5,800	16,000	5,800	12,000	3,200	8,000	2,000
8.0		12,000	5,800	12,000	5,800	12,000	5,800	9,000	3,200	6,000	2,000
10.0		9,600	5,800	9,600	5,800	9,600	5,800	7,200	3,200	4,800	2,000
12.0		8,000	5,800	8,000	5,800	8,000	5,800	6,000	3,200	4,000	2,000
Standard Depth of Cut	ap	1 to 1.5DC		1 to 1.5DC		1 to 1.5DC		1 to 1.5DC		1 to 1.5DC	
	ae	0.1DC		0.05DC		0.05DC		0.02DC		0.01DC	

GSH 8000SF type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC

8 Flutes | GS HARD Coat | Gash Land | 50° Helix Angle | Shoulder Milling | Groove Finishing | Face Milling

Fig 1



Body (8 Flutes)

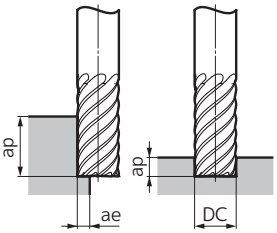
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Overall Length LF	Shank Dia. DMM	Fig
GSH 8160SF	●	**16.0**	32.0	90	16	1
8200SF	●	**20.0**	38.0	100	20	1

Grade: ACF07C

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Side Milling and Groove Milling

Work Material / Cutting Conditions / DC(mm)		Low Hardened Steel Carbon Steel, Alloy Steel (up to 35HRC)		Medium Hardened Steel Pre-hardened Steel, Die Steel (35 to 45HRC)		Hardened Steel SKD61 (45 to 55HRC)		Hardened Steel SKD11 (55 to 60HRC)		Hardened Steel SKH51 (60 to 65HRC)		Hardened Steel SKH55 (65HRC up)	
		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)
16.0		2,800	2,500	2,500	1,800	1,950	1,220	1,530	760	1,400	630	980	440
20.0		2,250	2,100	2,000	1,540	1,550	1,050	1,230	650	1,100	540	780	380
Side Milling	ap	1 to 1.5DC		1 to 1.5DC		1 to 1.5DC		1 to 1.5DC		1 to 1.5DC		1 to 1.5DC	
	ae	0.1DC		0.1DC		0.05DC		0.05DC		0.02DC		0.02DC	
Groove Milling	ap	0.1DC		0.1DC		0.05DC		0.05DC		Up to 0.05DC Max. 0.5mm		Up to 0.05DC Max. 0.5mm	

Side Milling (Using High Speed Machining Centre)

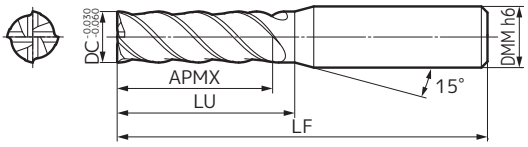
Work Material / Cutting Conditions / DC(mm)		Low Hardened Steel Carbon Steel, Alloy Steel (up to 35HRC)		Medium Hardened Steel Pre-hardened Steel, Die Steel (35 to 45HRC)		Hardened Steel SKD61 (45 to 55HRC)		Hardened Steel SKD11 (55 to 60HRC)		Hardened Steel SKH51 (60 to 65HRC)	
		Spindle Speed (min⁻¹)	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)
16.0		6,000	5,400	6,000	5,400	6,000	5,400	4,500	3,000	3,000	1,900
20.0		4,800	4,600	4,800	4,600	4,800	4,600	3,600	2,580	2,400	1,600
Standard Depth of Cut	ap	1 to 1.5DC		1 to 1.5DC		1 to 1.5DC		1 to 1.5DC		1 to 1.5DC	
	ae	0.1DC		0.05DC		0.05DC		0.02DC		0.01DC	

HHM 4000ZX type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC

4 Flutes | ZX Coat | Gash Land | 45° Helix Angle | Shoulder Milling | Face Milling

Fig 1



Body (4 Flutes)

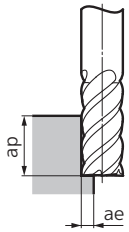
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
HHM 4030ZX	●	**3.0**	8.0	11.0	50	6	1
4040ZX	●	**4.0**	10.0	13.0	50	6	1
4050ZX	●	**5.0**	12.0	15.0	50	6	1

Grade: ACZ10M

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Side Milling

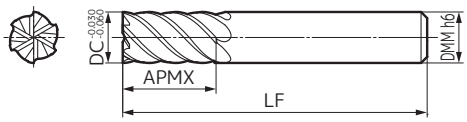
Work Material / Cutting Conditions		Carbon Steel / Alloy Steel (Below 25HRC)		Carbon Steel / Alloy Steel (Below 45HRC)		Hardened Steel (Below 65HRC)		Cast Iron Special Cast Iron	
DC(mm)		Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)
3.0		16,500	2,000	14,700	1,750	8,200	600	16,500	2,000
4.0		12,300	2,000	11,000	1,750	6,100	600	12,300	2,000
5.0		9,800	2,000	8,800	1,750	4,900	600	9,800	2,000
Standard Depth of Cut	ap	1.5DC		1.5DC		1.0DC		1.5DC	
	ae	0.1DC		0.1DC		0.02DC		0.1DC	

HHM 6000ZX type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC

6 Flutes | ZX Coat | Gash Land | 45° Helix Angle | Shoulder Milling | Face Milling

Fig 1



Body (6 Flutes)

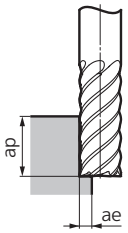
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Overall Length LF	Shank Dia. DMM	Fig
HHM 6060ZX	●	**6.0**	12.0	50	6	1
6080ZX	●	**8.0**	16.0	60	8	1
6100ZX	●	**10.0**	20.0	71	10	1
6120ZX	●	**12.0**	24.0	75	12	1

Grade: ACZ10M

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Side Milling

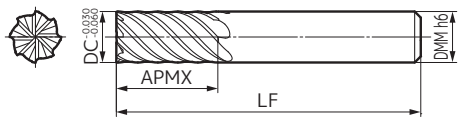
Work Material / Cutting Conditions		Carbon Steel / Alloy Steel (Below 25HRC)		Carbon Steel / Alloy Steel (Below 45HRC)		Hardened Steel (Below 65HRC)		Cast Iron Special Cast Iron	
DC(mm)		Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)
6.0		8,200	2,900	7,300	2,600	4,100	900	8,200	2,900
8.0		6,100	2,900	5,500	2,600	3,100	900	6,100	2,900
10.0		4,900	2,900	4,400	2,600	2,500	900	4,900	2,900
12.0		4,100	2,900	3,650	2,600	2,100	900	4,100	2,900
Standard Depth of Cut	ap	1.5DC		1.5DC		1.0DC		1.5DC	
	ae	0.1DC		0.1DC		0.02DC		0.1DC	

HHM 8000ZX type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC

8 Flutes | ZX Coat | Gash Land | 45° Helix Angle | Shoulder Milling | Face Milling

Fig 1



Body (8 Flutes)

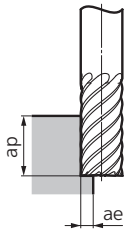
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Overall Length LF	Shank Dia. DMM	Fig
HHM 8160ZX	●	**16.0**	32	90	16	1
8200ZX	●	**20.0**	40	106	20	1
8320ZX	●	**32.0**	64	130	32	1

Grade: ACZ10M

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Side Milling

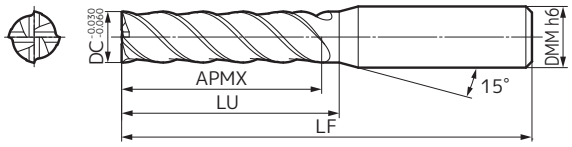
Work Material / Cutting Conditions / DC(mm)		Carbon Steel / Alloy Steel (Below 25HRC) Spindle Speed (min⁻¹)	Carbon Steel / Alloy Steel (Below 25HRC) Feed Rate (mm/min)	Carbon Steel / Alloy Steel (Below 45HRC) Spindle Speed (min⁻¹)	Carbon Steel / Alloy Steel (Below 45HRC) Feed Rate (mm/min)	Hardened Steel (Below 65HRC) Spindle Speed (min⁻¹)	Hardened Steel (Below 65HRC) Feed Rate (mm/min)	Cast Iron Special Cast Iron Spindle Speed (min⁻¹)	Cast Iron Special Cast Iron Feed Rate (mm/min)
16.0		3,100	3,500	2,750	3,200	1,550	1,100	3,100	3,500
20.0		2,500	3,150	2,200	2,800	1,250	950	2,500	3,150
32.0		1,550	2,400	1,350	1,950	780	700	1,550	2,400
Standard Depth of Cut	ap	1.5DC		1.5DC		1.0DC		1.5DC	
	ae	0.1DC		0.1DC		0.02DC		0.1DC	

LHHM 4000ZX type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC

4 Flutes | ZX Coat | Gash Land | 45° Helix Angle | Shoulder Milling | Face Milling

Fig 1



Body (4 Flutes)

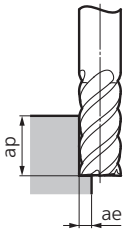
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
LHHM 4030ZX	●	**3.0**	12.0	15.0	55	6	1
4040ZX	●	**4.0**	15.0	17.9	60	6	1
4050ZX	●	**5.0**	18.0	21.0	60	6	1

Grade: ACZ10M

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Side Milling

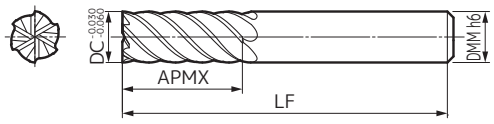
Work Material / Cutting Conditions		Carbon Steel / Alloy Steel (Below 25HRC)		Carbon Steel / Alloy Steel (Below 45HRC)		Hardened Steel (Below 65HRC)		Cast Iron Special Cast Iron	
DC(mm)		Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)
3.0		16,500	1,500	14,700	1,300	8,200	450	16,500	1,500
4.0		12,300	1,500	11,000	1,300	6,100	450	12,300	1,500
5.0		9,800	1,500	8,800	1,300	4,900	450	9,800	1,500
Standard Depth of Cut	ap	2.0DC		2.0DC		1.5DC		2.0DC	
	ae	0.1DC		0.1DC		0.02DC		0.1DC	

LHHM 6000ZX type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC

6 Flutes | ZX Coat | Gash Land | 45° Helix Angle | Shoulder Milling | Face Milling

Fig 1



Body (6 Flutes)

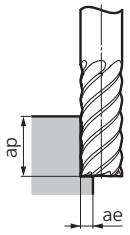
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Overall Length LF	Shank Dia. DMM	Fig
LHHM 6060ZX	●	**6.0**	18.0	60	6	1
6080ZX	●	**8.0**	25.0	75	8	1
6100ZX	●	**10.0**	30.0	80	10	1
6120ZX	●	**12.0**	30.0	100	12	1

Grade: ACZ10M

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Side Milling

Work Material / Cutting Conditions		Carbon Steel / Alloy Steel (Below 25HRC)		Carbon Steel / Alloy Steel (Below 45HRC)		Hardened Steel (Below 65HRC)		Cast Iron Special Cast Iron	
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)
6.0		8,200	2,200	7,300	2,000	4,150	700	8,200	2,200
8.0		6,100	2,200	5,500	2,000	3,100	700	6,100	2,200
10.0		4,900	2,200	4,400	2,000	2,500	700	4,900	2,200
12.0		4,100	2,200	3,700	2,000	2,100	700	4,100	2,200
Standard Depth of Cut	ap	2.0DC		2.0DC		1.5DC		2.0DC	
	ae	0.1DC		0.1DC		0.02DC		0.1DC	

LHHM 8000ZX type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC

8 Flutes | ZX Coat | Gash Land | 45° Helix Angle | Shoulder Milling | Face Milling

Fig 1

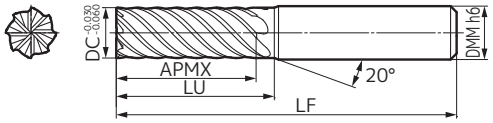
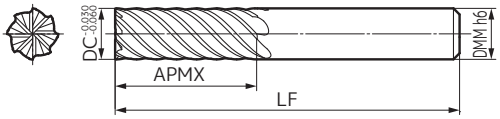


Fig 2



Body (8 Flutes)

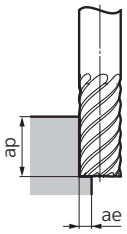
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
LHHM 8160ZX	●	**16.0**	50.0	—	105	16	2
8200ZX	●	**20.0**	55.0	—	120	20	2
8250ZX	●	**25.0**	65.0	—	140	25	2
8300ZX	●	**30.0**	75.0	86.5	160	32	1
8320ZX	●	**32.0**	85.0	—	170	32	2

Grade: ACZ10M

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Side Milling

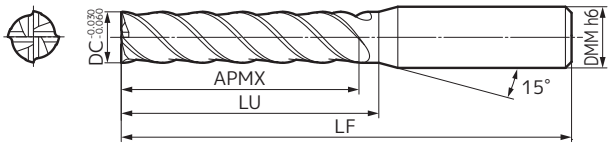
Work Material / Cutting Conditions		Carbon Steel / Alloy Steel (Below 25HRC)		Carbon Steel / Alloy Steel (Below 45HRC)		Hardened Steel (Below 65HRC)		Cast Iron Special Cast Iron	
DC(mm)		Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)
16.0		3,100	2,700	2,750	2,400	1,550	800	3,100	2,700
20.0		2,500	2,400	2,200	2,100	1,250	700	2,500	2,400
25.0		2,000	2,100	1,750	1,700	1,000	600	2,000	2,000
32.0		1,550	1,800	1,350	1,500	780	550	1,550	1,800
Standard Depth of Cut	ap	2.0DC		2.0DC		1.5DC		2.0DC	
	ae	0.1DC		0.1DC		0.02DC		0.1DC	

EHHM 4000ZX type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC

4 Flutes | ZX Coat | Gash Land | 45° Helix Angle | Shoulder Milling | Face Milling

Fig 1



Body (4 Flutes)

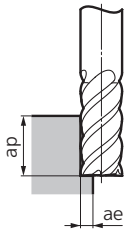
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
EHHM 4030ZX	●	**3.0**	20.0	23.0	60	6	1
4040ZX	●	**4.0**	25.0	27.9	65	6	1
4050ZX	●	**5.0**	30.0	33.0	70	6	1

Grade: ACZ10M

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Side Milling

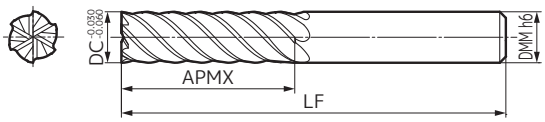
Work Material / Cutting Conditions / DC(mm)		Carbon Steel / Alloy Steel (Below 25HRC) Spindle Speed (min⁻¹)	Carbon Steel / Alloy Steel (Below 25HRC) Feed Rate (mm/min)	Carbon Steel / Alloy Steel (Below 45HRC) Spindle Speed (min⁻¹)	Carbon Steel / Alloy Steel (Below 45HRC) Feed Rate (mm/min)	Hardened Steel (Below 65HRC) Spindle Speed (min⁻¹)	Hardened Steel (Below 65HRC) Feed Rate (mm/min)	Cast Iron Special Cast Iron Spindle Speed (min⁻¹)	Cast Iron Special Cast Iron Feed Rate (mm/min)
3.0		5,800	700	4,600	400	1,800	90	5,800	700
4.0		4,400	650	3,500	400	1,350	100	4,400	650
5.0		3,500	600	2,800	400	1,100	110	3,500	600
Standard Depth of Cut	ap	2.0DC		2.0DC		2.0DC		2.0DC	
	ae	0.05DC		0.02DC		0.01DC		0.05DC	

EHHM 6000ZX type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC

6 Flutes | ZX Coat | Gash Land | 45° Helix Angle | Shoulder Milling | Face Milling

Fig 1



Body (6 Flutes)

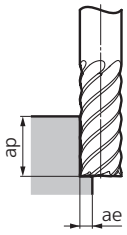
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Overall Length LF	Shank Dia. DMM	Fig
EHHM 6060ZX	●	**6.0**	30.0	70	6	1
6080ZX	●	**8.0**	40.0	90	8	1
6100ZX	●	**10.0**	50.0	100	10	1
6120ZX	●	**12.0**	50.0	120	12	1

Grade: ACZ10M

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Side Milling

Work Material / Cutting Conditions		Carbon Steel / Alloy Steel (Below 25HRC)		Carbon Steel / Alloy Steel (Below 45HRC)		Hardened Steel (Below 65HRC)		Cast Iron Special Cast Iron	
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)
6.0		2,900	810	2,300	590	900	160	2,900	810
8.0		2,400	860	2,000	620	800	170	2,400	860
10.0		2,100	920	1,800	650	700	170	2,100	920
12.0		1,750	880	1,500	580	600	170	1,750	880
Standard Depth of Cut	ap	2.0DC		2.0DC		2.0DC		2.0DC	
	ae	0.05DC		0.02DC		0.01DC		0.05DC	

EHHM 8000ZX type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC

8 Flutes | ZX Coat | Gash Land | 45° Helix Angle | Shoulder Milling | Face Milling

Fig 1

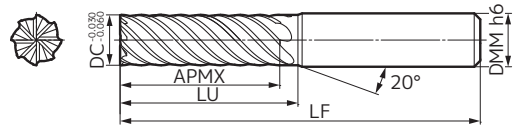
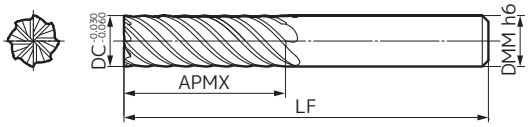


Fig 2



Body (8 Flutes)

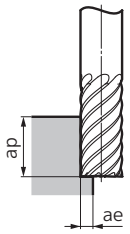
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
EHHM 8160ZX	●	**16.0**	70.0	—	140	16	2
8200ZX	●	**20.0**	85.0	—	165	20	2
8250ZX	●	**25.0**	100.0	—	185	25	2
8300ZX	●	**30.0**	110.0	121.5	205	32	1
8320ZX	●	**32.0**	110.0	—	205	32	2

Grade: ACZ10M

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Side Milling

Work Material / Cutting Conditions		Carbon Steel / Alloy Steel (Below 25HRC)		Carbon Steel / Alloy Steel (Below 45HRC)		Hardened Steel (Below 65HRC)		Cast Iron Special Cast Iron	
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)
16.0		1,350	1,000	1,100	600	450	190	1,350	1,000
20.0		1,100	850	900	520	350	160	1,100	850
25.0		850	700	700	420	300	150	850	700
32.0		680	580	550	350	220	120	680	580
Standard Depth of Cut	ap	2.0DC		2.0DC		2.0DC		2.0DC	
	ae	0.05DC		0.02DC		0.01DC		0.05DC	

GSRE 4000SF type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

4 Flutes | GS Coat | Gash Land | 40° Helix Angle | Shoulder Milling | Groove Milling | Face Milling | Helical Milling | Ramping

Fig 1

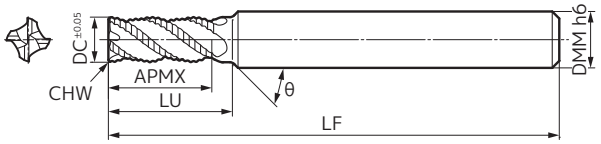
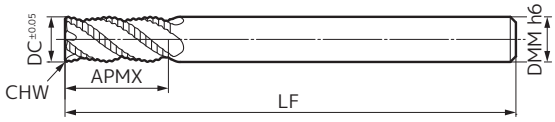


Fig 2



DC	θ
ø11 or less	45°
> ø12	20°

Body

Dimensions (mm)

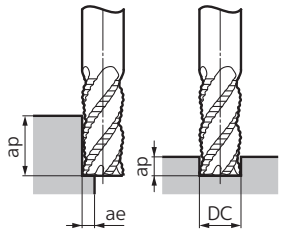
Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Chamfer CHW	Shank Dia. DMM	Fig
GSRE 4060SF	●	**6.0**	13.0	—	50	0.3	6	2
4070SF	●	**7.0**	16.0	19.0	60	0.3	8	1
4080SF	●	**8.0**	19.0	—	60	0.4	8	2
4090SF	●	**9.0**	19.0	22.0	70	0.4	10	1
4100SF	●	**10.0**	22.0	—	70	0.5	10	2
GSRE 4110SF	●	**11.0**	22.0	25.0	75	0.5	12	1
4120SF	●	**12.0**	26.0	—	75	0.6	12	2
4140SF	●	**14.0**	26.0	30.0	90	0.6	16	1
4160SF	●	**16.0**	32.0	—	90	0.8	16	2
4180SF	●	**18.0**	32.0	40.0	100	0.8	20	1
GSRE 4200SF	●	**20.0**	38.0	—	100	1.0	20	2

Grade: ACZ20W

GSRE 4000SF type

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Side Milling

Work Material / Cutting Conditions		Structural Steel, Carbon Steel (150 to 250HB)		Cast Iron FC, FCD		Alloy Steel (25 to 35HRC)		Hardened Steel (45 to 50HRC)		Stainless Steel SUS304, SUS316		Heat-Resistant Alloy 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)
6.0		4,800	1,200	5,800	1,500	3,200	380	2,600	400	5,300	250	1,600	90
7.0		4,100	1,200	5,000	1,500	2,700	380	2,200	400	4,500	250	1,350	90
8.0		3,600	1,200	4,500	1,500	2,400	380	2,000	400	4,000	250	1,250	90
9.0		3,200	1,200	4,000	1,500	2,100	380	1,800	400	3,500	250	1,050	90
10.0		2,800	1,200	3,500	1,500	1,900	380	1,600	400	3,200	250	1,000	100
11.0		2,600	1,200	3,000	1,400	1,700	380	1,500	400	2,900	250	900	100
12.0		2,400	1,200	2,900	1,400	1,600	400	1,300	400	2,600	250	800	100
14.0		2,200	1,100	2,600	1,300	1,300	380	1,100	350	2,200	200	700	100
16.0		1,800	900	2,200	1,100	1,200	380	1,000	350	2,000	180	600	100
18.0		1,400	700	1,800	900	1,000	380	900	300	1,800	150	550	100
20.0		1,400	700	1,700	850	850	380	800	300	1,600	150	500	100
Standard Depth of Cut	ap	1.5DC											
	ae	0.5DC						0.3DC					

Groove Milling

Work Material / Cutting Conditions		Structural Steel, Carbon Steel (150 to 250HB)		Cast Iron FC, FCD		Alloy Steel (25 to 35HRC)		Hardened Steel (45 to 50HRC)		Stainless Steel SUS304, SUS316		Heat-Resistant Alloy 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)
6.0		3,600	900	4,300	1,100	2,400	300	1,700	260	4,200	250	1,100	60
7.0		3,000	900	3,700	1,100	2,000	280	1,500	260	3,600	250	900	60
8.0		2,700	900	3,400	1,100	1,800	280	1,350	260	3,200	250	800	60
9.0		2,400	900	3,000	1,100	1,600	280	1,200	260	2,800	250	700	60
10.0		2,100	900	2,600	1,100	1,400	280	1,100	270	2,500	250	650	65
11.0		2,000	900	2,300	1,100	1,300	280	1,000	270	2,300	250	600	70
12.0		1,800	900	2,200	1,100	1,200	300	900	270	2,100	250	550	70
14.0		1,600	800	2,000	1,000	1,000	290	750	240	1,800	180	450	65
16.0		1,350	650	1,650	850	900	280	700	240	1,600	160	400	65
18.0		1,200	550	1,500	750	800	280	600	230	1,400	140	350	60
20.0		1,050	500	1,350	700	700	280	550	210	1,250	125	300	60
Standard Depth of Cut	ap	1.0DC						0.5DC					

ASM 2000DL type

Aluminum Alloy | Copper Alloy

2 Flutes | AURORA Coat DLC | Sharp Corner | 30° Helix Angle | Shoulder Milling | Groove Milling | Groove Finishing | Face Milling | Spot Facing | Helical Milling | Ramping

Fig 1

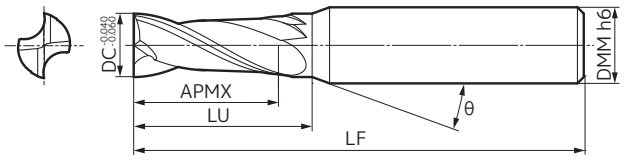


Fig 2

DC	θ
< ø3	10°
≥ ø3	15°

Body

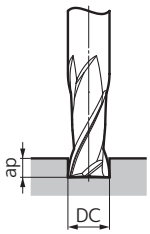
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
ASM 2020DL	●	**2.0**	6.0	6.8	40	4	1
2030DL	●	**3.0**	10.0	12.9	45	6	1
2040DL	●	**4.0**	12.0	14.7	45	6	1
2050DL	●	**5.0**	15.0	18.6	50	6	1
2060DL	●	**6.0**	15.0	—	50	6	2
ASM 2080DL	●	**8.0**	18.0	—	60	8	2
2100DL	●	**10.0**	22.0	—	71	10	2
2120DL	●	**12.0**	25.0	—	75	12	2
2160DL	●	**16.0**	32.0	—	90	16	2

Grade: DL1000

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Groove Milling

Work Material / Cutting Conditions		Aluminum Alloy			
		Wet		Dry	
DC(mm)		Spindle Speed (min⁻¹)	Feed Rate (mm/min)	Spindle Speed (min⁻¹)	Feed Rate (mm/min)
2.0		28,000	280	28,000	200
3.0		22,000	400	22,000	280
4.0		18,000	520	18,000	360
5.0		14,000	520	14,000	360
6.0		12,000	540	12,000	370
8.0		9,000	540	9,000	370
10.0		7,200	560	7,200	390
12.0		6,000	560	6,000	390
16.0		4,500	560	4,500	390
Standard Depth of Cut	ap	1.0DC		0.5DC	
	ae	1.0DC		1.0DC	

ASM 4000DL type

Aluminum Alloy | Copper Alloy

4 Flutes | AURORA Coat DLC | Sharp Corner | 30° Helix Angle | Shoulder Milling | Groove Finishing | Face Milling | Helical Milling | Ramping

Fig 1

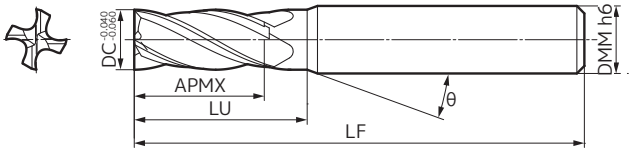
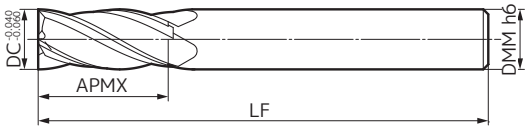


Fig 2



DC	θ
< ø3	10°
≥ ø3	15°

Body

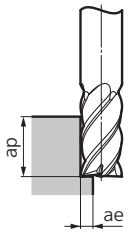
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
ASM 4020DL	●	**2.0**	6.0	6.8	40	4	1
4030DL	●	**3.0**	10.0	12.9	45	6	1
4040DL	●	**4.0**	12.0	14.7	45	6	1
4050DL	●	**5.0**	15.0	18.6	50	6	1
4060DL	●	**6.0**	15.0	—	50	6	2
ASM 4080DL	●	**8.0**	18.0	—	60	8	2
4100DL	●	**10.0**	22.0	—	71	10	2
4120DL	●	**12.0**	25.0	—	75	12	2
4160DL	●	**16.0**	32.0	—	90	16	2

Grade: DL1000

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Side Milling

Work Material / Cutting Conditions		Aluminum Alloy			
		Wet		Dry	
DC(mm)		Spindle Speed (min⁻¹)	Feed Rate (mm/min)	Spindle Speed (min⁻¹)	Feed Rate (mm/min)
2.0		40,000	1,400	40,000	980
3.0		32,000	2,000	32,000	1,400
4.0		26,000	2,600	26,000	1,800
5.0		20,000	2,600	20,000	1,800
6.0		17,000	2,700	17,000	1,900
8.0		13,000	2,700	13,000	1,900
10.0		11,000	2,800	11,000	2,000
12.0		8,500	2,800	8,500	2,000
16.0		6,400	2,800	6,400	2,000
Standard Depth of Cut	ap	1.5DC		1.5DC	
	ae	0.2DC		0.2DC	

ASM 2000 type

Aluminum Alloy | Copper Alloy

2 Flutes | Uncoated Carbide | Sharp Corner | 30° Helix Angle | Shoulder Milling | Groove Milling | Groove Finishing | Face Milling | Spot Facing | Helical Milling | Ramping

Fig 1

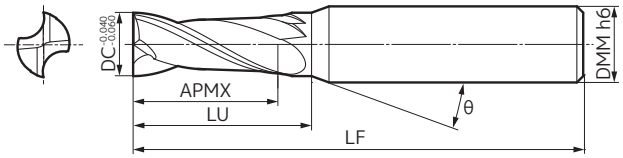


Fig 2

DC	θ
< ø3	10°
≥ ø3 < ø6	15°
> ø6	20°

Body

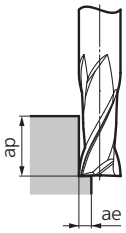
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
ASM 2020	●	**2.0**	6	6.8	40	4	1
2030	●	**3.0**	10	12.9	45	6	1
2040	●	**4.0**	12	14.7	45	6	1
2050	●	**5.0**	15	18.6	50	6	1
2060	●	**6.0**	15	—	50	6	2
ASM 2080	●	**8.0**	18	—	60	8	2
2100	●	**10.0**	22	—	71	10	2
2120	●	**12.0**	25	—	75	12	2
2140	●	**14.0**	32	44.2	90	16	1
2150	●	**15.0**	32	44.1	90	16	1
ASM 2160	●	**16.0**	32	—	90	16	2

Grade: H1

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Side Milling

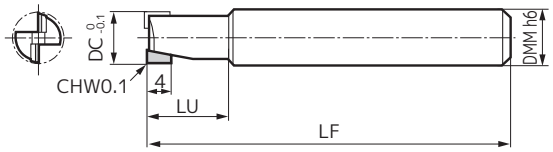
Work Material / Cutting Conditions		Aluminum Alloy		Cast Iron Special Cast Iron	
DC(mm)		Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)
2.0		35,000	460	13,000	240
3.0		23,400	770	8,750	275
4.0		17,500	800	6,550	310
6.0		11,700	910	4,370	340
8.0		8,750	980	3,280	390
10.0		7,000	1,100	2,620	400
12.0		5,850	1,150	2,185	430
16.0		4,380	1,150	1,640	430
Standard Depth of Cut	ap	1.5DC		1.5DC	
	ae	0.1DC		0.1DC	

DFE series

Aluminum Alloy | Copper Alloy | Graphite

2 Flutes | PCD | Shoulder Milling | Face Milling

Fig 1



Body

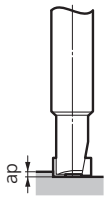
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
DFE 2040S	●	**4.0**	15	50	6	1
2050S	●	**5.0**	15	50	6	1
2080S	●	**8.0**	15	60	10	1
2090S	●	**9.0**	15	70	10	1
2100S	●	**10.0**	15	70	10	1

Grade: DA2200

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Face Milling (2 Flutes)

Work Material / Cutting Conditions		Aluminum Alloy Copper Alloy	
DC(mm)		Spindle Speed (min^{-1})	Feed Rate (mm/min)
4.0		40,000	4,000
5.0		32,000	3,200
8.0		20,000	2,000
9.0		17,800	1,780
10.0		16,000	1,600
Standard Depth of Cut	ap	0.4DC	

DFE series

Aluminum Alloy | Copper Alloy | Graphite

4 Flutes | PCD | Shoulder Milling | Face Milling

Fig 1

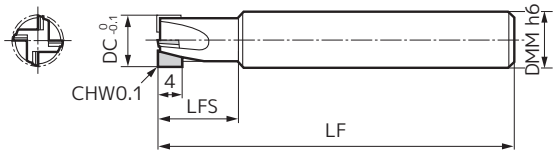
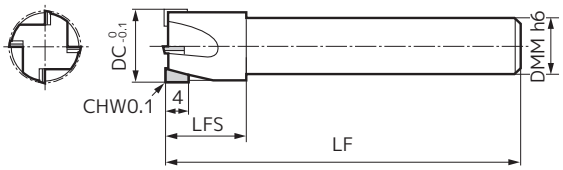


Fig 2



Body

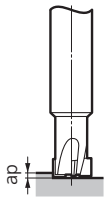
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Neck Length LFS	Overall Length LF	Shank Dia. DMM	Fig
DFE 4090S	●	**9.0**	15	70	10	1
4100S	●	**10.0**	15	70	10	1
4130GS	●	**13.0**	15	70	10	2

Grade: DA2200

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Face Milling (4 Flutes)

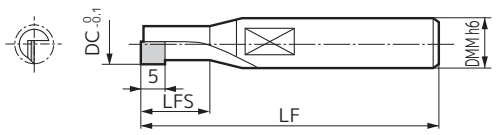
Work Material / Cutting Conditions / DC(mm)	Aluminum Alloy Copper Alloy	
	Spindle Speed (min^{-1})	Feed Rate (mm/min)
9.0	17,800	3,560
10.0	16,000	3,200
13.0	12,300	2,460
Standard Depth of Cut ap	0.4DC	

DAE series

Aluminum Alloy | Copper Alloy | Graphite

1 Flute | PCD | Shoulder Milling | Face Milling

Fig 1

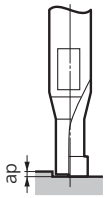


Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Neck Length LFS	Overall Length LF	Shank Dia. DMM	Fig
DAE 1040	●	**4.0**	10	45	6	1
1050	●	**5.0**	12	50	6	1

Grade: DA200



Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.

Face Milling (1 Flute)

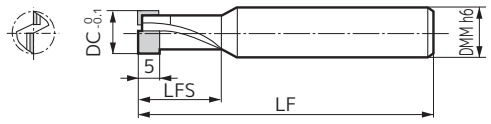
Work Material / Cutting Conditions		Aluminum Alloy Copper Alloy	
DC(mm)		Spindle Speed (min^{-1})	Feed Rate (mm/min)
4.0		6,000	210
5.0		5,000	175
Standard Depth of Cut	ap	0.4DC	

DAE series

Aluminum Alloy | Copper Alloy | Graphite

2 Flutes | PCD | Shoulder Milling | Face Milling

Fig 1



Body (2 Flutes)

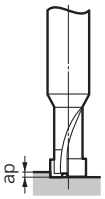
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Neck Length LFS	Overall Length LF	Shank Dia. DMM	Fig
DAE 2060	●	**6.0**	20	50	6	1
2070	●	**7.0**	20	60	8	1
2080	●	**8.0**	20	60	8	1
2090	●	**9.0**	25	71	10	1
2100	●	**10.0**	25	71	10	1
DAE 2110	●	**11.0**	25	75	12	1
2120	●	**12.0**	25	75	12	1

Grade: DA200

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Face Milling (2 Flutes)

Work Material / Cutting Conditions		Aluminum Alloy Copper Alloy	
DC(mm)		Spindle Speed (min^{-1})	Feed Rate (mm/min)
6.0		6,400	580
7.0		5,500	500
8.0		5,400	500
9.0		5,300	480
10.0		4,800	440
11.0		4,400	400
12.0		4,000	360
Standard Depth of Cut	ap	0.4DC	

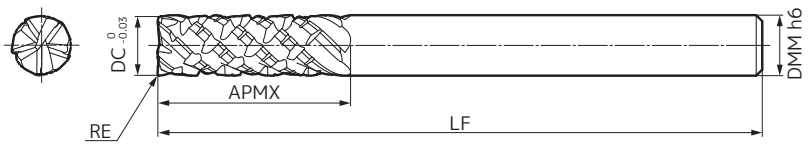
AVIX type

Graphite CFRP

New SUMIDIA Coat Sharp Corner 45° Helix Angle Shoulder Groove Milling Groove Finishing Cut Through Flat Spot Facing Helical Milling Ramping

*Refer to N44 for the tolerance of h6

Fig 1



Body

Dimensions (mm)

	Cat. No.	Stock	Dia. DC	Corner Radius RE	Cutting Edge Length APMX	Overall Length LF	Shank Dia. DMM	Number of Flutes	Bottom Cutting Edges	Fig
Metric	**AVIX 404000-R03**	●	**4.0**	0.3	12	60	4	4	4	1
	506000-R03	●	**6.0**	0.3	18	70	6	5	5	1
	508000-R03	●	**8.0**	0.3	24	80	8	5	5	1
	510000-R03	●	**10.0**	0.3	30	80	10	5	5	1
	612000-R03	●	**12.0**	0.3	36	90	12	6	6	1
Inch	**AVIX 403175-R03**	●	**3.175**	0.3	10	60	3.175	4	4	1
	506350-R03	●	**6.35**	0.3	19	70	6.35	5	5	1
	509525-R03	●	**9.525**	0.3	28	80	9.525	5	5	1
	612700-R03	●	**12.7**	0.3	38	90	12.7	6	6	1

Grade: DCT30X

Identification Code

AVIX 6 12700 - R03

Series Code | Number of Flutes | Dia. | Corner Radius

Recommended Cutting Conditions

Work Material	CFRP		
Cutting Conditions	Dry		
DC(mm)	Spindle Speed (min⁻¹)	Cutting Speed vc (m/min)	Feed Rate fz (mm/rev)
4.0	12,000	150	0.08 to 0.17
6.0	10,600	200	0.09 to 0.19
8.0	8,000	200	0.13 to 0.25
10.0	6,400	200	0.16 to 0.31
12.0	5,300	200	0.19 to 0.38
3.175	12,000	120	0.08 to 0.17
6.35	10,000	200	0.10 to 0.20
9.525	6,700	200	0.15 to 0.30
12.7	5,000	200	0.20 to 0.40

1. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.
2. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.

SSDC 4000(RL) type

Graphite | CFRP | GFRP

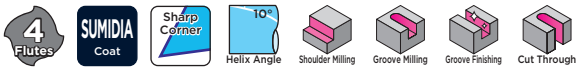
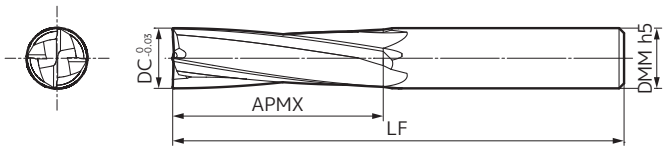


Fig 1



Body (Right-hand Helix type)

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Overall Length LF	Shank Dia. DMM	Fig
SSDC 4060	▲	**6.0**	20	70	6	1
4080	▲	**8.0**	30	80	8	1
4100	▲	**10.0**	30	90	10	1
4120	▲	**12.0**	30	100	12	1

Grade: DCX20

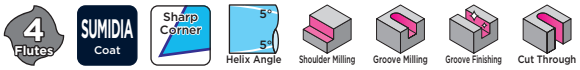
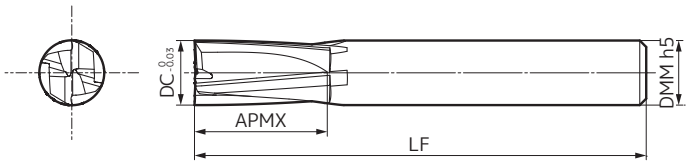


Fig 2



Body (Right-Left-hand Helix type)

Dimensions (mm)

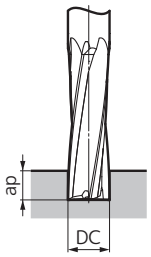
Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Overall Length LF	Shank Dia. DMM	Fig
SSDC 4060RL	▲	**6.0**	20	70	6	2
4080RL	▲	**8.0**	30	80	8	2
4100RL	▲	**10.0**	30	90	10	2
4120RL	▲	**12.0**	30	100	12	2

Grade: DCX20

Identification Code

SSDC 4 060 RL

Series Code	Number of Flutes	Dia.	Helix Shape (RL: Right-Left-hand Helix)



Recommended Cutting Conditions

1. The cutting conditions are guidelines.
   Cutting conditions are greatly influenced by clamping, work material grade, work material thickness and machine rigidity. Adjust the conditions accordingly.
2. Take sufficient dust control measures.
3. When radial depth of cut is 0.7D or more in groove milling and trimming, reduce feed rate accordingly.

Groove Milling (Common)

Work Material / Cutting Conditions	CFRP			
	Dry			
DC(mm)	Cutting Speed (m/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Feed Rate (mm/rev)
6.0	197.8	10,500	940	0.090
8.0	201.0	8,000	800	0.100
10.0	204.1	6,500	720	0.111
12.0	207.2	5,500	670	0.122

▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)

MEMO

GSX 40000-R-2D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

4 Flutes | GSX Coat | Corner r | 30° Helix Angle | Shoulder Milling | Groove Milling | Groove Finishing | Face Milling | Helical Milling | Ramping | Profiling

Fig 1

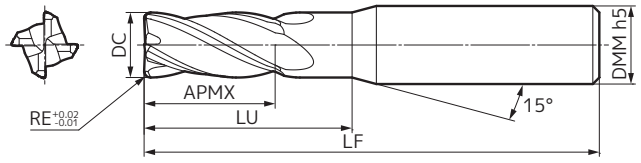
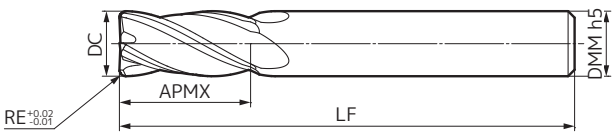


Fig 2



DC	Tolerance
D ≤ 3.0	0 -0.015
3.0 < D	0 -0.03

Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Corner Radius RE	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX 40300-R02-2D	●	**3.0**	0.2	8.0	9.5	45	6	1
40300-R05-2D	●	**3.0**	0.5	8.0	9.5	45	6	1
40400-R02-2D	●	**4.0**	0.2	11.0	14.0	45	6	1
40400-R05-2D	●	**4.0**	0.5	11.0	14.0	45	6	1
40400-R10-2D	●	**4.0**	1.0	11.0	14.0	45	6	1
GSX 40500-R02-2D	●	**5.0**	0.2	13.0	19.6	50	6	1
40500-R05-2D	●	**5.0**	0.5	13.0	19.6	50	6	1
40500-R10-2D	●	**5.0**	1.0	13.0	19.6	50	6	1
40600-R02-2D	●	**6.0**	0.2	13.0	—	50	6	2
40600-R05-2D	●	**6.0**	0.5	13.0	—	50	6	2
GSX 40600-R10-2D	●	**6.0**	1.0	13.0	—	50	6	2
40600-R15-2D	●	**6.0**	1.5	13.0	—	50	6	2
40800-R02-2D	●	**8.0**	0.2	19.0	—	60	8	2
40800-R05-2D	●	**8.0**	0.5	19.0	—	60	8	2
40800-R10-2D	●	**8.0**	1.0	19.0	—	60	8	2
GSX 40800-R15-2D	●	**8.0**	1.5	19.0	—	60	8	2
41000-R02-2D	●	**10.0**	0.2	22.0	—	70	10	2
41000-R05-2D	●	**10.0**	0.5	22.0	—	70	10	2
41000-R10-2D	●	**10.0**	1.0	22.0	—	70	10	2
41000-R15-2D	●	**10.0**	1.5	22.0	—	70	10	2
GSX 41000-R20-2D	●	**10.0**	2.0	22.0	—	70	10	2
41200-R02-2D	●	**12.0**	0.2	26.0	—	75	12	2
41200-R05-2D	●	**12.0**	0.5	26.0	—	75	12	2
41200-R10-2D	●	**12.0**	1.0	26.0	—	75	12	2
41200-R15-2D	●	**12.0**	1.5	26.0	—	75	12	2
GSX 41200-R20-2D	●	**12.0**	2.0	26.0	—	75	12	2

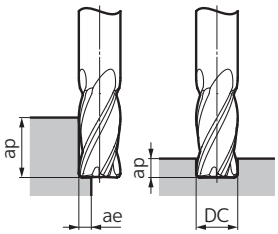
Grade: ACF20

Identification Code

GSX 4 0300 - R 02 - 2D

- GSX: Series Code
- 4: Number of Flutes
- 0300: Dia.
- R: Corner Style R: Radius
- 02: Corner Radius
- 2D: Cutting Edge Length

GSX 40000-R-2D type



Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.
3. For groove milling of stainless steel, use 60% of the recommended spindle speed and 40% of the recommended feed rate. (*)

Side Milling

Work Material / Cutting Conditions		Structural Steel, Carbon Steel, Cast Iron SS, SC, FC (150 to 250HB)		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-Resistant Alloy 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)
2.0		12,800	570	12,000	380	8,300	230	6,000	150	6,000	130	3,700	70
4.0		6,800	730	6,400	490	4,400	300	3,200	200	3,200	170	2,000	90
6.0		4,600	770	4,300	520	3,000	320	2,200	210	2,200	180	1,400	100
8.0		3,400	770	3,200	520	2,200	320	1,600	210	1,600	180	1,000	100
10.0		2,800	780	2,600	520	1,800	320	1,300	210	1,300	180	800	100
12.0		2,300	780	2,200	530	1,500	320	1,100	210	1,100	180	700	100
Standard Depth of Cut	ap	1.5DC		1.5DC		1.5DC		1.0DC		1.5DC		1.0DC	
	ae	0.1DC		0.1DC		0.05DC		0.02DC		0.1DC		0.05DC	

Groove Milling

Work Material / Cutting Conditions		Structural Steel, Carbon Steel, Cast Iron SS, SC, FC (150 to 250HB)		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-Resistant Alloy 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)
2.0		12,800	570	12,000	380	8,300	230	6,000	150	6,000	130	3,700	70
4.0		6,800	730	6,400	490	4,400	300	3,200	200	3,200	170	2,000	90
6.0		4,600	770	4,300	520	3,000	320	2,200	210	2,200	180	1,400	100
8.0		3,400	770	3,200	520	2,200	320	1,600	210	1,600	180	1,000	100
10.0		2,800	780	2,600	520	1,800	320	1,300	210	1,300	180	800	100
12.0		2,300	780	2,200	530	1,500	320	1,100	210	1,100	180	700	100
Groove Milling	ap	0.5DC		0.5DC		0.2DC		0.05DC		0.3DC		0.1DC	

Side Milling (Using High Speed Machining Centre)

Work Material / Cutting Conditions		Structural Steel, Carbon Steel, Cast Iron SS, SC, FC (150 to 250HB)		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel (*) SUS304, SUS316	
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)
2.0		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	1,900	19,900	1,400	15,900	1,100	8,000	490
6.0		16,000	2,700	16,000	2,000	13,300	1,500	10,600	1,200	5,300	510
8.0		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	2,000	8,000	1,500	6,400	1,200	3,200	520
12.0		8,000	2,700	8,000	2,000	6,700	1,500	5,300	1,200	2,700	520
Standard Depth of Cut	ap	1.5DC		1.5DC		1.5DC		1.0DC		1.5DC	
	ae	0.05DC		0.05DC		0.05DC		0.02DC		0.05DC	

GSV 4000-R-2.5D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

4 Flutes | GSX Coat | Corner r | 40° Helix Angle | Shoulder Milling | Groove Milling | Groove Finishing | Face Milling | Helical Milling | Ramping | Profiling

Fig 1

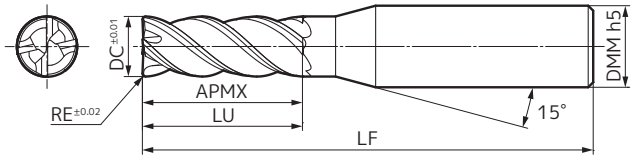
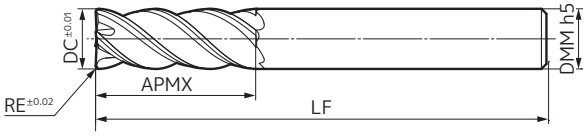


Fig 2



Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Corner Radius RE	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSV 4030-R02-2.5D	●	3.0	0.2	8.0	9.5	50	6	1
4030-R05-2.5D	●	3.0	0.5	8.0	9.5	50	6	1
4040-R02-2.5D	●	4.0	0.2	10.0	11.5	50	6	1
4040-R05-2.5D	●	4.0	0.5	10.0	11.5	50	6	1
4040-R10-2.5D	●	4.0	1.0	10.0	11.5	50	6	1
GSV 4050-R02-2.5D	●	5.0	0.2	13.0	14.5	60	6	1
4050-R05-2.5D	●	5.0	0.5	13.0	14.5	60	6	1
4050-R10-2.5D	●	5.0	1.0	13.0	14.5	60	6	1
4060-R03-2.5D	●	6.0	0.3	15.0	—	60	6	2
4060-R05-2.5D	●	6.0	0.5	15.0	—	60	6	2
GSV 4060-R10-2.5D	●	6.0	1.0	15.0	—	60	6	2
4060-R15-2.5D	●	6.0	1.5	15.0	—	60	6	2
4080-R03-2.5D	●	8.0	0.3	20.0	—	80	8	2
4080-R05-2.5D	●	8.0	0.5	20.0	—	80	8	2
4080-R10-2.5D	●	8.0	1.0	20.0	—	80	8	2
GSV 4080-R15-2.5D	●	8.0	1.5	20.0	—	80	8	2
4080-R20-2.5D	●	8.0	2.0	20.0	—	80	8	2
4100-R03-2.5D	●	10.0	0.3	25.0	—	90	10	2
4100-R05-2.5D	●	10.0	0.5	25.0	—	90	10	2
4100-R10-2.5D	●	10.0	1.0	25.0	—	90	10	2
GSV 4100-R15-2.5D	●	10.0	1.5	25.0	—	90	10	2
4100-R20-2.5D	●	10.0	2.0	25.0	—	90	10	2
4120-R05-2.5D	●	12.0	0.5	30.0	—	90	12	2
4120-R10-2.5D	●	12.0	1.0	30.0	—	90	12	2
4120-R15-2.5D	●	12.0	1.5	30.0	—	90	12	2
GSV 4120-R20-2.5D	●	12.0	2.0	30.0	—	90	12	2
4120-R30-2.5D	●	12.0	3.0	30.0	—	90	12	2
4160-R10-2.5D	●	16.0	1.0	40.0	—	115	16	2
4160-R15-2.5D	●	16.0	1.5	40.0	—	115	16	2
4160-R20-2.5D	●	16.0	2.0	40.0	—	115	16	2
GSV 4160-R30-2.5D	●	16.0	3.0	40.0	—	115	16	2
4200-R10-2.5D	●	20.0	1.0	50.0	—	125	20	2
4200-R15-2.5D	●	20.0	1.5	50.0	—	125	20	2
4200-R20-2.5D	●	20.0	2.0	50.0	—	125	20	2
4200-R30-2.5D	●	20.0	3.0	50.0	—	125	20	2
GSV 4250-R10-2.5D	●	25.0	1.0	63.0	—	140	25	2
4250-R15-2.5D	●	25.0	1.5	63.0	—	140	25	2
4250-R20-2.5D	●	25.0	2.0	63.0	—	140	25	2
4250-R30-2.5D	●	25.0	3.0	63.0	—	140	25	2

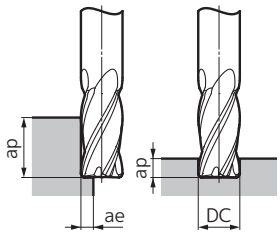
Grade: ACF20

Identification Code

GSV 4 030 - R 02 - 2.5D

- GSV: Series Code
- 4: Number of Flutes
- 030: Dia.
- R: Corner Style R: Radius
- 02: Corner Radius
- 2.5D: Cutting Edge Length

GSV 4000-R-2.5D type



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 maximum spindle speed available.

Side Milling

Work Material / Cutting Conditions		Carbon Steel, Cast Iron SS, SC, FC (150 to 250HB)		Alloy Steel SCM (25 to 35HRC)		Tempered Steel / Hardened Steel NAK, HPM (40 to 50HRC)		Stainless Steel SUS304, SUS316		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)
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	ap	1.5DC									
	ae	0.2DC				0.05DC		0.1DC		0.05DC	

Groove Milling

Work Material / Cutting Conditions		Carbon Steel, Cast Iron SS, SC, FC (150 to 250HB)		Alloy Steel SCM (25 to 35HRC)		Tempered Steel / Hardened Steel NAK, HPM (40 to 50HRC)		Stainless Steel SUS304, SUS316		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)
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	ap	0.8DC				0.16DC		0.4DC		0.16DC	

GSXVL 4000-R-2.5D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

4 Flutes | GSX Coat | Corner R | 40° 43° Helix Angle | Shoulder Milling | Groove Milling | Groove Finishing | Face Milling | Helical Milling | Ramping | Profiling

Fig 1

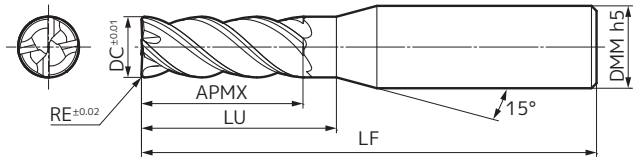
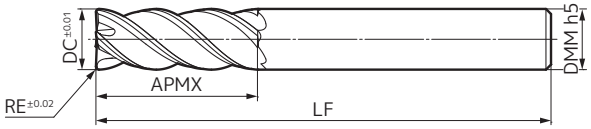


Fig 2



Body

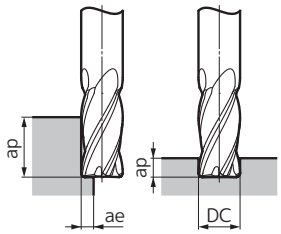
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Corner Radius RE	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSXVL 4030-R02-2.5D	●	3.0	0.2	8.0	9.5	50	6	1
4030-R05-2.5D	●	3.0	0.5	8.0	9.5	50	6	1
4040-R02-2.5D	●	4.0	0.2	10.0	11.5	50	6	1
4040-R05-2.5D	●	4.0	0.5	10.0	11.5	50	6	1
4040-R10-2.5D	●	4.0	1.0	10.0	11.5	50	6	1
GSXVL 4050-R02-2.5D	●	5.0	0.2	13.0	14.5	60	6	1
4050-R05-2.5D	●	5.0	0.5	13.0	14.5	60	6	1
4050-R10-2.5D	●	5.0	1.0	13.0	14.5	60	6	1
4060-R03-2.5D	●	6.0	0.3	15.0	—	60	6	2
4060-R05-2.5D	●	6.0	0.5	15.0	—	60	6	2
GSXVL 4060-R10-2.5D	●	6.0	1.0	15.0	—	60	6	2
4060-R15-2.5D	●	6.0	1.5	15.0	—	60	6	2
4080-R03-2.5D	●	8.0	0.3	20.0	—	80	8	2
4080-R05-2.5D	●	8.0	0.5	20.0	—	80	8	2
4080-R10-2.5D	●	8.0	1.0	20.0	—	80	8	2
GSXVL 4080-R15-2.5D	●	8.0	1.5	20.0	—	80	8	2
4080-R20-2.5D	●	8.0	2.0	20.0	—	80	8	2
4100-R03-2.5D	●	10.0	0.3	25.0	—	90	10	2
4100-R05-2.5D	●	10.0	0.5	25.0	—	90	10	2
4100-R10-2.5D	●	10.0	1.0	25.0	—	90	10	2
GSXVL 4100-R15-2.5D	●	10.0	1.5	25.0	—	90	10	2
4100-R20-2.5D	●	10.0	2.0	25.0	—	90	10	2
4120-R05-2.5D	●	12.0	0.5	30.0	—	90	12	2
4120-R10-2.5D	●	12.0	1.0	30.0	—	90	12	2
4120-R15-2.5D	●	12.0	1.5	30.0	—	90	12	2
GSXVL 4120-R20-2.5D	●	12.0	2.0	30.0	—	90	12	2
4120-R30-2.5D	●	12.0	3.0	30.0	—	90	12	2
4160-R10-2.5D	●	16.0	1.0	40.0	—	115	16	2
4160-R15-2.5D	●	16.0	1.5	40.0	—	115	16	2
4160-R20-2.5D	●	16.0	2.0	40.0	—	115	16	2
GSXVL 4160-R30-2.5D	●	16.0	3.0	40.0	—	115	16	2
4200-R10-2.5D	●	20.0	1.0	50.0	—	125	20	2
4200-R15-2.5D	●	20.0	1.5	50.0	—	125	20	2
4200-R20-2.5D	●	20.0	2.0	50.0	—	125	20	2
4200-R30-2.5D	●	20.0	3.0	50.0	—	125	20	2
GSXVL 4250-R10-2.5D		25.0	1.0	63.0	—	140	25	2
4250-R15-2.5D		25.0	1.5	63.0	—	140	25	2
4250-R20-2.5D		25.0	2.0	63.0	—	140	25	2
4250-R30-2.5D		25.0	3.0	63.0	—	140	25	2

Grade: ACF20

For the regrinding procedure, please download the details from our website.
https://www.sumitool.com/en/products/cutting-tools/endmills/pdf/gsxvl-regrinding_en.pdf

GSXVL 4000-R-2.5D type



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 maximum spindle speed available.

Side Milling

Work Material / Cutting Conditions		Carbon Steel, Cast Iron SS, SC, FC (150 to 250HB)		Alloy Steel SCM (25 to 35HRC)		Tempered Steel / Hardened Steel NAK, HPM (40 to 50HRC)		Stainless Steel SUS304, SUS316		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)
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	ap	1.5DC									
	ae	0.2DC				0.05DC		0.1DC		0.05DC	

Groove Milling

Work Material / Cutting Conditions		Carbon Steel, Cast Iron SS, SC, FC (150 to 250HB)		Alloy Steel SCM (25 to 35HRC)		Tempered Steel / Hardened Steel NAK, HPM (40 to 50HRC)		Stainless Steel SUS304, SUS316		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)
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	ap	1.0DC				0.2DC		0.5DC		0.2DC	

SSEHVL 4000W-R type

Stainless Steel | Ti Alloy / Heat Resistant Alloy

4 Flutes | GS HARD Coat | Corner R | 42° 45° Helix Angle | Shoulder Milling | Groove Milling | Groove Finishing | Face Milling | Profiling

Fig 1

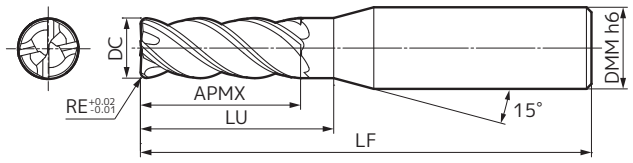
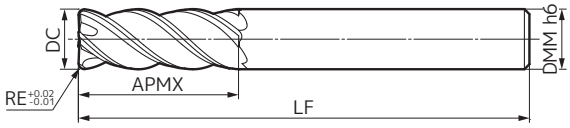


Fig 2



DC	Tolerance
4.0 < D ≤ 6.0	-0.020 to -0.038
6.0 < D	-0.025 to -0.047

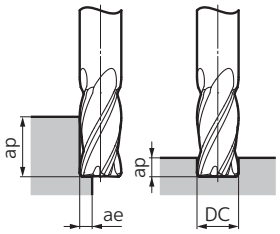
Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Corner Radius RE	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
SSEHVL 4045W-R05	●	**4.5**	0.5	12.0	14.5	50	6	1
4045W-R10	●	**4.5**	1.0	12.0	14.5	50	6	1
4050W-R05	●	**5.0**	0.5	13.0	15.5	60	6	1
4050W-R10	●	**5.0**	1.0	13.0	15.5	60	6	1
4060W-R10	●	**6.0**	1.0	13.0	—	60	6	2
SSEHVL 4080W-R10	●	**8.0**	1.0	19.0	—	80	8	2
4100W-R10	●	**10.0**	1.0	22.0	—	90	10	2
4100W-R30	●	**10.0**	3.0	22.0	—	90	10	2
4120W-R10	●	**12.0**	1.0	26.0	—	90	12	2
4120W-R30	●	**12.0**	3.0	26.0	—	90	12	2
SSEHVL 4160W-R10	●	**16.0**	1.0	32.0	—	115	16	2
4160W-R30	●	**16.0**	3.0	32.0	—	115	16	2
4200W-R10	●	**20.0**	1.0	40.0	—	125	20	2
4200W-R30	●	**20.0**	3.0	40.0	—	125	20	2
4250W-R10	●	**25.0**	1.0	50.0	—	140	25	2
SSEHVL 4250W-R30	●	**25.0**	3.0	50.0	—	140	25	2

Grade: ACW52

SSEHVL 4000W-R type



Recommended Cutting Conditions

1. For stable machining, a high-rigidity machine is recommended.
2. Wet machining is recommended for stainless steel and heat-resistant alloy applications.
3. If cutting noise and vibration are present, please change the cutting conditions accordingly.

Side Milling

Work Material / Cutting Conditions / DC(mm)		Stainless Steel SUS304, SUS316		Titanium Alloy		Heat-Resistant 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)
4.5		5,100	480	5,300	600	2,500	200
5.0		4,600	520	4,800	700	2,200	220
6.0		3,800	560	4,000	800	1,800	210
8.0		2,900	520	3,000	780	1,400	200
10.0		2,300	500	2,400	640	1,100	180
12.0		1,900	470	2,000	600	930	160
16.0		1,400	430	1,500	500	700	140
20.0		1,100	330	1,200	260	560	110
25.0		890	270	950	290	450	90
Standard Depth of Cut	ap	1.5DC		1.5DC		1.5DC	
	ae	0.1DC		0.05DC		0.05DC	

Groove Milling

Work Material / Cutting Conditions / DC(mm)		Stainless Steel SUS304, SUS316		Titanium Alloy		Heat-Resistant 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)
4.5		4,200	200	3,900	270	1,400	100
5.0		3,800	240	3,500	300	1,300	120
6.0		3,200	260	2,900	300	1,100	140
8.0		2,400	240	2,200	270	800	120
10.0		1,900	220	1,700	250	650	110
12.0		1,600	200	1,400	230	550	100
16.0		1,200	130	1,100	200	400	80
20.0		950	95	890	90	320	60
25.0		760	75	700	70	250	50
Standard Depth of Cut	ap	0.3DC		0.2DC		0.15DC	

SSEH 4000W-R type

Stainless Steel | Ti Alloy / Heat Resistant Alloy

4 Flutes | GS HARD Coat | Corner R | 45° Helix Angle | Shoulder Milling | Groove Finishing | Face Milling | Profiling

Fig 1

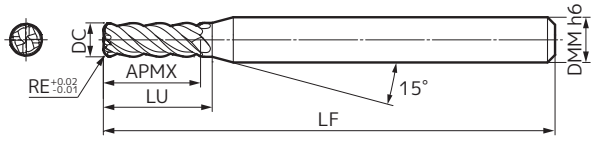
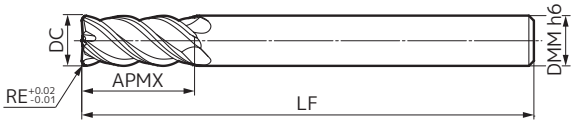


Fig 2



DC	Tolerance
4.0 < D ≤ 6.0	-0.020 to -0.038
6.0 < D	-0.025 to -0.047

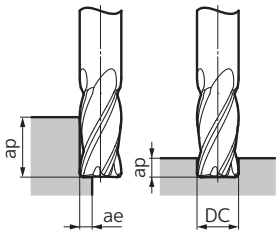
Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Corner Radius RE	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
SSEH 4045W-R05	●	**4.5**	0.5	12.0	14.5	50	6	1
4050W-R05	●	**5.0**	0.5	13.0	15.5	60	6	1
4060W-R10	●	**6.0**	1.0	13.0	—	60	6	2
4080W-R10	●	**8.0**	1.0	19.0	—	80	8	2
4100W-R10	●	**10.0**	1.0	22.0	—	90	10	2
SSEH 4100W-R30	●	**10.0**	3.0	22.0	—	90	10	2
4120W-R10	●	**12.0**	1.0	26.0	—	90	12	2
4120W-R30	●	**12.0**	3.0	26.0	—	90	12	2
4160W-R10	●	**16.0**	1.0	32.0	—	115	16	2
4160W-R30	●	**16.0**	3.0	32.0	—	115	16	2
SSEH 4200W-R10	●	**20.0**	1.0	40.0	—	125	20	2
4200W-R30	●	**20.0**	3.0	40.0	—	125	20	2
4250W-R10	●	**25.0**	1.0	50.0	—	140	25	2
4250W-R30	●	**25.0**	3.0	50.0	—	140	25	2

Grade: ACW52

SSEH 4000W-R type



Recommended Cutting Conditions

1. For stable machining, a high-rigidity machine is recommended.
2. Wet machining is recommended for stainless steel and heat-resistant alloy applications.
3. If cutting noise and vibration are present, please change the cutting conditions accordingly.

Side Milling

Work Material / Cutting Conditions / DC(mm)		Stainless Steel SUS304, SUS316		Titanium Alloy		Heat-Resistant 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)
4.5		3,500	350	3,500	280	2,100	170
5.0		3,200	380	3,200	320	1,900	190
6.0		2,700	430	2,700	320	1,600	190
8.0		2,000	400	2,000	280	1,200	170
10.0		1,600	380	1,600	260	1,000	160
12.0		1,300	360	1,300	230	800	140
16.0		1,000	320	1,000	200	600	120
20.0		800	260	800	160	480	100
25.0		640	200	640	130	380	80
Standard Depth of Cut	ap	1.5DC		1.5DC		1.5DC	
	ae	0.1DC		0.05DC		0.05DC	

Groove Milling

Work Material / Cutting Conditions / DC(mm)		Stainless Steel SUS304, SUS316		Titanium Alloy		Heat-Resistant 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)
4.5		2,800	140	2,500	200	1,300	100
5.0		2,500	150	2,200	220	1,100	110
6.0		2,100	170	1,900	230	1,000	120
8.0		1,600	160	1,400	200	700	100
10.0		1,300	160	1,100	180	600	100
12.0		1,100	150	900	160	500	90
16.0		800	130	700	140	400	80
20.0		640	100	560	110	320	65
25.0		510	85	450	90	250	50
Standard Depth of Cut	ap	0.3DC		0.2DC		0.15DC	

SSUP 4000ZX-R type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

4 Flutes | ZX Coat | Corner R | 40° Helix Angle | Shoulder Milling | Groove Milling | Groove Finishing | Face Milling | Helical Milling | Ramping | Profiling

Fig 1

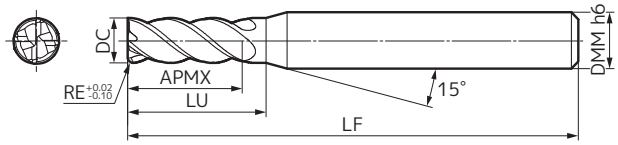
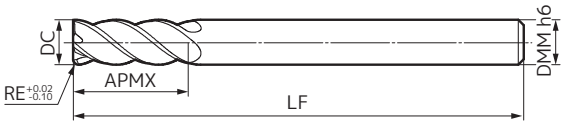


Fig 2



DC	Tolerance
D ≤ 3.0	-0.014 -0.028
3.0 < D ≤ 6.0	-0.020 -0.038
6.0 < D	-0.025 -0.047

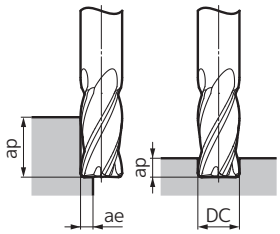
Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Corner Radius RE	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
SSUP 4030ZX-R02	●	**3.0**	0.2	8.0	9.5	50	6	1
4030ZX-R05	●	**3.0**	0.5	8.0	9.5	50	6	1
4040ZX-R02	●	**4.0**	0.2	11.0	12.5	50	6	1
4040ZX-R05	●	**4.0**	0.5	11.0	12.5	50	6	1
4040ZX-R10	●	**4.0**	1.0	11.0	12.5	50	6	1
SSUP 4050ZX-R02	●	**5.0**	0.2	13.0	14.5	60	6	1
4050ZX-R05	●	**5.0**	0.5	13.0	14.5	60	6	1
4050ZX-R10	●	**5.0**	1.0	13.0	14.5	60	6	1
4060ZX-R03	●	**6.0**	0.3	13.0	—	60	6	2
4060ZX-R05	●	**6.0**	0.5	13.0	—	60	6	2
SSUP 4060ZX-R10	●	**6.0**	1.0	13.0	—	60	6	2
4060ZX-R15	●	**6.0**	1.5	13.0	—	60	6	2
4080ZX-R03	●	**8.0**	0.3	19.0	—	80	8	2
4080ZX-R05	●	**8.0**	0.5	19.0	—	80	8	2
4080ZX-R10	●	**8.0**	1.0	19.0	—	80	8	2
SSUP 4080ZX-R15	●	**8.0**	1.5	19.0	—	80	8	2
4080ZX-R20	●	**8.0**	2.0	19.0	—	80	8	2
4100ZX-R03	●	**10.0**	0.3	22.0	—	90	10	2
4100ZX-R05	●	**10.0**	0.5	22.0	—	90	10	2
4100ZX-R10	●	**10.0**	1.0	22.0	—	90	10	2
SSUP 4100ZX-R15	●	**10.0**	1.5	22.0	—	90	10	2
4100ZX-R20	●	**10.0**	2.0	22.0	—	90	10	2
4120ZX-R05	●	**12.0**	0.5	26.0	—	90	12	2
4120ZX-R10	●	**12.0**	1.0	26.0	—	90	12	2
4120ZX-R15	●	**12.0**	1.5	26.0	—	90	12	2
SSUP 4120ZX-R20	●	**12.0**	2.0	26.0	—	90	12	2
4120ZX-R30	●	**12.0**	3.0	26.0	—	90	12	2
4160ZX-R10	●	**16.0**	1.0	32.0	—	115	16	2
4160ZX-R15	●	**16.0**	1.5	32.0	—	115	16	2
4160ZX-R20	●	**16.0**	2.0	32.0	—	115	16	2
SSUP 4160ZX-R30	●	**16.0**	3.0	32.0	—	115	16	2
4200ZX-R10	●	**20.0**	1.0	38.0	—	125	20	2
4200ZX-R15	●	**20.0**	1.5	38.0	—	125	20	2
4200ZX-R20	●	**20.0**	2.0	38.0	—	125	20	2
4200ZX-R30	●	**20.0**	3.0	38.0	—	125	20	2

Grade: ACZ50M

SSUP 4000ZX-R type



Recommended Cutting Conditions

1. For groove milling of stainless steel, use 60% of the recommended spindle speed and 40% of the recommended feed rate. (*)
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.

Side Milling and Groove Milling

Work Material / Cutting Conditions		Carbon Steel, Cast Iron SS, SC, FC (150 to 250HB)		Alloy Steel SCM (25 to 35HRC)		Tempered Steel / Hardened Steel NAK, HPM (40 to 50HRC)		Stainless Steel (*)		Heat-Resistant Alloy Titanium Alloy (20 to 45HRC)	
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)
2.0		9,000	720	6,000	430	4,000	320	5,500	320	2,600	120
4.0		6,600	800	4,500	450	3,000	380	4,000	320	2,000	120
6.0		4,800	960	3,000	480	2,500	380	3,000	480	1,200	120
8.0		3,600	1,000	2,200	610	2,000	400	2,000	520	1,000	140
10.0		2,800	1,000	1,800	610	1,500	400	1,700	550	800	160
12.0		2,400	950	1,500	550	1,200	380	1,500	500	700	140
14.0		2,200	880	1,300	490	1,000	360	1,200	430	600	130
16.0		1,800	650	1,100	420	800	300	1,000	360	500	120
18.0		1,600	580	1,000	360	750	270	900	340	450	110
20.0		1,400	500	900	330	700	250	820	300	400	100
Side Milling	ap	1.5DC									
	ae	0.1DC				0.05DC		0.1DC		0.05DC	
Groove Milling	ap	1.0DC				0.2DC		0.3DC		0.2DC	

SSUPR 4000ZX-R type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Stainless Steel | Cast Iron

4 Flutes | ZX Coat | Corner | 45° Helix Angle | Shoulder Milling | Groove Finishing | Face Milling | Profiling

Fig 1

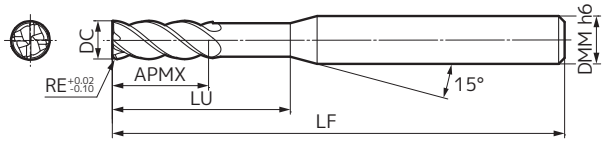


Fig 2

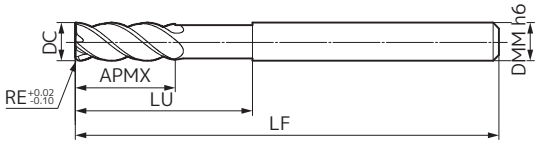
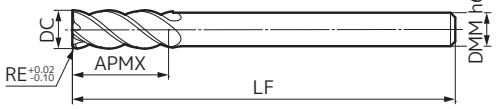


Fig 3



DC	Tolerance
D ≤ 3.0	-0.014 -0.028
3.0 < D ≤ 6.0	-0.020 -0.038
6.0 < D	-0.025 -0.047

Body

Dimensions (mm)

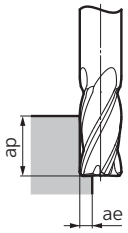
Cat. No.	Stock	Dia. DC	Corner Radius RE	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
SSUPR 4030ZX-R02	●	**3.0**	0.2	4.5	12.0	60	6	1
4030ZX-R05	●	**3.0**	0.5	4.5	12.0	60	6	1
4040ZX-R02	●	**4.0**	0.2	6.0	16.0	60	6	1
4040ZX-R05	●	**4.0**	0.5	6.0	16.0	60	6	1
4050ZX-R02	●	**5.0**	0.2	7.5	20.0	60	6	1
SSUPR 4050ZX-R05	●	**5.0**	0.5	7.5	20.0	60	6	1
4060ZX-R03	●	**6.0**	0.3	9.0	24.0	60	6	2
4060ZX-R05	●	**6.0**	0.5	9.0	24.0	60	6	2
4070ZX-R03	●	**7.0**	0.3	10.5	—	80	6	3
4070ZX-R05	●	**7.0**	0.5	10.5	—	80	6	3
SSUPR 4080ZX-R05	●	**8.0**	0.5	12.0	34.0	80	8	2
4080ZX-R10	●	**8.0**	1.0	12.0	34.0	80	8	2
4090ZX-R05	●	**9.0**	0.5	13.5	—	90	8	3
4090ZX-R10	●	**9.0**	1.0	13.5	—	90	8	3
4100ZX-R05	●	**10.0**	0.5	15.0	42.0	100	10	2
SSUPR 4100ZX-R10	●	**10.0**	1.0	15.0	42.0	100	10	2
4100ZX-R15	●	**10.0**	1.5	15.0	42.0	100	10	2
4110ZX-R05	●	**11.0**	0.5	16.5	—	120	10	3
4110ZX-R10	●	**11.0**	1.0	16.5	—	120	10	3
4110ZX-R15	●	**11.0**	1.5	16.5	—	120	10	3
SSUPR 4120ZX-R05	●	**12.0**	0.5	18.0	50.0	120	12	2
4120ZX-R10	●	**12.0**	1.0	18.0	50.0	120	12	2
4120ZX-R15	●	**12.0**	1.5	18.0	50.0	120	12	2
4130ZX-R05	●	**13.0**	0.5	19.5	—	130	12	3
4130ZX-R10	●	**13.0**	1.0	19.5	—	130	12	3
SSUPR 4130ZX-R15	●	**13.0**	1.5	19.5	—	130	12	3
4160ZX-R10	●	**16.0**	1.0	24.0	66.0	160	16	2
4160ZX-R15	●	**16.0**	1.5	24.0	66.0	160	16	2
4160ZX-R20	●	**16.0**	2.0	24.0	66.0	160	16	2
4170ZX-R10	●	**17.0**	1.0	25.5	—	170	16	3
SSUPR 4170ZX-R15	●	**17.0**	1.5	25.5	—	170	16	3
4170ZX-R20	●	**17.0**	2.0	25.5	—	170	16	3
4200ZX-R10	●	**20.0**	1.0	30.0	82.0	200	20	2
4200ZX-R15	●	**20.0**	1.5	30.0	82.0	200	20	2
4200ZX-R20	●	**20.0**	2.0	30.0	82.0	200	20	2

Grade: ACZ50M

SSUPR 4000ZX-R type

Recommended Cutting Conditions

1. The conditions recommended are for endmills with standard overhang lengths of 4xD.
   For overhangs of 5xD or more, please use 70% (max) of recommended conditions.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Side Milling

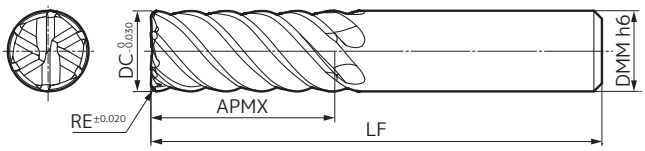
Work Material / Cutting Conditions		Carbon Steel, Cast Iron (150 to 250HB)		Alloy Steel SCM (25 to 35HRC)		Tempered Steel / Hardened Steel NAK, HPM (40 to 50HRC)		Stainless Steel		Heat-Resistant Alloy Titanium Alloy (20 to 45HRC)	
DC(mm)		Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	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)
3.0		9,000	600	5,300	400	3,100	200	4,200	350	2,600	160
4.0		6,600	600	4,000	400	2,400	200	3,200	350	2,000	160
6.0		4,200	600	2,600	400	1,600	200	2,100	350	1,300	160
8.0		3,200	650	2,000	450	1,200	200	1,600	350	1,000	160
10.0		2,500	650	1,600	450	950	200	1,200	400	800	180
12.0		2,100	650	1,300	450	800	200	1,000	400	650	180
13.0		1,900	650	1,200	450	700	200	950	400	600	180
16.0		1,600	650	1,000	400	600	200	800	350	500	160
17.0		1,500	600	900	400	550	200	750	350	450	160
20.0		1,200	600	800	400	500	200	650	350	400	160
Standard Depth of Cut	ap	1.2DC									
	ae	0.1DC				0.05DC		0.1DC		0.05DC	

GSH 6000SF-R type

Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Hardened Steel 60 to 65HRC

6 Flutes | GS HARD Coat | Corner R | 50° Helix Angle | Shoulder Milling | Groove Finishing | Face Milling | Profiling

Fig 1



Body

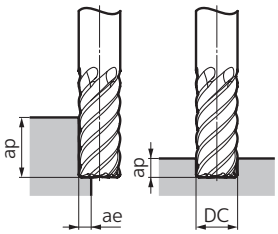
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Corner Radius RE	Cutting Edge Length APMX	Overall Length LF	Shank Dia. DMM	Fig
GSH 6060SF-R02	●	**6.0**	0.2	13.0	50	6	1
6060SF-R05	●	**6.0**	0.5	13.0	50	6	1
6060SF-R10	●	**6.0**	1.0	13.0	50	6	1
6080SF-R02	●	**8.0**	0.2	19.0	60	8	1
6080SF-R05	●	**8.0**	0.5	19.0	60	8	1
GSH 6080SF-R10	●	**8.0**	1.0	19.0	60	8	1
6100SF-R05	●	**10.0**	0.5	22.0	70	10	1
6100SF-R10	●	**10.0**	1.0	22.0	70	10	1
6100SF-R15	●	**10.0**	1.5	22.0	70	10	1
6100SF-R20	●	**10.0**	2.0	22.0	70	10	1
GSH 6120SF-R05	●	**12.0**	0.5	26.0	75	12	1
6120SF-R10	●	**12.0**	1.0	26.0	75	12	1
6120SF-R15	●	**12.0**	1.5	26.0	75	12	1
6120SF-R20	●	**12.0**	2.0	26.0	75	12	1

Grade: ACF07C

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Side Milling and Groove Milling

Work Material / Cutting Conditions		Low Carbon Steel, Carbon Steel, Alloy Steel (up to 35HRC)		Medium Hardened Steel, Pre-hardened Steel, Die Steel (35 to 45HRC)		Hardened Steel SKD61 (45 to 55HRC)		Hardened Steel SKD11 (55 to 60HRC)		Hardened Steel SKH51 (60 to 65HRC)		Hardened Steel SKH55 (65 to 70HRC)	
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)
6.0		7,500	2,700	6,700	1,930	5,200	1,300	4,100	810	3,700	670	2,600	470
8.0		5,600	2,700	5,000	1,930	3,900	1,300	3,050	810	2,800	670	1,950	470
10.0		4,500	2,700	4,000	1,930	3,100	1,300	2,450	810	2,200	670	1,550	470
12.0		3,750	2,700	3,350	1,930	2,600	1,300	2,050	810	1,850	670	1,300	470
Side Milling	ap	1 to 1.5DC											
	ae	0.1DC				0.05DC				0.02DC			
Groove Milling	ap	0.1DC				0.05DC				Up to 0.05DC Max. 0.5mm			

Side Milling (Using High Speed Machining Centre)

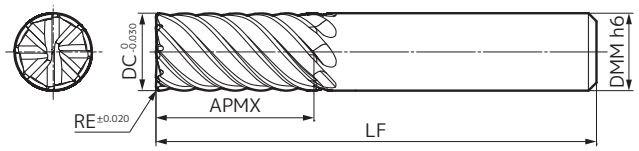
Work Material / Cutting Conditions		Low Carbon Steel, Carbon Steel, Alloy Steel (up to 35HRC)		Medium Hardened Steel, Pre-hardened Steel, Die Steel (35 to 45HRC)		Hardened Steel SKD61 (45 to 55HRC)		Hardened Steel SKD11 (55 to 60HRC)		Hardened Steel SKH51 (60 to 65HRC)	
DC (mm)		Spindle Speed (min^{-1})	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)
6.0		16,000	5,800	16,000	5,800	16,000	5,800	12,000	3,200	8,000	2,000
8.0		12,000	5,800	12,000	5,800	12,000	5,800	9,000	3,200	6,000	2,000
10.0		9,600	5,800	9,600	5,800	9,600	5,800	7,200	3,200	4,800	2,000
12.0		8,000	5,800	8,000	5,800	8,000	5,800	6,000	3,200	4,000	2,000
Standard Depth of Cut	ap	1 to 1.5DC									
	ae	0.1DC		0.05DC		0.05DC		0.02DC		0.01DC	

GSH 8000SF-R type

Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Hardened Steel 60 to 65HRC

8 Flutes | GS HARD Coat | Corner r | 50° Helix Angle | Shoulder Milling | Groove Finishing | Face Milling | Profiling

Fig 1



Body

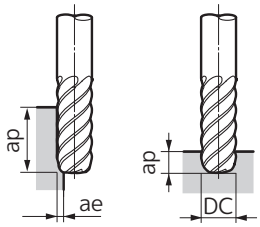
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Corner Radius RE	Cutting Edge Length APMX	Overall Length LF	Shank Dia. DMM	Fig
GSH 8160SF-R10	●	**16.0**	1.0	32.0	90	16	1
8160SF-R15	●	**16.0**	1.5	32.0	90	16	1
8160SF-R20	●	**16.0**	2.0	32.0	90	16	1
8200SF-R10	●	**20.0**	1.0	38.0	100	20	1
8200SF-R15	●	**20.0**	1.5	38.0	100	20	1
GSH 8200SF-R20	●	**20.0**	2.0	38.0	100	20	1

Grade: ACF07C

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Side Milling and Groove Milling

Work Material / Cutting Conditions		Low Carbon Steel Carbon Steel, Alloy Steel (up to 35HRC)		Medium Hardened Steel Pre-hardened Steel, Die Steel (35 to 45HRC)		Hardened Steel SKD61 (45 to 55HRC)		Hardened Steel SKD11 (55 to 60HRC)		Hardened Steel SKH51 (60 to 65HRC)		Hardened Steel SKH55 (65 to 70HRC)	
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)
16.0		2,800	2,500	2,500	1,800	1,950	1,220	1,530	760	1,400	630	980	440
20.0		2,250	2,100	2,000	1,540	1,550	1,050	1,230	650	1,100	540	780	380
Side Milling	ap	1 to 1.5DC											
	ae	0.1DC				0.05DC				0.02DC			
Groove Milling	ap	0.1DC				0.05DC				Up to 0.05DC Max. 0.5mm			

Side Milling (Using High Speed Machining Centre)

Work Material / Cutting Conditions		Low Carbon Steel Carbon Steel, Alloy Steel (up to 35HRC)		Medium Hardened Steel Pre-hardened Steel, Die Steel (35 to 45HRC)		Hardened Steel SKD61 (45 to 55HRC)		Hardened Steel SKD11 (55 to 60HRC)		Hardened Steel SKH51 (60 to 65HRC)	
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)
16.0		6,000	5,400	6,000	5,400	6,000	5,400	4,500	3,000	3,000	1,900
20.0		4,800	4,600	4,800	4,600	4,800	4,600	3,600	2,580	2,400	1,600
Standard Depth of Cut	ap	1 to 1.5DC									
	ae	0.1DC		0.05DC		0.05DC		0.02DC		0.01DC	

SSEHVL 4000-R type

Stainless Steel | Ti Alloy / Heat Resistant Alloy

4 Flutes | Uncoated Carbide | Corner R | 42° 45° Helix Angle | Shoulder Milling | Groove Finishing | Face Milling | Profiling

Fig 1

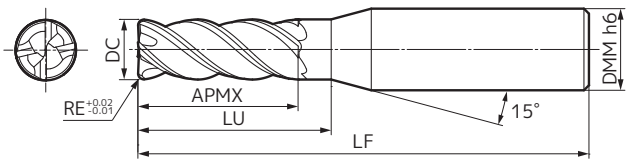
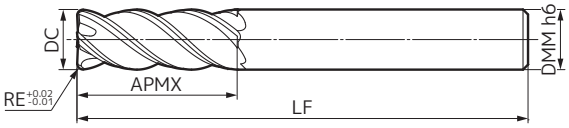


Fig 2



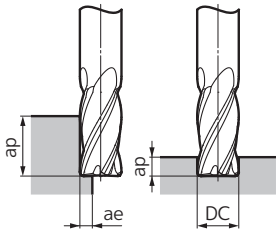
DC	Tolerance
D ≤ 6.0	-0.028 to -0.043
6.0 < D	-0.033 to -0.052

Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Corner Radius RE	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
SSEHVL 4045-R05	●	**4.5**	0.5	12.0	14.5	50	6	1
4045-R10	●	**4.5**	1.0	12.0	14.5	50	6	1
4050-R05	●	**5.0**	0.5	13.0	15.5	60	6	1
4050-R10	●	**5.0**	1.0	13.0	15.5	60	6	1
4060-R10	●	**6.0**	1.0	13.0	—	60	6	2
SSEHVL 4080-R10	●	**8.0**	1.0	19.0	—	80	8	2
4100-R10	●	**10.0**	1.0	22.0	—	90	10	2
4100-R30	●	**10.0**	3.0	22.0	—	90	10	2
4120-R10	●	**12.0**	1.0	26.0	—	90	12	2
4120-R30	●	**12.0**	3.0	26.0	—	90	12	2
SSEHVL 4160-R10	●	**16.0**	1.0	32.0	—	115	16	2
4160-R30	●	**16.0**	3.0	32.0	—	115	16	2

Grade: EH520



Recommended Cutting Conditions

1. For stable machining, a high-rigidity machine is recommended.
2. Wet machining is recommended for stainless steel and heat-resistant alloy applications.
3. If cutting noise and vibration are present, please change the cutting conditions accordingly.

Side Milling

Work Material / Cutting Conditions / DC(mm)		Stainless Steel SUS304, SUS316 Spindle Speed (min⁻¹)	Stainless Steel SUS304, SUS316 Feed Rate (mm/min)	Titanium Alloy Spindle Speed (min⁻¹)	Titanium Alloy Feed Rate (mm/min)	Heat-Resistant Alloy Spindle Speed (min⁻¹)	Heat-Resistant Alloy Feed Rate (mm/min)
4.5		2,300	120	4,600	370	1,600	130
5.0		2,000	130	4,100	410	1,500	150
6.0		1,700	130	3,400	400	1,200	140
8.0		1,300	130	2,600	360	900	130
10.0		1,000	130	2,100	340	700	110
12.0		800	110	1,700	300	600	100
16.0		600	90	1,300	260	500	100
Standard Depth of Cut	ap	1.5DC		1.5DC		1.5DC	
	pf	0.1DC		0.05DC		0.05DC	

Groove Milling

Work Material / Cutting Conditions / DC(mm)		Stainless Steel SUS304, SUS316 Spindle Speed (min⁻¹)	Stainless Steel SUS304, SUS316 Feed Rate (mm/min)	Titanium Alloy Spindle Speed (min⁻¹)	Titanium Alloy Feed Rate (mm/min)	Heat-Resistant Alloy Spindle Speed (min⁻¹)	Heat-Resistant Alloy Feed Rate (mm/min)
4.5		1,800	50	3,200	250	1,300	110
5.0		1,600	50	2,900	290	1,200	120
6.0		1,400	50	2,400	290	1,000	120
8.0		1,000	50	1,800	250	700	90
10.0		800	50	1,400	230	600	100
12.0		600	50	1,200	210	500	90
16.0		500	40	900	180	400	80
Standard Depth of Cut	ap	0.3DC		0.2DC		0.15DC	

SSEH 4000-R type

Stainless Steel | Ti Alloy / Heat Resistant Alloy

4 Flutes | Uncoated Carbide | Corner r | 45° Helix Angle | Shoulder Milling | Groove Finishing | Face Milling | Profiling

Fig 1

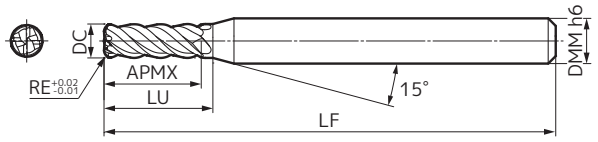
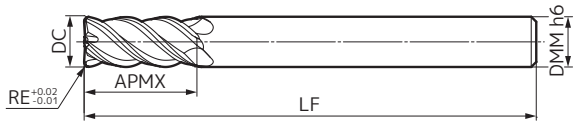


Fig 2



DC	Tolerance
D ≤ 6.0	-0.028 to -0.043
6.0 < D	-0.033 to -0.052

Body

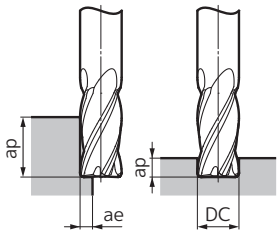
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Corner Radius RE	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
SSEH 4045-R05	●	**4.5**	0.5	12.0	14.5	50	6	1
4050-R05	●	**5.0**	0.5	13.0	15.5	60	6	1
4060-R10	●	**6.0**	1.0	13.0	—	60	6	2
4080-R10	●	**8.0**	1.0	19.0	—	80	8	2
4100-R10	●	**10.0**	1.0	22.0	—	90	10	2
SSEH 4100-R30	●	**10.0**	3.0	22.0	—	90	10	2
4120-R10	●	**12.0**	1.0	26.0	—	90	12	2
4120-R30	●	**12.0**	3.0	26.0	—	90	12	2
4160-R10	●	**16.0**	1.0	32.0	—	115	16	2
4160-R30	●	**16.0**	3.0	32.0	—	115	16	2

Grade: EH520

Recommended Cutting Conditions

1. For stable machining, a high-rigidity machine is recommended.
2. Wet machining is recommended for stainless steel and heat-resistant alloy applications.
3. If cutting noise and vibration are present, please change the cutting conditions accordingly.



Side Milling

Work Material / Cutting Conditions / DC(mm)		Stainless Steel SUS304, SUS316		Titanium Alloy		Heat-Resistant 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)
4.5		1,800	90	3,500	280	1,400	110
5.0		1,600	100	3,200	320	1,300	130
6.0		1,300	100	2,700	320	1,100	130
8.0		1,000	100	2,000	280	800	110
10.0		800	100	1,600	260	600	100
12.0		700	100	1,300	230	500	90
16.0		500	80	1,000	200	400	80
Standard Depth of Cut	ap	1.5DC		1.5DC		1.5DC	
	ae	0.1DC		0.05DC		0.05DC	

Groove Milling

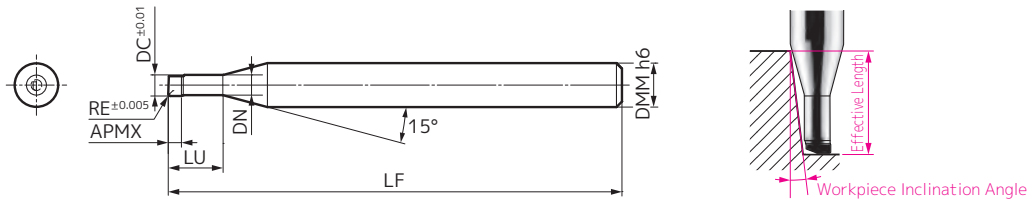
Work Material / Cutting Conditions / DC(mm)		Stainless Steel SUS304, SUS316		Titanium Alloy		Heat-Resistant Alloy	
		Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)
4.5		1,400	40	2,500	200	1,100	90
5.0		1,300	40	2,200	220	1,000	100
6.0		1,100	40	1,900	230	800	100
8.0		800	40	1,400	200	600	80
10.0		600	40	1,100	180	500	80
12.0		500	40	900	160	400	70
16.0		400	30	700	140	300	60
Standard Depth of Cut	ap	0.3DC		0.2DC		0.15DC	

NPDRS type

Cemented Carbide | Hard Brittle Materials

1 Flute | Binderless PCD | Corner R | Shoulder Milling | Face Milling | Profiling

Fig 1



Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Corner Radius RE	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Neck Dia. DN	Shank Dia. DMM	Effective Length for Workpiece Inclination Angle 0.5°	1°	1.5°	2°	3°	Wiper Edge	Fig
NPDRS 1020R002-006	●	0.2	0.02	0.1	0.6	40	0.175	4	0.63	0.65	0.67	0.70	0.75	No	1
1020R005-006	●	0.2	0.05	0.1	0.6	40	0.175	4	0.63	0.65	0.67	0.69	0.74	No	1
1030R002-010	●	0.3	0.02	0.15	1.0	40	0.27	4	1.04	1.08	1.11	1.15	1.24	No	1
1030R005-010	●	0.3	0.05	0.15	1.0	40	0.27	4	1.04	1.08	1.11	1.15	1.23	No	1
1050R005-015	●	0.5	0.05	0.25	1.5	40	0.47	4	1.56	1.61	1.66	1.72	1.84	No	1
NPDRS 1050R010-015	●	0.5	0.10	0.25	1.5	40	0.47	4	1.56	1.60	1.65	1.71	1.83	No	1
1100R005-030	●	1.0	0.05	0.55	3.0	40	0.95	4	3.14	3.24	3.35	3.46	3.72	No	1
1100R010-030	●	1.0	0.10	0.55	3.0	40	0.95	4	3.14	3.24	3.34	3.46	3.71	No	1
1100R020-030	●	1.0	0.20	0.55	3.0	40	0.95	4	3.14	3.23	3.33	3.44	3.69	No	1
1200R005-040	●	2.0	0.05	0.55	4.0	40	1.95	4	4.17	4.31	4.45	4.60	4.94	No	1
NPDRS 1200R010-040	●	2.0	0.10	0.55	4.0	40	1.95	4	4.17	4.30	4.44	4.60	4.93	No	1
1200R020-040	●	2.0	0.20	0.55	4.0	40	1.95	4	4.17	4.30	4.43	4.58	4.91	No	1

Grade: NPD10

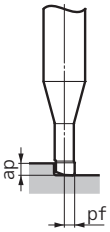
Identification Code

NPDR S 1 020 R002 - 006

Series Code	For Standard Finishing	Number of Flutes	Dia.	Corner Radius	Neck Length

Recommended Cutting Conditions

1. Use a machine with high accuracy for stable cutting.
2. Non-water-soluble cutting oil is recommended. Use as a mist or with external coolant supply. As sparks or tool breakage during machining may cause fire, be sure to take appropriate fire prevention measures.
3. Shorten overhang as much as possible.
4. Adjust cutting conditions as necessary as machine specs and other conditions may vary.
5. The cutting parameters shown are for reference only. Adjust the cutting conditions to the desired machined surface finish.



Work Material		Cemented Carbide			
DC (mm)	LU (mm)	Spindle Speed (min⁻¹)	Feed Rate (mm/min)	ap(mm)	pf(mm)
0.2	0.6	40,000	100	0.001	0.001
0.3	1.0	40,000	150	0.002	0.001
0.5	1.5	40,000	200	0.003	0.001
1.0	3.0	40,000	400	0.005	0.003
2.0	4.0	40,000	600	0.010	0.005

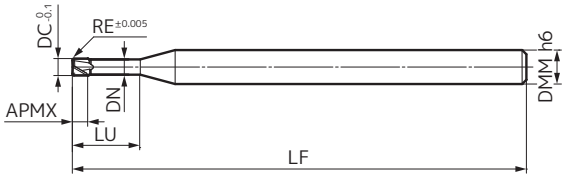
MEMO

BNBR type

Pre-hardened Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Hardened Steel 60 to 65HRC

2 Flutes | CBN | Corner R | Shoulder Milling | Face Milling | Profiling

Fig 1



Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Corner Radius RE	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Neck Dia. DN	Shank Dia. DMM	Wiper Edge	Fig
BNBR 2D020R005-0054	●	**0.2**	0.05	0.1	0.5	50	0.17	4	No	1
2D030R005-0054	●	**0.3**	0.05	0.15	0.5	50	0.27	4	No	1
2D040R005-0054	●	**0.4**	0.05	0.2	0.5	50	0.37	4	No	1
2D050R005-0054	●	**0.5**	0.05	0.3	0.5	50	0.47	4	No	1
2D050R005-0154	●	**0.5**	0.05	0.3	1.5	50	0.47	4	No	1
BNBR 2D050R005-0254	●	**0.5**	0.05	0.3	2.5	50	0.47	4	No	1
2D050R010-0154	●	**0.5**	0.10	0.3	1.5	50	0.47	4	No	1
2D050R010-0254	●	**0.5**	0.10	0.3	2.5	50	0.47	4	No	1
2D100R005-0304	●	**1.0**	0.05	0.7	3.0	50	0.97	4	Yes	1
2D100R005-0504	●	**1.0**	0.05	0.7	5.0	50	0.97	4	Yes	1
BNBR 2D100R010-0304	●	**1.0**	0.10	0.7	3.0	50	0.97	4	Yes	1
2D100R010-0504	●	**1.0**	0.10	0.7	5.0	50	0.97	4	Yes	1
2D100R020-0304	●	**1.0**	0.20	0.7	3.0	50	0.97	4	Yes	1
2D100R020-0504	●	**1.0**	0.20	0.7	5.0	50	0.97	4	Yes	1
2D100R030-0304	●	**1.0**	0.30	0.7	3.0	50	0.97	4	Yes	1
BNBR 2D100R030-0504	●	**1.0**	0.30	0.7	5.0	50	0.97	4	Yes	1
2D150R010-0454	●	**1.5**	0.10	1.2	4.5	50	1.47	4	Yes	1
2D150R010-0754	●	**1.5**	0.10	1.2	7.5	50	1.47	4	Yes	1
2D150R020-0454	●	**1.5**	0.20	1.2	4.5	50	1.47	4	Yes	1
2D150R020-0754	●	**1.5**	0.20	1.2	7.5	50	1.47	4	Yes	1
BNBR 2D150R030-0454	●	**1.5**	0.30	1.2	4.5	50	1.47	4	Yes	1
2D150R030-0754	●	**1.5**	0.30	1.2	7.5	50	1.47	4	Yes	1
2D200R010-0604	●	**2.0**	0.10	1.5	6.0	50	1.97	4	Yes	1
2D200R020-0604	●	**2.0**	0.20	1.5	6.0	50	1.97	4	Yes	1
2D200R030-0604	●	**2.0**	0.30	1.5	6.0	50	1.97	4	Yes	1
BNBR 2D200R050-0604	●	**2.0**	0.50	1.5	6.0	50	1.97	4	Yes	1

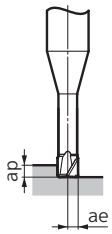
Grade: BNX20

Identification Code

BNBR 2 D050 R010 - 015 4

Series Code	Number of Flutes	Dia.	Corner Radius	Neck Length	Shank Dia.

BNBR type



Recommended Cutting Conditions

1. Use a machine with high rigidity for stable cutting.
2. Non-water-soluble cutting oil is recommended. Use as a mist or with external coolant supply.
   As sparks or tool breakage during machining may cause fire, be sure to take appropriate fire prevention measures.
3. Shorten overhang as much as possible.
4. Adjust cutting conditions as necessary as machine rigidity and other conditions may vary.
5. Depths of cut shown in the table of conditions are maximum depths. Adjust the actual depth of cut to the desired machined surface roughness.

Work Material			STAVAX, NAK80, SKD61 (Up to 52HRC)				ELMAX, DC53, SKD11 Modified (Up to 62HRC)				YXR3, SKH (Up to 70HRC)			
DC (mm)	RE (mm)	LU (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	ap(mm)	ae(mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	ap(mm)	ae(mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	ap(mm)	ae(mm)
0.2	0.05	0.5	40,000	400	0.005	0.03	40,000	400	0.005	0.03	40,000	250	0.005	0.02
0.3	0.05	0.5	40,000	500	0.010	0.05	40,000	500	0.010	0.05	40,000	300	0.005	0.03
0.4	0.05	0.5	40,000	600	0.015	0.1	40,000	600	0.015	0.1	40,000	400	0.01	0.05
0.5	0.05	0.5	40,000	600	0.02	0.15	40,000	600	0.02	0.15	40,000	400	0.01	0.1
	0.05	1.5	40,000		0.02	0.1	40,000		0.02	0.1	35,000			0.05
	0.1		40,000				40,000				35,000			
	0.05	2.5	40,000		0.01	0.05	40,000		0.01	0.05	35,000			
	0.1		40,000				40,000				35,000			
1.0	0.05	3.0	35,000	800	0.03	0.3	35,000	800	0.03	0.2	30,000	600	0.01	0.1
	0.1		35,000				35,000				30,000			
	0.2		35,000				35,000				30,000			
	0.3		35,000				35,000				30,000			
	0.05	5.0	35,000		0.02	0.2	35,000	800	0.02	0.1	30,000	600	0.01	0.1
	0.1		35,000				35,000				30,000			
	0.2		35,000				35,000				30,000			
	0.3		35,000				35,000				30,000			
1.5	0.1	4.5	26,000	800	0.03	0.5	26,000	800	0.03	0.3	20,000	600	0.02	0.3
	0.2		26,000				26,000				20,000			
	0.3		26,000				26,000				20,000			
	0.1	7.5	26,000		0.03	0.5	26,000	800	0.03	0.3	20,000	600	0.02	0.3
	0.2		26,000				26,000				20,000			
	0.3		26,000				26,000				20,000			
2.0	0.1	6.0	20,000	800	0.03	0.7	20,000	800	0.03	0.7	15,000	600	0.03	0.7
	0.2		20,000				20,000				15,000			
	0.3		20,000				20,000				15,000			
	0.5		20,000				20,000				15,000			

GSXB 20000 type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

2 Flutes | GSX Coat | Ballnose R | 30° Helix Angle | Shoulder Milling | Face Milling | R-Grooving | Profiling

Fig 1

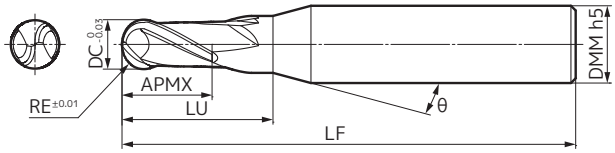
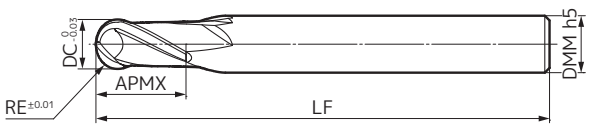


Fig 2



DC	θ
< ø2	10°
ø2 or more	15°

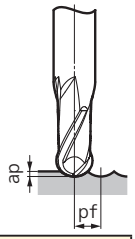
Body

Dimensions (mm)

Cat. No.	Stock	Ballnose Radius RE	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSXB 20020	●	**0.20**	**0.4**	0.6	0.8	50	4	1
20030	●	**0.30**	**0.6**	0.9	1.2	50	4	1
20050	●	**0.50**	**1.0**	1.5	2.0	50	4	1
20075	●	**0.75**	**1.5**	2.5	3.0	50	4	1
20100	●	**1.00**	**2.0**	3.0	4.0	60	6	1
GSXB 20125	●	**1.25**	**2.5**	4.0	5.0	60	6	1
20150	●	**1.50**	**3.0**	4.5	6.0	60	6	1
20200	●	**2.00**	**4.0**	6.0	8.0	70	6	1
20250	●	**2.50**	**5.0**	7.5	10.0	80	6	1
20300	●	**3.00**	**6.0**	9.0	—	80	6	2
GSXB 20350	●	**3.50**	**7.0**	11.0	20.0	90	8	1
20400	●	**4.00**	**8.0**	12.0	—	90	8	2
20500	●	**5.00**	**10.0**	15.0	—	100	10	2
20600	●	**6.00**	**12.0**	18.0	—	110	12	2
20700	●	**7.00**	**14.0**	21.0	38.0	110	16	1
GSXB 20800	●	**8.00**	**16.0**	24.0	—	140	16	2
20900	●	**9.00**	**18.0**	27.0	50.0	140	20	1
21000	●	**10.00**	**20.0**	30.0	—	160	20	2

Grade: ACB20

GSXB 20000 type



Recommended Cutting Conditions

1. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.
2. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.

Radius Milling

Work Material / Cutting Conditions RE(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
Standard Depth of Cut	ap	0.02DC		0.02DC		0.02DC		0.02DC	
	pf	0.05DC		0.05DC		0.05DC		0.05DC	

GSBH 20000SF type

Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Hardened Steel 60 to 65HRC

2 Flutes | GS HARD Coat | Ballnose R | 25° Helix Angle | Shoulder Milling | Face Milling | R-Grooving | Profiling

Fig 1

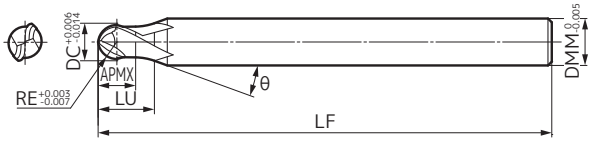
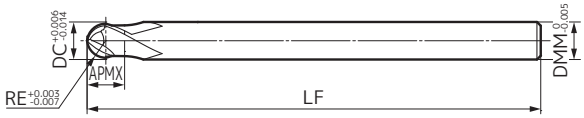


Fig 2



DC	θ
< ø2	10°
ø2 or more	15°

Body

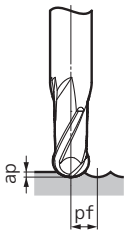
Dimensions (mm)

Cat. No.	Stock	Ballnose Radius RE	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSBH 20020SF	●	**0.20**	**0.4**	0.4	0.6	50	4	1
20030SF	●	**0.30**	**0.6**	0.6	0.9	50	4	1
20050SF	●	**0.50**	**1.0**	1.0	1.5	50	4	1
20075SF	●	**0.75**	**1.5**	1.5	2.3	50	4	1
20100SF	●	**1.00**	**2.0**	2.0	3.0	60	6	1
GSBH 20125SF	●	**1.25**	**2.5**	2.5	3.8	60	6	1
20150SF	●	**1.50**	**3.0**	3.0	4.5	60	6	1
20200SF	●	**2.00**	**4.0**	4.0	6.0	70	6	1
20250SF	●	**2.50**	**5.0**	5.0	7.5	80	6	1
20300SF	●	**3.00**	**6.0**	6.0	—	80	6	2
GSBH 20400SF	●	**4.00**	**8.0**	8.0	—	90	8	2
20500SF	●	**5.00**	**10.0**	10.0	—	100	10	2
20600SF	●	**6.00**	**12.0**	12.0	—	110	12	2

Grade: ACF07D

Recommended Cutting Conditions

1. When the depth of cut is lowered, feed rate can be increased further.
2. If the machine is not suited to the recommended spindle speed, please use the maximum spindle speed available.
   In this case, lower the feed rate by the same ratio.
3. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Radius Milling

Work Material / Cutting Conditions / RE(mm)	Medium Hardened Steel Pre-hardened Steel, Die Steel (40 to 50HRC)		Hardened Steel SKD61 (50 to 55HRC)		Hardened Steel SKD11 (55 to 60HRC)		Hardened Steel SKH55 (60 to 65HRC)	
	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	500	50,000	500	50,000	500	50,000	500
0.30	50,000	800	50,000	800	50,000	800	50,000	700
0.50	50,000	1,400	50,000	1,400	50,000	1,300	42,000	1,000
0.75	50,000	2,000	50,000	2,000	37,300	1,400	28,000	1,000
1.00	38,100	2,100	38,100	2,100	28,000	1,400	21,000	1,000
1.25	30,500	2,100	30,500	2,100	22,400	1,400	16,800	1,000
1.50	25,400	2,100	25,400	2,100	18,700	1,400	14,000	1,000
2.00	19,100	2,100	19,100	2,100	14,000	1,400	10,500	1,000
2.50	15,300	2,100	15,300	2,100	11,200	1,400	8,400	1,000
3.00	12,700	2,100	12,700	2,100	9,300	1,400	7,000	1,000
4.00	9,500	2,100	9,500	2,100	7,000	1,400	5,300	1,000
5.00	7,600	2,100	7,600	2,100	5,600	1,400	4,200	1,000
6.00	6,400	2,100	6,400	2,100	4,700	1,400	3,500	1,000
Standard Depth of Cut ap	0.08DC				0.05DC			
Standard Depth of Cut pf	0.25DC				0.15DC			

SNB 2000DL type

Aluminum Alloy | Copper Alloy

2 Flutes | AURORA Coat DLC | Ballnose R | 30° Helix Angle | Shoulder Milling | Groove Milling | Groove Finishing | R-Grooving | Profiling

Fig 1

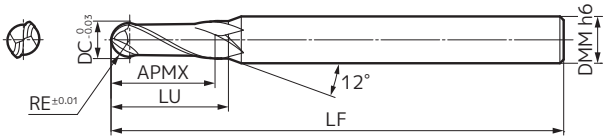
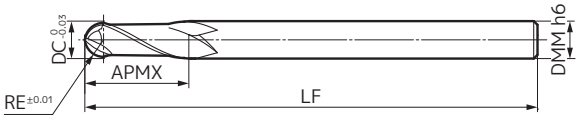


Fig 2



Body

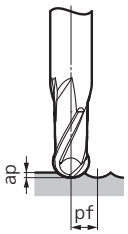
Dimensions (mm)

Cat. No.	Stock	Ballnose Radius RE	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
SNB 2020DL	●	**1.0**	**2.0**	3.0	5	60	6	1
2030DL	●	**1.5**	**3.0**	4.5	8	80	6	1
2040DL	●	**2.0**	**4.0**	6.0	12	80	6	1
2050DL	●	**2.5**	**5.0**	7.5	14	90	6	1
2060DL	●	**3.0**	**6.0**	9.0	—	100	6	2
SNB 2080DL	●	**4.0**	**8.0**	12.0	—	100	8	2
2100DL	●	**5.0**	**10.0**	15.0	—	120	10	2
2120DL	●	**6.0**	**12.0**	18.0	—	120	12	2
2160DL	●	**8.0**	**16.0**	24.0	—	160	16	2

Grade: DL1200

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Radius Milling

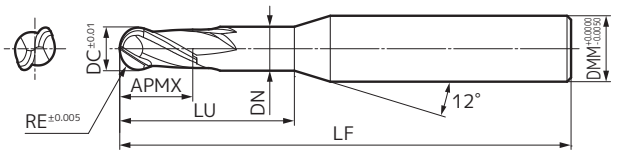
Work Material		Aluminum Alloy			
Cutting Conditions		Wet		Dry	
RE(mm)		Spindle Speed (min^{-1})	Feed Rate (mm/min)	Spindle Speed (min^{-1})	Feed Rate (mm/min)
1.0		48,000	1,500	48,000	1,000
1.5		38,000	2,100	38,000	1,500
2.0		31,000	2,800	31,000	2,000
2.5		24,000	2,800	24,000	2,000
3.0		20,000	2,800	20,000	2,000
4.0		15,000	2,800	15,000	2,000
5.0		13,000	3,000	13,000	2,100
6.0		10,000	3,000	10,000	2,100
8.0		7,700	3,000	7,700	2,100
Standard Depth of Cut	ap	0.1DC		0.1DC	
	pf	0.2DC		0.2DC	

SNB2 type

Aluminum Alloy | Copper Alloy

2 Flutes | AURORA Coat DLC | Ballnose R | 30° Helix Angle | Shoulder Milling | Groove Finishing | R-Grooving | Profiling | For Copper Electrodes

Fig 1



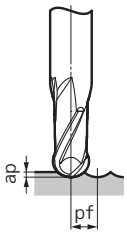
Body

Dimensions (mm)

Cat. No.	Stock	Ballnose Radius RE	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Neck Dia. DN	Shank Dia. DMM	Fig
SNB2 0005 0034DL	●	**0.05**	**0.1**	0.1	0.3	45	0.09	4	1
0005 0064DL	●	**0.05**	**0.1**	0.1	0.6	45	0.09	4	1
0010 0054DL	●	**0.10**	**0.2**	0.2	0.5	45	0.18	4	1
0010 0104DL	●	**0.10**	**0.2**	0.2	1.0	45	0.18	4	1
0010 0204DL	●	**0.10**	**0.2**	0.2	2.0	45	0.18	4	1
SNB2 0015 0054DL	●	**0.15**	**0.3**	0.3	0.5	45	0.27	4	1
0015 0104DL	●	**0.15**	**0.3**	0.3	1.0	45	0.27	4	1
0015 0204DL	●	**0.15**	**0.3**	0.3	2.0	45	0.27	4	1
0015 0304DL	●	**0.15**	**0.3**	0.3	3.0	45	0.27	4	1
0020 0104DL	●	**0.20**	**0.4**	0.4	1.0	45	0.36	4	1
SNB2 0020 0204DL	●	**0.20**	**0.4**	0.4	2.0	45	0.36	4	1
0020 0304DL	●	**0.20**	**0.4**	0.4	3.0	45	0.36	4	1
0020 0404DL	●	**0.20**	**0.4**	0.4	4.0	45	0.36	4	1
0025 0104DL	●	**0.25**	**0.5**	0.45	1.0	45	0.45	4	1
0025 0204DL	●	**0.25**	**0.5**	0.45	2.0	45	0.45	4	1
SNB2 0025 0304DL	●	**0.25**	**0.5**	0.45	3.0	45	0.45	4	1
0025 0404DL	●	**0.25**	**0.5**	0.45	4.0	45	0.45	4	1
0030 0204DL	●	**0.30**	**0.6**	0.6	2.0	45	0.54	4	1
0030 0304DL	●	**0.30**	**0.6**	0.6	3.0	45	0.54	4	1
0030 0404DL	●	**0.30**	**0.6**	0.6	4.0	45	0.54	4	1
SNB2 0030 0504DL	●	**0.30**	**0.6**	0.6	5.0	45	0.54	4	1
0030 0604DL	●	**0.30**	**0.6**	0.6	6.0	45	0.54	4	1
0050 0304DL	●	**0.50**	**1.0**	1.5	3.0	45	0.90	4	1
0050 0404DL	●	**0.50**	**1.0**	1.5	4.0	45	0.90	4	1
0050 0604DL	●	**0.50**	**1.0**	1.5	6.0	45	0.90	4	1
SNB2 0050 0804DL	●	**0.50**	**1.0**	1.5	8.0	50	0.90	4	1
0050 1004DL	●	**0.50**	**1.0**	1.5	10.0	50	0.90	4	1
0075 0304DL	●	**0.75**	**1.5**	2.3	3.0	45	1.35	4	1
0075 0604DL	●	**0.75**	**1.5**	2.3	6.0	45	1.35	4	1
0075 1004DL	●	**0.75**	**1.5**	2.3	10.0	50	1.35	4	1
SNB2 0100 0304DL	●	**1.00**	**2.0**	3.0	3.0	50	1.80	4	1
0100 0604DL	●	**1.00**	**2.0**	3.0	6.0	50	1.80	4	1
0100 1004DL	●	**1.00**	**2.0**	3.0	10.0	50	1.80	4	1
0100 1504DL	●	**1.00**	**2.0**	3.0	15.0	60	1.80	4	1
0100 2004DL	●	**1.00**	**2.0**	3.0	20.0	60	1.80	4	1
SNB2 0200 1606DL	●	**2.00**	**4.0**	6.0	16.0	80	3.60	6	1
0200 2006DL	●	**2.00**	**4.0**	6.0	20.0	80	3.60	6	1
0200 3006DL	●	**2.00**	**4.0**	6.0	30.0	80	3.60	6	1

Grade: DL1200

SNB2 type



Recommended Cutting Conditions

1. For radius processing, reduce the feed to half the recommended feed.
2. Insoluble cutting oil is recommended.
3. Because of the high spindle speeds, runout of the endmill when mounted should be less than 10μm.

Radius Milling

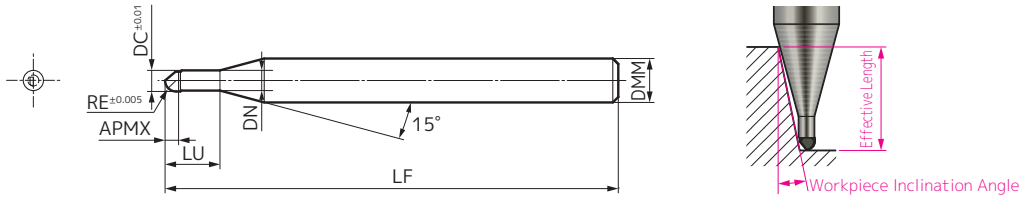
Work Material / Cutting Conditions / Cat. No.	Copper Alloy			
	Spindle Speed (min⁻¹)	Feed Rate (mm/min)	Standard depth of cut (mm) ap	ae
SNB2 0005 0034DL	20,000 -50,000	90	0.005	0.005
0005 0064DL		80	0.005	0.005
SNB2 0010 0054DL	20,000 -50,000	350	0.01	0.02
0010 0104DL		350	0.007	0.015
0010 0204DL		200	0.005	0.005
SNB2 0015 0054DL	20,000 -50,000	400	0.015	0.025
0015 0104DL		400	0.01	0.02
0015 0204DL		300	0.007	0.01
0015 0304DL		250	0.005	0.008
SNB2 0020 0104DL	20,000 -30,000	800	0.025	0.05
0020 0204DL		700	0.02	0.03
0020 0304DL		600	0.015	0.02
0020 0404DL		400	0.007	0.015
SNB2 0025 0104DL	20,000 -30,000	1,000	0.04	0.07
0025 0204DL		800	0.03	0.06
0025 0304DL		700	0.02	0.05
0025 0404DL		600	0.015	0.04
SNB2 0030 0204DL	20,000 -30,000	1,400	0.05	0.15
0030 0304DL		1,200	0.04	0.1
0030 0404DL		1,000	0.03	0.07
0030 0504DL		700	0.03	0.06
0030 0604DL		600	0.015	0.03
SNB2 0050 0304DL	20,000 -30,000	3,500	0.2	0.4
0050 0404DL		3,000	0.15	0.4
0050 0604DL		2,500	0.13	0.3
0050 0804DL		2,000	0.07	0.15
0050 1004DL		1,200	0.04	0.07
SNB2 0075 0304DL	20,000	4,000	0.25	0.4
0075 0604DL	20,000	3,200	0.15	0.4
0075 1004DL	20,000	2,000	0.1	0.3
SNB2 0100 0304DL	16,000	4,500	0.4	0.6
0100 0604DL	16,000	3,500	0.35	0.6
0100 1004DL	16,000	3,000	0.25	0.4
0100 1504DL	12,000	2,000	0.15	0.3
0100 2004DL	10,000	1,500	0.1	0.2
SNB2 0200 1606DL	16,000	4,000	0.4	0.8
0200 2006DL	16,000	3,500	0.4	0.8
0200 3006DL	12,000	3,000	0.2	0.4

NPDBS type

Cemented Carbide | Hard Brittle Materials

1 Flute | Binderless PCD | Ballnose R | Shoulder Milling | Face Milling | R-Grooving | Profiling

Fig 1



Body (for Standard Finishing)

Dimensions (mm)

Cat. No.	Stock	Ballnose Radius RE	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Neck Dia. DN	Shank Dia. DMM	Effective Length for Workpiece Inclination Angle 0.5°	1°	1.5°	2°	3°	Fig
NPDBS 1010-004	●	**0.1**	**0.2**	0.1	0.4	40	0.18	4	0.42	0.43	0.44	0.46	0.48	1
1020-008	●	**0.2**	**0.4**	0.2	0.8	40	0.38	4	0.83	0.85	0.87	0.90	0.95	1
1030-010	●	**0.3**	**0.6**	0.3	1.0	40	0.58	4	1.03	1.06	1.08	1.11	1.17	1
1050-020	●	**0.5**	**1.0**	0.5	2.0	40	0.95	4	2.10	2.15	2.20	2.26	2.39	1
1100-030	●	**1.0**	**2.0**	1.0	3.0	40	1.95	4	3.11	3.18	3.25	3.33	3.51	1

Grade: NPD10

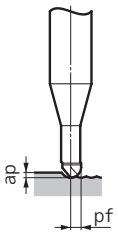
Identification Code

NPDB S 1 010 - 004

NPDB	S	1	010	004
Series Code	For Standard Finishing	Number of Flutes	Ballnose Radius	Neck Length

Recommended Cutting Conditions

1. Use a machine with high accuracy for stable cutting.
2. Non-water-soluble cutting oil is recommended. Use as a mist or with external coolant supply. As sparks or tool breakage during machining may cause fire, be sure to take appropriate fire prevention measures.
3. Shorten overhang as much as possible.
4. Adjust cutting conditions as necessary as machine specs and other conditions may vary.
5. The cutting parameters shown are for reference only. Adjust the cutting conditions to the desired machined surface finish.



Work Material		Cemented Carbide			
RE (mm)	LU (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	ap(mm)	pf(mm)
0.1	0.4	40,000	100	0.001	0.001
0.2	0.8	40,000	150	0.002	0.001
0.3	1.0	40,000	200	0.003	0.001
0.5	2.0	40,000	400	0.005	0.003
1.0	3.0	40,000	600	0.010	0.005

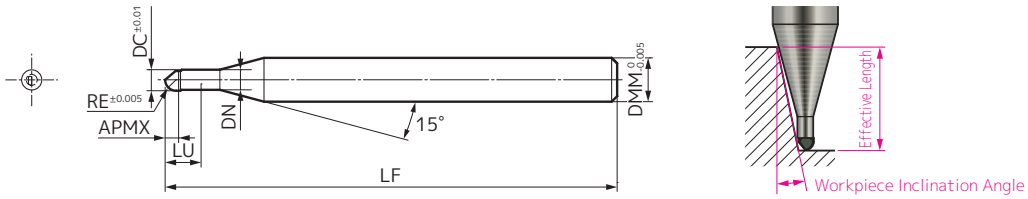
*Radius accuracy inspection report is included inside the case. I129
*Long neck type is also available depending on the size. Please consult us separately.

NPDB type

Cemented Carbide | Hard Brittle Materials

1 Flute | Binderless PCD | Ballnose R | Shoulder Milling | Face Milling | R-Grooving | Profiling

Fig 1



Body (for Precise Finishing)

Dimensions (mm)

Cat. No.	Stock	Ballnose Radius RE	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Neck Dia. DN	Shank Dia. DMM	Effective Length for Workpiece Inclination Angle 0.5°	1°	1.5°	2°	3°	Fig
NPDB 1010-004	●	**0.1**	**0.2**	0.1	0.4	40	0.18	4	0.42	0.43	0.44	0.46	0.48	1
1020-008	●	**0.2**	**0.4**	0.2	0.8	40	0.38	4	0.83	0.85	0.87	0.90	0.95	1
1030-010	●	**0.3**	**0.6**	0.3	1.0	40	0.58	4	1.03	1.06	1.08	1.11	1.17	1
1050-020	●	**0.5**	**1.0**	0.5	2.0	40	0.95	4	2.10	2.15	2.20	2.26	2.39	1
1100-030	●	**1.0**	**2.0**	1.0	3.0	40	1.95	4	3.11	3.18	3.25	3.33	3.51	1

Grade: NPD10

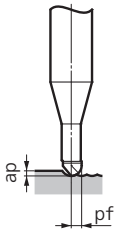
Identification Code

NPDB 1 010 - 004

- NPDB: Series Code
- 1: Number of Flutes
- 010: Ballnose Radius
- 004: Neck Length

Recommended Cutting Conditions

1. Use a machine with high accuracy for stable cutting.
2. Non-water-soluble cutting oil is recommended. Use as a mist or with external coolant supply. As sparks or tool breakage during machining may cause fire, be sure to take appropriate fire prevention measures.
3. Shorten overhang as much as possible.
4. Adjust cutting conditions as necessary as machine specs and other conditions may vary.
5. The cutting parameters shown are for reference only. Adjust the cutting conditions to the desired machined surface finish.



Work Material		Cemented Carbide			
RE (mm)	LU (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	ap(mm)	pf(mm)
0.1	0.4	40,000	100	0.001	0.001
0.2	0.8	40,000	150	0.002	0.001
0.3	1.0	40,000	200	0.003	0.001
0.5	2.0	40,000	400	0.005	0.003
1.0	3.0	40,000	600	0.010	0.005

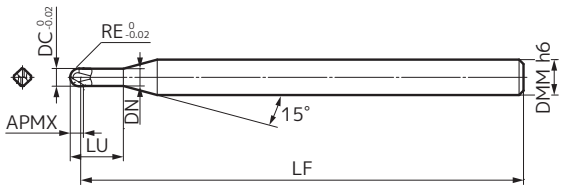
*Radius accuracy inspection report is included inside the case. I129
*Long neck type is also available depending on the size. Please consult us separately.

SDCB type

Cemented Carbide | Hard Brittle Materials

2 Flutes | SUMIDIA Coat | Ballnose R | Shoulder Milling | Face Milling | R-Grooving | Profiling

Fig 1



Body (For Rough/Medium Finishing)

Dimensions (mm)

Cat. No.	Stock	Ballnose Radius RE	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Neck Dia. DN	Shank Dia. DMM	Fig
SDCB 2R050-015	●	**0.5**	**1.0**	0.6	1.5	50	0.94	4	1
2R050-020	●	**0.5**	**1.0**	0.6	2.0	50	0.94	4	1
2R050-030	●	**0.5**	**1.0**	0.6	3.0	50	0.94	4	1
2R050-050	●	**0.5**	**1.0**	0.6	5.0	50	0.94	4	1
SDCB 2R100-025	●	**1.0**	**2.0**	1.4	2.5	50	1.92	4	1
2R100-040	●	**1.0**	**2.0**	1.4	4.0	50	1.92	4	1
2R100-060	●	**1.0**	**2.0**	1.4	6.0	50	1.92	4	1
2R100-100	●	**1.0**	**2.0**	1.4	10.0	50	1.92	4	1

Grade: DCM20

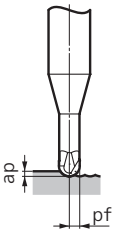
Identification Code

SDCB 2 R050 - 015

- SDCB: Series Code
- 2: Number of Flutes
- R050: Ballnose Radius
- 015: Neck Length

Recommended Cutting Conditions

1. Use a machine with high accuracy for stable cutting.
2. Non-water-soluble cutting oil is recommended. Use as a mist or with external coolant supply. As sparks or tool breakage during machining may cause fire, be sure to take appropriate fire prevention measures.
3. Shorten overhang as much as possible.
4. Adjust cutting conditions as necessary as machine specs and other conditions may vary.
5. The cutting parameters shown are for reference only. Adjust the cutting conditions to the desired machined surface finish.



Work Material		Cemented Carbide			
RE (mm)	LU (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	ap(mm)	pf(mm)
0.5	1.5	30,000	300	0.05	0.25
1.0	2.5	30,000	300	0.10	0.30

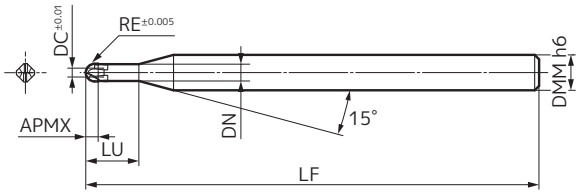
MEMO

BNBP type

Pre-hardened Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Hardened Steel 60 to 65HRC

2 Flutes | CBN | Ballnose R | Shoulder Milling | Face Milling | R-Grooving | Profiling

Fig 1



Body

Dimensions (mm)

Cat. No.	Stock	Ballnose Radius RE	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Neck Dia. DN	Shank Dia. DMM	Fig
BNBP 2R020-0124	●	**0.20**	**0.4**	0.3	1.2	50	0.37	4	1
2R020-0126	●	**0.20**	**0.4**	0.3	1.2	50	0.37	6	1
2R020-0204	●	**0.20**	**0.4**	0.3	2.0	50	0.37	4	1
2R020-0304	●	**0.20**	**0.4**	0.3	3.0	50	0.37	4	1
2R020-0404	●	**0.20**	**0.4**	0.3	4.0	50	0.37	4	1
BNBP 2R030-0154	●	**0.30**	**0.6**	0.4	1.5	50	0.57	4	1
2R030-0156	●	**0.30**	**0.6**	0.4	1.5	50	0.57	6	1
2R030-0204	●	**0.30**	**0.6**	0.4	2.0	50	0.57	4	1
2R030-0304	●	**0.30**	**0.6**	0.4	3.0	50	0.57	4	1
2R030-0404	●	**0.30**	**0.6**	0.4	4.0	50	0.57	4	1
BNBP 2R030-0504	●	**0.30**	**0.6**	0.4	5.0	50	0.57	4	1
2R030-0604	●	**0.30**	**0.6**	0.4	6.0	50	0.57	4	1
2R050-0254	●	**0.50**	**1.0**	0.6	2.5	50	0.97	4	1
2R050-0256	●	**0.50**	**1.0**	0.6	2.5	50	0.97	6	1
2R050-0304	●	**0.50**	**1.0**	0.6	3.0	50	0.97	4	1
BNBP 2R050-0404	●	**0.50**	**1.0**	0.6	4.0	50	0.97	4	1
2R050-0604	●	**0.50**	**1.0**	0.6	6.0	50	0.97	4	1
2R050-0804	●	**0.50**	**1.0**	0.6	8.0	50	0.97	4	1
2R075-0404	●	**0.75**	**1.5**	0.9	4.0	50	1.47	4	1
2R075-0406	●	**0.75**	**1.5**	0.9	4.0	50	1.47	6	1
BNBP 2R100-0554	●	**1.00**	**2.0**	1.4	5.5	50	1.97	4	1
2R100-0556	●	**1.00**	**2.0**	1.4	5.5	50	1.97	6	1
2R100-0804	●	**1.00**	**2.0**	1.4	8.0	50	1.97	4	1

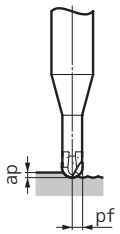
Grade: BN350

Identification Code

BNBP 2 R030 - 015 4

Series Code	Number of Flutes	Ballnose Radius	Neck Length	Shank Dia.

BNBP type



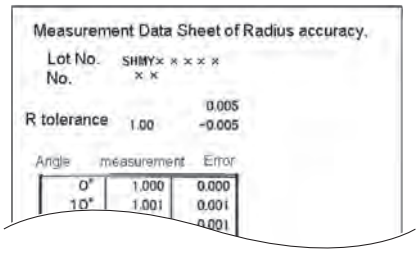
Recommended Cutting Conditions

1. Use a machine with high rigidity for stable cutting.
2. Non-water-soluble cutting oil is recommended. Use as a mist or with external coolant supply.
   As sparks or tool breakage during machining may cause fire, be sure to take appropriate fire prevention measures.
3. Shorten overhang as much as possible.
4. Adjust cutting conditions as necessary as machine rigidity and other conditions may vary.
5. Depths of cut shown in the table of conditions are maximum depths. Adjust the actual depth of cut to the desired machined surface roughness.

Work Material		STAVAX, NAK80, SKD61 (Up to 52HRC)				ELMAX, DC53, SKD11 Modified (Up to 62HRC)				YXR3, SKH (Up to 70HRC)			
RE (mm)	LU (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	ap(mm)	pf(mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	ap(mm)	pf(mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	ap(mm)	pf(mm)
0.2	1.2	40,000	1,000	0.005	0.010	40,000	800	0.005	0.010	40,000	600	0.005	0.005
	2.0	40,000	800	0.005	0.010	40,000	600	0.005	0.010	40,000	400	0.005	0.005
	3.0	40,000	600	0.005	0.010	40,000	500	0.005	0.010	40,000	300	0.005	0.005
	4.0	40,000	500	0.005	0.010	40,000	400	0.005	0.005	40,000	200	0.005	0.005
0.3	1.5	40,000	1,600	0.020	0.020	40,000	1,400	0.010	0.020	40,000	1,200	0.010	0.020
	2.0	40,000	1,500	0.010	0.020	40,000	1,300	0.010	0.020	40,000	1,100	0.010	0.010
	3.0	40,000	1,400	0.010	0.020	40,000	1,200	0.010	0.020	40,000	1,000	0.010	0.010
	4.0	30,000	1,200	0.010	0.010	30,000	1,000	0.010	0.010	30,000	700	0.005	0.010
	5.0	30,000	800	0.010	0.010	30,000	700	0.005	0.010	30,000	600	0.005	0.005
	6.0	30,000	600	0.005	0.010	30,000	500	0.005	0.005	30,000	400	0.005	0.005
0.5	2.5	40,000	2,800	0.040	0.050	40,000	2,800	0.030	0.040	40,000	2,200	0.020	0.030
	3.0	40,000	2,600	0.040	0.050	40,000	2,600	0.030	0.040	40,000	2,100	0.020	0.030
	4.0	40,000	2,400	0.030	0.050	40,000	2,400	0.020	0.030	40,000	2,000	0.020	0.020
	6.0	25,000	1,500	0.020	0.030	25,000	1,500	0.010	0.020	25,000	1,300	0.010	0.010
	8.0	16,000	1,200	0.020	0.020	16,000	1,100	0.010	0.020	16,000	850	0.010	0.010
0.75	4.0	32,000	2,400	0.030	0.030	32,000	2,200	0.020	0.030	32,000	2,000	0.020	0.020
1.0	5.5	40,000	4,000	0.050	0.050	40,000	4,000	0.030	0.030	40,000	3,000	0.020	0.030
	8.0	32,000	3,000	0.030	0.050	32,000	2,600	0.020	0.030	32,000	2,200	0.010	0.020

■ Radius Accuracy Inspection Test Results

Radius accuracy inspection report is attached as below with the ballnose type.


Measurement Data Sheet of Radius accuracy.

Lot No. SHMY× × × × ×
No. × ×

R tolerance 1.00 0.005 −0.005

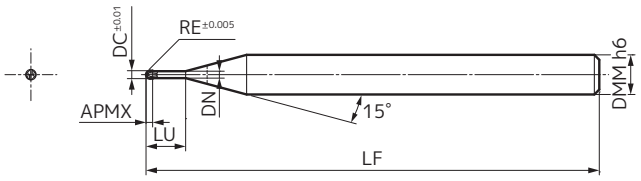
Angle	measurement	Error
0°	1.000	0.000
10°	1.001	0.001
		0.001

BNBC type

Copper Alloy

2 Flutes | CBN | Ballnose R | Shoulder Milling | Face Milling | R-Grooving | Profiling

Fig 1



Body

Dimensions (mm)

Cat. No.	Stock	Ballnose Radius RE	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Neck Dia. DN	Shank Dia. DMM	Fig
BNBC 2R010-0034	●	**0.1**	**0.2**	0.2	0.3	50	0.17	4	1
2R010-0104	●	**0.1**	**0.2**	0.2	1.0	50	0.17	4	1
2R020-0054	●	**0.2**	**0.4**	0.3	0.5	50	0.37	4	1
2R020-0204	●	**0.2**	**0.4**	0.3	2.0	50	0.37	4	1
2R030-0104	●	**0.3**	**0.6**	0.4	1.0	50	0.57	4	1
BNBC 2R030-0304	●	**0.3**	**0.6**	0.4	3.0	50	0.57	4	1
2R050-0304	●	**0.5**	**1.0**	0.6	3.0	50	0.97	4	1

Grade: BN700

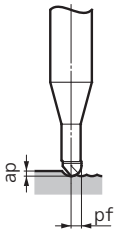
Identification Code

BNBC 2 R030 - 010 4

Series Code	Number of Flutes	Ballnose Radius	Neck Length	Shank Dia.

Recommended Cutting Conditions

1. Use a machine with high rigidity for stable cutting.
2. Non-water-soluble cutting oil is recommended. Use as a mist or with external coolant supply.
   As sparks or tool breakage during machining may cause fire, be sure to take appropriate fire prevention measures.
3. Shorten overhang as much as possible.
4. Adjust cutting conditions as necessary as machine rigidity and other conditions may vary.
5. Depths of cut shown in the table of conditions are maximum depths. Adjust the actual depth of cut to the desired machined surface roughness.



Side Milling

Work Material / Cutting Conditions / Cat. No.	Copper Alloy			
	Spindle Speed (min⁻¹)	Feed Rate (mm/min)	Standard depth of cut (mm) ap	pf
BNBC 2R010-0034	20,000 -50,000	350	0.01	0.02
2R010-0104		350	0.007	0.015
BNBC 2R020-0054	20,000 -50,000	800	0.025	0.05
2R020-0204		700	0.02	0.03
BNBC 2R030-0104	20,000 -50,000	1,400	0.05	0.15
2R030-0304		1,200	0.04	0.1
BNBC 2R050-0304	20,000 -50,000	2,200	0.15	0.35

MEMO

GSXSLT 30000C-1.5D type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

3 Flutes | GSX Coat | Gash Land | 40° Helix Angle | Shoulder Milling | Groove Milling | Groove Finishing | Face Milling | Spot Facing | Helical Milling | Ramping

Fig 1

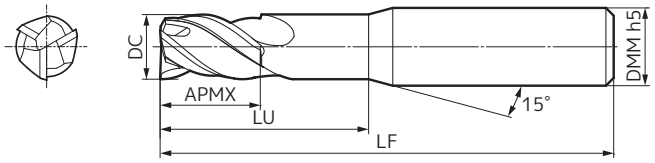
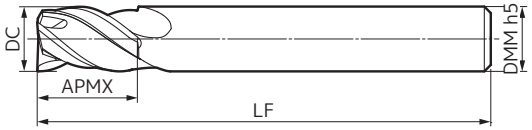


Fig 2



DC	Tolerance
D ≤ 3.0	0 -0.015
3.0 < D ≤ 12	0 -0.020
12.0 < D	0 -0.030

Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSXSLT 30100C-1.5D	●	1.0	1.5	2.5	40	4	1
30150C-1.5D	●	1.5	2.3	3.3	40	4	1
30200C-1.5D	●	2.0	3.0	4.0	40	4	1
30250C-1.5D	●	2.5	3.8	4.8	40	4	1
30300C-1.5D	●	3.0	4.5	6.0	45	6	1
GSXSLT 30400C-1.5D	●	4.0	6.0	7.5	45	6	1
30500C-1.5D	●	5.0	7.5	9.5	50	6	1
30600C-1.5D	●	6.0	9.0	—	50	6	2
30700C-1.5D	●	7.0	11.0	13.0	60	8	1
30800C-1.5D	●	8.0	12.0	—	60	8	2
GSXSLT 30900C-1.5D	●	9.0	14.0	16.0	70	10	1
31000C-1.5D	●	10.0	15.0	—	70	10	2
31200C-1.5D	●	12.0	18.0	—	75	12	2

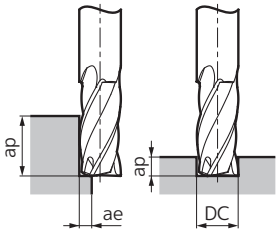
Grade: ACF20

Identification Code

GSXSLT 3 0100 C - 1.5D

Series Code	Number of Flutes	Dia.	Corner Style C: Gash Land	Cutting Edge Length

GSXSLT 30000C-1.5D type



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. Use step machining of 0.1 DC when drilling stainless steel, heat-resistant alloy, and titanium alloy.
5. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.

Side Milling

Work Material / Cutting Conditions		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 50HRC)		Stainless Steel SUS304, SUS316		Heat-Resistant Alloy 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		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
Standard Depth of Cut	ap	1.5DC										1.0DC					
	ae	0.05DC										0.02DC					

Groove Milling

Work Material / Cutting Conditions		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 50HRC)		Stainless Steel SUS304, SUS316		Heat-Resistant Alloy 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		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
Standard Depth of Cut	ap	0.2DC		0.5DC						0.2DC		0.05DC		0.2DC			

Drilling

Work Material / Cutting Conditions	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 50HRC)		Stainless Steel SUS304, SUS316		Heat-Resistant Alloy 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	19,600	70	19,600	90	19,600	90	18,300	60	12,700	40	9,000	25	11,000	20	4,500	10
2.0	11,200	90	11,200	120	11,200	120	10,500	80	7,300	50	5,300	30	6,400	25	2,650	15
4.0	6,400	130	6,400	160	6,400	160	6,000	110	4,200	70	3,000	40	3,600	30	1,500	20
6.0	4,600	160	4,600	200	4,600	200	4,300	130	3,000	80	2,200	50	2,650	40	1,150	20
8.0	3,400	160	3,400	200	3,400	200	3,200	130	2,200	80	1,600	50	2,000	40	800	20
10.0	2,800	160	2,800	200	2,800	200	2,600	130	1,800	80	1,300	50	1,600	40	650	20
12.0	2,300	160	2,300	200	2,300	200	2,200	130	1,500	80	1,100	50	1,300	40	500	20

SSUP 3000ZX type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Hardened Steel 45 to 55HRC | Hardened Steel 55 to 60HRC | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron

3 Flutes | ZX Coat | Gash Land | 50° Helix Angle | Shoulder Milling | Groove Milling | Groove Finishing | Face Milling | Spot Facing | Helical Milling | Ramping

Fig 1

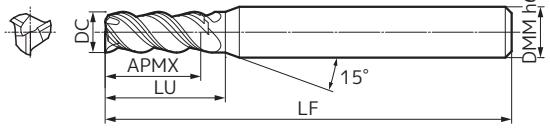
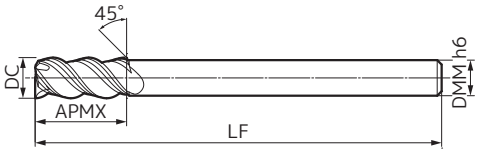


Fig 2

Fig 3



DC	Tolerance
D ≤ 3.0	-0.014 -0.028
3.0 < D ≤ 6.0	-0.020 -0.038
6.0 < D	-0.025 -0.047

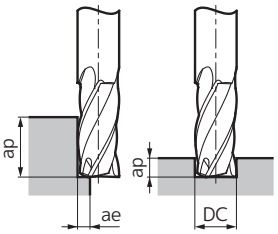
Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
SSUP 3020ZX	●	**2.0**	6.0	7.0	50	4	1
3025ZX	●	**2.5**	8.0	9.0	50	4	1
3030ZX	●	**3.0**	8.0	9.5	50	6	1
3035ZX	●	**3.5**	10.0	11.5	50	6	1
3040ZX	●	**4.0**	11.0	12.5	50	6	1
SSUP 3045ZX	●	**4.5**	11.0	12.5	50	6	1
3050ZX	●	**5.0**	13.0	14.5	60	6	1
3055ZX	●	**5.5**	13.0	14.5	60	6	1
3060ZX	●	**6.0**	13.0	—	60	6	2
3065ZX	●	**6.5**	16.0	18.0	70	8	1
SSUP 3070ZX	●	**7.0**	16.0	18.0	70	8	1
3075ZX	●	**7.5**	16.0	18.0	70	8	1
3080ZX	●	**8.0**	19.0	—	80	8	2
3085ZX	●	**8.5**	19.0	21.5	90	10	1
3090ZX	●	**9.0**	19.0	21.5	90	10	1
SSUP 3095ZX	●	**9.5**	19.0	21.5	90	10	1
3100ZX	●	**10.0**	22.0	—	90	10	2
3110ZX	●	**11.0**	22.0	24.5	90	12	1
3120ZX	●	**12.0**	26.0	—	90	12	2
3130ZX	●	**13.0**	26.0	—	100	12	3
SSUP 3140ZX	●	**14.0**	26.0	28.5	110	16	1
3150ZX	●	**15.0**	26.0	28.5	110	16	1
3160ZX	●	**16.0**	32.0	—	115	16	2

Grade: ACZ50M

SSUP 3000ZX type



Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.

Side Milling and Groove Milling

Work Material / Cutting Conditions		Carbon Steel, Cast Iron (150 to 250HB)		Alloy Steel SCM (25 to 35HRC)		Tempered Steel / Hardened Steel NAK, HPM (40 to 50HRC)		Stainless Steel (*)		Heat-Resistant Alloy Titanium Alloy (20 to 45HRC)	
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)
2.0		9,000	540	6,000	320	4,000	240	5,500	240	2,600	90
4.0		6,600	600	4,500	340	3,000	280	4,000	240	2,000	90
6.0		4,800	720	3,000	360	2,500	280	3,000	360	1,200	90
8.0		3,600	750	2,200	460	2,000	300	2,000	390	1,000	100
10.0		2,800	750	1,800	460	1,500	300	1,700	410	800	120
12.0		2,400	710	1,500	410	1,200	280	1,500	380	700	100
14.0		2,200	660	1,300	370	1,000	270	1,200	320	600	95
16.0		1,800	490	1,100	320	800	230	1,000	270	500	90
Side Milling	ap	1.5DC									
	ae	0.1DC				0.05DC		0.1DC		0.05DC	
Groove Milling	ap	1.0DC				0.2DC		0.3DC		0.2DC	

1. For groove milling of stainless steel, use 60% of the recommended spindle speed and 40% of the recommended feed rate. (*)
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.

Drilling

Work Material / Cutting Conditions	Carbon Steel, Cast Iron (150 to 250HB)		Alloy Steel SCM (25 to 35HRC)		Tempered Steel / Hardened Steel NAK, HPM (40 to 50HRC)		Stainless Steel		Heat-Resistant Alloy Titanium Alloy (20 to 45HRC)	
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)
2.0	9,000	150	6,000	100	4,000	60	6,400	25	2,600	20
4.0	6,600	250	4,500	170	3,000	80	3,600	30	2,000	40
6.0	4,800	300	3,000	200	2,500	110	2,650	40	1,200	40
8.0	3,600	300	2,200	200	2,000	120	2,000	40	1,000	50
10.0	2,800	300	1,800	200	1,500	120	1,600	40	800	50
12.0	2,400	300	1,500	200	1,200	120	1,300	40	700	50
14.0	2,200	250	1,300	150	1,000	80	1,150	35	600	40
16.0	1,800	200	1,100	120	800	60	1,000	35	500	30

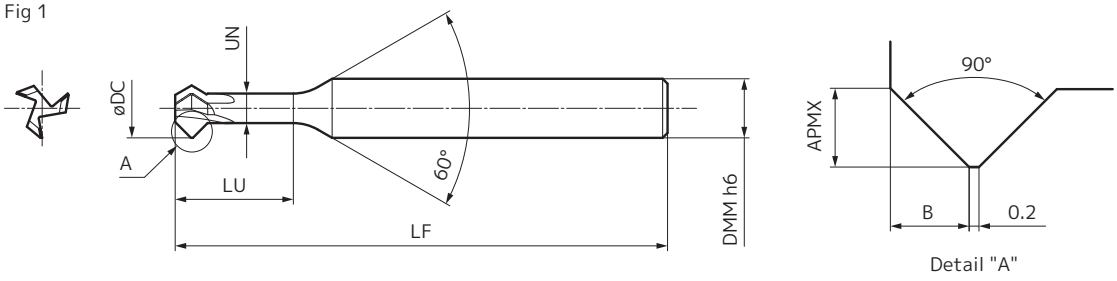
1. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.
2. Supply water-soluble coolant when machining stainless steel, heat-resistant alloy and titanium alloy. Use dry machining (air blow) for all other work materials.

AVIC type

General Steel | Carbon Steel | Alloy Steel | Pre-hardened Steel | Tempered Steel / Die Steel | Stainless Steel | Ti Alloy / Heat Resistant Alloy | Cast Iron | Aluminum Alloy | Copper Alloy

New | 3 Flutes | GS HARD Coat | Uncoated Carbide | Sharp Corner | 30° Helix Angle | Chamfering

Fig 1



Body

Dimensions (mm)

	Cat. No.	Stock: KH26 for Titanium Alloys	Stock: ACF07C for Ni-based Heat-resistant Alloys	Dia. DC	Cutting Edge Length B	Cutting Edge Depth APMX	Neck Dia. UN	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
Metric	**AVIC 302000-45-0.4(E)**	●	●	**2.0**	0.5	0.4	1.0	4	40	4	1
	303000-45-0.6(E)	●	●	**3.0**	0.7	0.6	1.6	6	40	4	1
	304000-45-0.8(E)	●	●	**4.0**	0.9	0.8	2.2	8	50	4	1
	305000-45-1.0(E)	●	●	**5.0**	1.2	1.0	2.6	10	50	6	1
	306000-45-1.4(E)	●	●	**6.0**	1.6	1.4	3.0	12	50	6	1
	308000-45-1.5(E)	●	●	**8.0**	1.7	1.5	4.6	16	60	8	1
	310000-45-1.7(E)	●	●	**10.0**	1.9	1.7	6.0	20	70	10	1
	312000-45-2.0(E)	●	●	**12.0**	2.2	2.0	7.5	24	70	12	1
Inch	**AVIC 302383-45-0.4(E)**	●	●	**2.383**	0.5	0.4	1.3	3.9	38.1	3.175	1
	303175-45-0.6(E)	●	●	**3.175**	0.7	0.6	1.6	6.3	38.1	3.175	1
	303969-45-0.8(E)			**3.969**	0.9	0.8	2.1	7.9	50.8	4.763	1
	304763-45-1.0(E)	●	●	**4.763**	1.2	1.0	2.4	9.5	50.8	4.763	1
	306350-45-1.4(E)	●	●	**6.350**	1.6	1.4	3.0	12.7	50.8	6.350	1
	307938-45-1.5(E)	●	●	**7.938**	1.7	1.5	4.6	15.8	63.5	7.938	1
	309525-45-1.7(E)	●	●	**9.525**	1.9	1.7	5.6	20.6	76.2	9.525	1
	312700-45-2.0(E)			**12.700**	2.2	2.0	8.0	23.8	76.2	12.700	1

*Add E as the part number suffix for ACF07C

Grades: Uncoated: KH26 Coated: ACF07C

Recommended Cutting Conditions

Work Material / Cutting Conditions: DC(mm)	Structural Steel, Carbon Steel SS, SC: Spindle Speed (min⁻¹)	Structural Steel, Carbon Steel SS, SC: Feed Rate (mm/min)	Stainless Steel SUS304, SUS316: Spindle Speed (min⁻¹)	Stainless Steel SUS304, SUS316: Feed Rate (mm/min)	Titanium Alloy: Spindle Speed (min⁻¹)	Titanium Alloy: Feed Rate (mm/min)	Ni-based Heat-resistant Alloy: Spindle Speed (min⁻¹)	Ni-based Heat-resistant Alloy: Feed Rate (mm/min)
2.0	11,100	1,700	8,000	720	4,800	430	3,200	190
3.0	7,400	1,100	5,300	480	3,200	290	2,100	130
4.0	5,600	840	4,000	360	2,400	220	1,600	100
5.0	4,500	670	3,200	290	1,900	170	1,300	80
6.0	3,700	560	2,700	240	1,600	140	1,100	60
8.0	2,800	420	2,000	180	1,200	110	800	50
10.0	2,200	330	1,600	140	960	90	640	40
12.0	1,900	280	1,300	120	800	70	530	30

1. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.
2. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.

● mark: Standard stocked item (new product/expanded item)

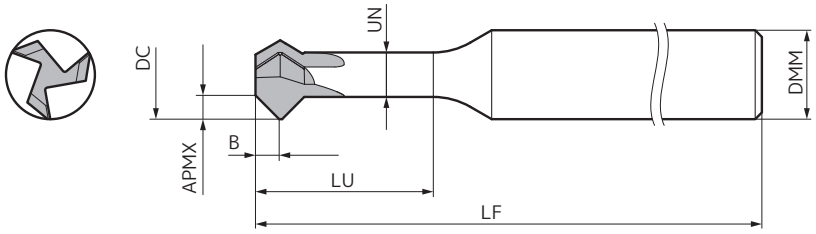
Chamfering Endmills AVIC type Design Inquiry Sheet

After filling in the required dimensions and other information, contact our nearest sales office or distributor.

Feel free to contact us with other requests as well.

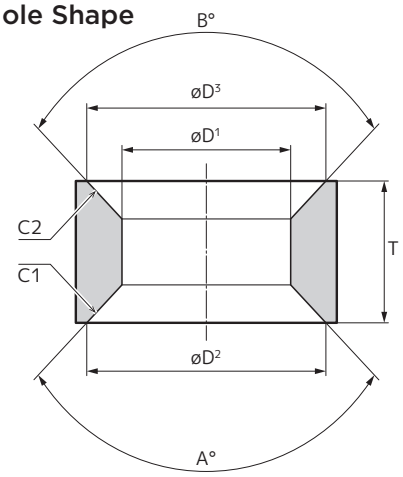
Company Name/Contact

■ Tool Shape



Part	Value
Work Material	
DC	
B	
APMX	
UN	
LU	
LF	
DMM	
Number of Flutes	

■ Workpiece: Hole Shape



Part	Value
Work Material	
Workpiece	☐ Hole Shape ☐ Ext. Shape
øD1	
øD2	
øD3	
A	
B	
C1	
C2	
T	

■ Workpiece: External Shape