

Endmills

I1 to I122

I



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Square	General-purpose	GSX MILL Ballnose 2 Flutes	GSXB 20000 - Inch	I27
		GSX MILL 2 Flutes	GSX 200C-1.5D - Inch	I28
		GSX MILL 2 Flutes	GSX 200C-2D - Inch	I29
		GSX MILL 2 Flutes	GSX 200C-3D - Inch	I30
		GSX MILL 2 Flutes	GSX 200C-4D - Inch	I31
		GSX MILL 2 Flutes	GSX 200S-2D - Inch	I32
		GSX MILL 2 Flutes	GSX 200S-3D - Inch	I33
		GSX MILL 4 Flutes	GSX 400C-1.5D - Inch	I34
		GSX MILL 4 Flutes	GSX 400C-2D - Inch	I35
		GSX MILL 4 Flutes	GSX 400C-3D - Inch	I36
		GSX MILL 4 Flutes	GSX 400C-4D - Inch	I37
		GSX MILL 4 Flutes	GSX 400S-2D - Inch	I38
		GSX MILL 4 Flutes	GSX 400S-3D - Inch	I39
		GSX MILL 2 Flutes	GSX 20000C-1.5D - Metric	I40
		GSX MILL 2 Flutes	GSX 20000S-2D/20000C-2D - Metric	I42, I46
		GSX MILL 2 Flutes	GSX 20000S-3D/20000C-3D - Metric	I48, I50
		GSX MILL 2 Flutes	GSX 20000S-4D/20000C-4D - Metric	I52, I54
		GSX MILL 3 Flutes	GSX 30000C-1.5D - Metric	I56
		GSX MILL 3 Flutes	GSX 30000C-2D - Metric	I58
		GSX MILL 4 Flutes	GSX 40000C-1.5D - Metric	I60
		GSX MILL 4 Flutes	GSX 40000S-2D/40000C-2D - Metric	I62, I64
		GSX MILL 4 Flutes	GSX 40000S-3D/40000C-3D - Metric	I66, I68
		GSX MILL 4 Flutes	GSX 40000S-4D/40000C-4D - Metric	I70, I72
High Efficiency	GSX MILL Anti-vibration 4 Flutes	GSV 4000-2.5D	I74	
	GSX MILL Anti-vibration 4 Flutes	GSXVL 4000-2.5D/4000S-2.5D	I76, I78	
Hardened Steel	SUMIBORON Helical Master 1 Flute	Helical Master BNES	I80	
Non-ferrous Metal	Non-Ferrous Metals AURORA Coat 2/4 Flutes	ASM 2000DL/4000DL	I82, I83	
	Non-Ferrous Metals 2 Flutes	ASM 2000	I84	
	Non-Ferrous Metals SUMIDIA 2/4 Flutes	DFE	I85	
	Non-Ferrous Metals SUMIDIA 1/2 Flutes	DAE	I87	
CFRP Graphite	SUMIDIA Coated for CFRP 4 Flutes	SSDC 4000(RL)	I89	
Radius	GSX MILL 4 Flutes	GSX 40000-R-2D	I90	
	GSX MILL Anti-vibration 4 Flutes	GSV 4000-R-2.5D	I92	
	GSX MILL Anti-vibration 4 Flutes	GSXVL 4000-R-2.5D	I94	
	Exotic Alloy SSEH Anti-vibration 4 Flutes	SSEHVL 4000W-R	I96	
	Exotic Alloy SSEH 4 Flutes	SSEH 4000W-R	I98	
	Exotic Alloy SSEH Anti-vibration 4 Flutes	SSEHVL 4000-R	I100	
	Exotic Alloy SSEH 4 Flutes	SSEH 4000-R	I101	
	MOLD FINISH MASTER Series 1 Flute	NPDRS	I102	
	MOLD FINISH MASTER Series 2 Flutes	BNBR	I104	
Ballnose	GSX MILL Ballnose 2 Flutes	GSXB 20000 - Metric	I106	
	Non-Ferrous Metals AURORA Coat Ballnose 2 Flutes	SNB 2000DL	I109	
	Non-Ferrous Metals AURORA Coat Long Neck Ballnose 2 Flutes	SNB2	I110	
	MOLD FINISH MASTER Series 1 Flute	NPDBS/NPDB	I112, I113	
	SUMIDIA Coated Ballnose 2 Flutes	SDCB	I114	
	MOLD FINISH MASTER Series 2 Flutes	BNBP/BNBC	I116, I118	
Multi-Purpose	GSX MILL Slot 3 Flutes	GSXSLT 30000C-1.5D	I119	

Stock Markings and Symbols

- : Standard stocked item
- ★: Worldwide Warehouse Item
- ▲: Limited Availability Item, made to order, or discontinued (please confirm stock availability).

Blank: Made-to-order item
— mark: Not available

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

I1

Square Endmill Selection Guide

⊙: 1st Recommendation, ⊗: 2nd Recommendation, O: Good, Blank: Not recommended, x: Unsuitable

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Ballnose

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Uncoated

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Applications / Features	Diameter DC (Min. to Max.) inch (mm)	Series Name / Series Code	Appearance	Work Material														
				P				H		M	S	K	N					
				General Structure Rolled Steel	Carbon Steel	Alloy Steel	Pre-hardened Steel	Tempered Steel/Die Steel	Hardened Steel		Stainless Steel	Titanium Alloy/Heat-Resistant Alloy	Cast Iron	Aluminum Alloy	Copper Alloy	Graphite	CFRP	
				30 to 45HRC	45 to 55HRC	55 to 60HRC	60 up HRC											
General-purpose	ø0.0625" to ø1.0000" ø0.5 to 25mm	GSXMILL 2 Flutes GSX200C/ GSX20000C		⊙	⊙	⊙	⊙	⊙	⊙	○		⊙	○	⊙				
	ø0.0625" to ø1.0000" ø0.5 to 25mm	GSXMILL 2 Flutes GSX200S/ GSX20000S		○	⊙	⊙	⊙	⊙	⊙	○		⊙	○	○				
	ø1 to 12	GSXMILL 3 Flutes GSX30000C		○	⊙	⊙	⊙	⊙	⊙			⊙	○	○				
	ø0.0625" to ø1.0000" ø1 to 25mm	GSXMILL 4 Flutes GSX400C/ GSX40000C		⊙	⊙	⊙	⊙	⊙	⊙	○		⊙	○	⊙				
	ø0.0625" to ø1.0000" ø1 to 25mm	GSXMILL 4 Flutes GSX400S/ GSX40000S		○	⊙	⊙	⊙	⊙	⊙	○		⊙	○	○				
High Efficiency	ø2 to 25 mm	GSXMILL Anti-vibration 4 Flutes GSXVL 4000		⊙	⊙	⊙	⊙	⊙	⊙	○		⊙	○	○				
	ø2 to 25 mm	GSV Anti-vibration 4 Flutes GSV 4000		⊙	⊙	⊙	⊙	⊙	⊙	○		⊙	○	○				
Hardened Steel	ø6 to 16 mm	CBN - SUMIBORON Helical Master BNES BNES					○		○	⊙	⊙				×	×		

④③③: Number of teeth

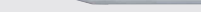
⊙: 1st Recommendation, ⊗: 2nd Recommendation, O: Good, Blank: Not recommended, x: Unsuitable

Applications / Features	Diameter DC (Min. to Max.) inch (mm)	Series Name / Series Code	Appearance	Work Material																
				P				H		M	S	K	N							
				General Structure	Rolled Steel	Carbon Steel	Alloy Steel	Pre-hardened Steel	Tempered Steel/Die Steel	30 to 45HRC	45 to 55HRC	55 to 60HRC	60 up HRC	Hardened Steel	Stainless Steel	Titanium Alloy/Heat-Resistant Alloy	Cast Iron	Aluminum Alloy	Copper Alloy	Graphite
Aluminum and Non-Ferrous Metal	ø2 to 16	DLC - AURORA Coat 2 Flutes ASM 2000DL																⊙	○	
	ø2 to 16	DLC - AURORA Coat 4 Flutes ASM 4000DL															⊙	⊙		
	ø2 to 16	Solid Carbide Endmills for Non-ferrous Cutting ASM 2000															⊙	○		
	① ø4 to 5 ② ø6 to 12	SUMIDIA Endmills DAE Type DAE		x	x	x	x	x	x	x	x	x	x	x	x	⊙	⊙	○		
	② ø4 to 10 ④ ø9 to 13	SUMIDIA Endmills DFE Type DFE		x	x	x	x	x	x	x	x	x	x	x	x	⊙	⊙	○		
CFRP/ Graphite	ø6 to 12	SUMIDIA Coated SSDC SSDC 4000		x	x	x	x	x	x	x	x	x	x	x				○	⊙	
	ø6 to 12	SUMIDIA Coated SSDCRL SSDC 4000RL		x	x	x	x	x	x	x	x	x	x	x				○	⊙	
Multi-Purpose	ø1 to 12	GSX MILL Slot 3 Flutes GSXSLT 30000C		○	⊙	⊙	⊙	⊙	⊙			⊙	○	○						

①②④: Number of teeth

Corner Radius & Ballnose Endmill Selection Guide

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Applications / Features	Diameter DC (Min. to Max.) inch (mm)	Series Name / Series Code	Appearance	Material															
				P					H		M	S	K	N					
				General Structure Rolled Steel	Carbon Steel	Alloy Steel	Pre-hardened Steel	30 to 45HRC	45 to 55HRC	55 to 60HRC	60 up HRC	Hardened Steel	Stainless Steel	Titanium Alloy/Heat-Resistant Alloy	Cast Iron	Aluminum Alloy	Copper Alloy	Graphite	CFRP
General Endmilling with Corner Radius	ø3 to 12	GSX MILL Radius GSX 40000-R		⊙	⊙	⊙	⊙	⊙	⊙				⊙	○	○				
High Efficiency Endmill with Corner Radius	ø3 to 25	GSV Anti-vibration Radius GSV 4000-R		○	⊙	⊙	⊙	⊙	⊙	○			⊙	○	○				
Exotic Material	ø4.5 to 16	SSEH Anti-vibration Radius SSEHVL 4000-R											○	⊙					
	ø4.5 to 16	SSEH Radius SSEH 4000-R											○	⊙					
High-precision Mold Profiling	ø0.2 to 2	MOLD FINISH MASTER SUMIBORON Radius Endmills BNBR					○		○	⊙	⊙					×	×		
Cemented Carbide and Hard Brittle Material	ø0.2 to 2	MOLD FINISH MASTER SUMIDIA BINDERLESS Radius Endmills NPDRS		Cemented Carbide					⊙		Hard Brittle Material					○			

⊙: 1st Recommendation. ⊗: 2nd Recommendation, ○: Good, Blank: Not recommended, ×: Unsuitable

Applications / Features	Ballnose Radius (Min. to Max.) / Tolerance inch (mm)	Series Name / Series Code	Appearance	Material														
				P					H		M	S	K	N				
				General Structure Rolled Steel	Carbon Steel	Alloy Steel	Pre-hardened Steel	30 to 45HRC Tempered Steel/Die Steel	45 to 55HRC	55 to 60HRC	60 up HRC	Hardened Steel	Stainless Steel	Titanium Alloy/Heat-Resistant Alloy	Cast Iron	Aluminum Alloy	Copper Alloy	Graphite
General-purpose	R0.2 to 10 .0625-1.00" ± 0.01	GSXMILL Ballnose GSXB		⊙	⊙	⊙	⊙	⊙	⊙	○		⊙	○	○				
Aluminum and Non-Ferrous Metal	R1 to 8 ± 0.01	DLC - AURORA Coat Ballnose SNB 2000DL													⊙	⊙		
Copper Electrodes	R0.05 to 2 ± 0.005	AURORA Coat Long Neck Ballnose Endmills SNB2													⊙	⊙		
	R0.1 to 0.5 ± 0.005	MOLD FINISH MASTER SUMIBORON Ballnose Endmills BNBC														⊙		
High-precision Mold Profiling	R0.2 to 1 ± 0.005	MOLD FINISH MASTER SUMIBORON Ballnose Endmills BNBP					○		○	⊙	⊙				×	×		
Cemented Carbide and Hard Brittle Material	R0.1 to 1	MOLD FINISH MASTER SUMIDIA BINDERLESS Ballnose Endmills NPDBS (For Standard Finishing)		Cemented Carbide					⊙		Hard Brittle Material					○		
	R0.1 to 1	MOLD FINISH MASTER SUMIDIA BINDERLESS Ballnose Endmills NPDB (For Precision Finishing)		Cemented Carbide					⊙		Hard Brittle Material					○		
	R0.5 to 1	SUMIDIA Coat Ballnose Endmills SDCB		Cemented Carbide					⊙		Hard Brittle Material					○		

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

Cutting Edge Length List by Diameter

Endmill Sizes by Diameter

Square

Endmill Sizes by Diameter

Square

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF
0.3	0.6	GSX20030S-2D	40.0
0.4	0.8	GSX20040S-2D	40.0
0.5	1.0	GSX20050C-1.5D	40.0
		GSX20050C-2D	40.0
	1.3	GSX20050S-2D	40.0
	1.5	GSX20050C-3D	40.0
		GSX20050S-3D	40.0
	2.0	GSX20050C-4D	40.0
		GSX20050S-4D	40.0
0.6	1.3	GSX20060S-2D	40.0
0.7	1.4	GSX20070S-2D	40.0
0.8	1.6	GSX20080S-2D	40.0
0.9	1.8	GSX20090S-2D	40.0
1.0	1.5	GSX20100C-1.5D	40.0
		GSX30100C-1.5D	40.0
		GSX40100C-1.5D	40.0
		GSXSLT30100C-1.5D	40.0
		GSX20100C-2D	40.0
	2.0	GSX40100C-2D	40.0
		GSX20100S-2D	40.0
	2.5	GSX30100C-2D	40.0
		GSX40100S-2D	40.0
		GSX40100S-2D-S3	38.0
	3.0	GSX20100C-3D	40.0
		GSX20100S-3D	40.0
		GSX40100C-3D	40.0
		GSX40100S-3D	40.0
	4.0	GSX20100C-4D	40.0
		GSX40100S-4D	40.0
	5.0	GSX20100S-4D	40.0
1.1	2.5	GSX20110S-2D	40.0
1.2	2.5	GSX20120S-2D	40.0
1.3	2.6	GSX20130S-2D	40.0
1.4	2.8	GSX20140S-2D	40.0
1.5	2.3	GSX20150C-1.5D	40.0
		GSX30150C-1.5D	40.0
		GSX40150C-1.5D	40.0
		GSXSLT30150C-1.5D	40.0
	3.0	GSX20150C-2D	40.0
		GSX40150C-2D	40.0
	3.8	GSX20150S-2D	40.0
		GSX20150S-2D-S3	38.0
		GSX30150C-2D	40.0
		GSX40150S-2D	40.0
	4.5	GSX20150C-3D	40.0
		GSX20150S-3D	40.0
		GSX40150C-3D	40.0
		GSX40150S-3D	40.0
	6.0	GSX20150C-4D	40.0
		GSX40150C-4D	40.0
		GSX40150S-4D	40.0
	7.0	GSX20150S-4D	40.0
1.6	3.8	GSX20160S-2D	40.0
0.0625	0.0938	GSX204C-1.5D	1.5000
		GSX404C-1.5D	1.5000
	0.1250	GSX204C-2D	1.5000
		GSX204C-3D	1.5000
		GSX204S-2D	1.5000
		GSX404S-2D	1.5000
	0.1875	GSX204S-3D	1.5000
		GSX404C-3D	1.5000
	0.2500	GSX404S-3D	1.5000
		GSX204C-4D	1.5000
	0.2500	GSX404C-4D	1.5000
1.7	3.8	GSX20170S-2D	40.0
1.8	3.8	GSX20180S-2D	40.0
1.9	3.8	GSX20190S-2D	40.0
2.0	3.0	GSX20200C-1.5D	40.0
		GSX30200C-1.5D	40.0
		GSX40200C-1.5D	40.0

: 0.5mm Increments

: Inch Diameters

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF
2.0	3.0	GSXSLT30200C-1.5D	40.0
	4.0	GSX20200C-2D	40.0
		GSX40200C-2D	40.0
	5.0	GSV4020-2.5D	50.0
		GSX20200S-2D	40.0
		GSX20200S-2D-S3	38.0
		GSX30200C-2D	40.0
		GSX40200S-2D	40.0
		GSX40200S-2D-S3	38.0
		GSXVL4020-2.5D	50.0
	6.0	ASM2020	40.0
		ASM2020DL	40.0
		ASM4020DL	40.0
		GSX20200C-3D	40.0
		GSX20200S-3D	40.0
		GSX40200C-3D	40.0
	8.0	GSX40200S-3D	40.0
		GSX20200C-4D	40.0
		GSX40200C-4D	40.0
	9.0	GSX20200S-4D	40.0
2.1	6.0	GSX20210S-2D	40.0
2.2	6.0	GSX20220S-2D	40.0
2.3	6.0	GSX20230S-2D	40.0
0.0938	0.1406	GSX206C-1.5D	1.5000
		GSX406C-1.5D	1.5000
	0.1875	GSX406C-2D	1.5000
		GSX206C-2D	1.5000
		GSX206C-3D	1.5000
		GSX206S-2D	1.5000
	0.2813	GSX406S-2D	1.5000
		GSX206S-3D	1.5000
	0.3750	GSX406C-3D	1.5000
		GSX406S-3D	1.5000
	0.3750	GSX406C-4D	1.5000
		GSX206C-4D	2.0000
2.4	6.0	GSX20240S-2D	40.0
2.5	3.8	GSX20250C-1.5D	40.0
		GSX30250C-1.5D	40.0
		GSX40250C-1.5D	40.0
	5.0	GSXSLT30250C-1.5D	40.0
		GSX20250C-2D	40.0
	6.3	GSX40250C-2D	40.0
		GSX20250S-2D	40.0
	7.5	GSX30250C-2D	40.0
		GSX40250S-2D	40.0
		GSX20250C-3D	40.0
	8.0	GSX20250S-3D	40.0
		GSX40250C-3D	40.0
	10.0	GSX20250C-4D	50.0
		GSX40250C-4D	50.0
	12.0	GSX20250S-4D	50.0
2.6	7.0	GSX20260S-2D	40.0
	8.0	GSX20260S-3D	50.0
2.7	7.0	GSX20270S-2D	40.0
	8.5	GSX20270S-3D	50.0
2.8	7.0	GSX20280S-2D	40.0
	9.0	GSX20280S-3D	50.0
2.9	7.0	GSX20290S-2D	40.0
	9.0	GSX20290S-3D	50.0
3.0	4.5	GSX20300C-1.5D	45.0
		GSX30300C-1.5D	45.0
		GSXSLT30300C-1.5D	45.0
	6.0	GSX20300C-2D	45.0
		GSX40300C-2D	45.0
	7.5	GSX20300S-2D	45.0
		GSX20300S-2D-S3	38.0
		GSX30300C-2D	45.0
		GSX40300S-2D	45.0

Cutting Edge Length List by Diameter

Endmill Sizes by Diameter

Square

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF
3.0	7.5	GSX40300S-2D-S3	38.0
	8.0	GSV4030-2.5D	50.0
		GSXVL4030-2.5D	50.0
	9.0	GSX20300C-3D	50.0
		GSX20300S-3D	50.0
		GSX40300C-3D	50.0
		GSX40300S-3D	50.0
		ASM2030	45.0
	10.0	ASM2030DL	45.0
		ASM4030DL	45.0
		GSX20300C-4D	50.0
	12.0	GSX20300S-4D	50.0
		GSX40300C-4D	50.0
		GSX40300S-4D	50.0
		GSX40300S-4D	50.0
3.1	7.5	GSX20310S-2D	45.0
	7.5	GSX208C-1.5D	2.0000
0.1250	0.1875	GSX408C-1.5D	2.0000
	0.2500	GSX408C-2D	2.0000
		GSX208C-2D	2.0000
		GSX208C-3D	2.0000
		GSX208S-2D	2.0000
		GSX408S-2D	2.0000
	0.3750	GSX208S-3D	2.0000
		GSX408C-3D	2.0000
	0.5000	GSX408S-3D	2.0000
		GSX208C-4D	2.0000
		GSX408C-4D	2.0000
3.2	7.5	GSX20320S-2D	45.0
3.3	7.5	GSX20330S-2D	45.0
3.4	7.5	GSX20340S-2D	45.0
3.5	5.3	GSX20350C-1.5D	45.0
		GSX40350C-1.5D	45.0
	7.0	GSX20350C-2D	45.0
		GSX40350C-2D	45.0
	8.8	GSX20350S-2D	45.0
		GSX40350S-2D	45.0
	11.0	GSX20350C-3D	50.0
		GSX40350C-3D	50.0
		GSX40350S-3D	50.0
	12.0	GSX20350S-3D	50.0
		GSX20350C-4D	50.0
		GSX20350S-4D	50.0
		GSX40350C-4D	50.0
		GSX40350S-4D	50.0
3.6	8.8	GSX20360S-2D	45.0
3.7	8.8	GSX20370S-2D	45.0
3.8	8.8	GSX20380S-2D	45.0
3.9	8.8	GSX20390S-2D	45.0
0.1563	0.2344	GSX210C-1.5D	2.0000
		GSX410C-1.5D	2.0000
	0.3125	GSX410C-2D	2.0000
		GSX210C-2D	2.0000
		GSX210C-3D	2.0000
		GSX210S-2D	2.0000
		GSX410S-2D	2.0000
	0.4688	GSX210S-3D	2.0000
		GSX410C-3D	2.0000
	0.6250	GSX410S-3D	2.0000
		GSX210C-4D	2.0000
		GSX410C-4D	2.0000
4.0	6.0	GSX20400C-1.5D	45.0
		GSX30400C-1.5D	45.0
		GSX40400C-1.5D	45.0
		GSXSLT 30400C-1.5D	45.0
	8.0	GSX20400C-2D	45.0
		GSX40400C-2D	45.0
		GSV4040-2.5D	50.0
	10.0	GSXVL4040-2.5D	50.0
		GSX20400S-2D	45.0
	11.0	GSX20400S-2D-S4	45.0
		GSX30400C-2D	45.0
		GSX40400S-2D	45.0
		GSX40400S-2D	45.0

: 0.5mm Increments
: Inch Diameters

Endmill Sizes by Diameter

Square

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF
4.0	11.0	GSX40400S-2D-S4	45.0
	12.0	ASM2040	45.0
		ASM2040DL	45.0
		ASM4040DL	45.0
		GSX20400C-3D	50.0
		GSX20400S-3D	50.0
		GSX40400C-3D	50.0
		GSX40400S-3D	50.0
	16.0	GSX20400C-4D	50.0
		GSX20400S-4D	50.0
		GSX40400C-4D	50.0
		GSX40400S-4D	50.0
4.1	11.0	GSX20410S-2D	45.0
4.2	11.0	GSX20420S-2D	45.0
4.3	11.0	GSX20430S-2D	45.0
4.4	11.0	GSX20440S-2D	45.0
4.5	6.8	GSX20450C-1.5D	50.0
		GSX40450C-1.5D	50.0
	9.0	GSX20450C-2D	50.0
		GSX40450C-2D	50.0
	11.3	GSX20450S-2D	50.0
		GSX40450S-2D	50.0
	14.0	GSX20450C-3D	50.0
		GSX40450C-3D	50.0
	15.0	GSX20450S-3D	50.0
		GSX40450S-3D	50.0
	18.0	GSX20450C-4D	60.0
		GSX20450S-4D	60.0
		GSX40450C-4D	60.0
		GSX40450S-4D	60.0
4.6	11.3	GSX20460S-2D	50.0
4.7	11.3	GSX20470S-2D	50.0
0.1875	0.2813	GSX212C-1.5D	2.0000
	0.3750	GSX412C-1.5D	2.0000
		GSX412C-2D	2.0000
		GSX212C-2D	2.0000
		GSX212C-3D	2.0000
		GSX212S-2D	2.0000
	0.5625	GSX412S-2D	2.0000
		GSX212S-3D	2.0000
		GSX412C-3D	2.0000
	0.7500	GSX412S-3D	2.0000
		GSX212C-4D	2.5000
		GSX412C-4D	2.5000
4.8	11.3	GSX20480S-2D	50.0
4.9	11.3	GSX20490S-2D	50.0
5.0	7.5	GSX20500C-1.5D	50.0
		GSX30500C-1.5D	50.0
		GSX40500C-1.5D	50.0
	10.0	GSXSLT30500C-1.5D	50.0
		GSX20500C-2D	50.0
		GSX40500C-2D	50.0
	13.0	GSV4050-2.5D	60.0
		GSX20500S-2D	50.0
		GSX30500C-2D	50.0
		GSX40500S-2D	50.0
		GSXVL4050-2.5D	60.0
	15.0	ASM2050	50.0
		ASM2050DL	50.0
		ASM4050DL	50.0
		GSX20500C-3D	50.0
		GSX20500S-3D	50.0
		GSX40500C-3D	50.0
		GSX40500S-3D	50.0
5.1	13.0	GSX20500C-4D	60.0
		GSX20500S-4D	60.0
		GSX40500C-4D	60.0
		GSX40500S-4D	60.0
5.2	13.0	GSX20510S-2D	50.0
5.3	13.0	GSX20520S-2D	50.0
		GSX20530S-2D	50.0
		GSX20540S-2D	50.0

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

15

Cutting Edge Length List by Diameter

Endmill Sizes by Diameter

Square

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF	
5.5	8.3	GSX20550C-1.5D	50.0	
		GSX40550C-1.5D	50.0	
	11.0	GSX20550C-2D	50.0	
		GSX40550C-2D	50.0	
	13.0	GSX20550S-2D	50.0	
		GSX40550S-2D	50.0	
	17.0	GSX20550C-3D	50.0	
		GSX40550C-3D	50.0	
	18.0	GSX20550S-3D	50.0	
		GSX40550S-3D	50.0	
	22.0	GSX20550C-4D	60.0	
		GSX20550S-4D	60.0	
		GSX40550C-4D	60.0	
		GSX40550S-4D	60.0	
0.2188	0.3282	GSX214C-1.5D	2.0000	
		GSX414C-1.5D	2.0000	
	0.4376	GSX414C-2D	2.0000	
		GSX214C-2D	2.0000	
		GSX214C-3D	2.0000	
		GSX214S-2D	2.0000	
	0.6564	GSX414S-2D	2.0000	
		GSX214S-3D	2.0000	
		GSX414C-3D	2.0000	
	0.8752	GSX414S-3D	2.0000	
		GSX214C-4D	2.5000	
	GSX414C-4D	2.5000		
5.6	13.0	GSX20560S-2D	50.0	
5.7	13.0	GSX20570S-2D	50.0	
5.8	13.0	GSX20580S-2D	50.0	
5.9	13.0	GSX20590S-2D	50.0	
6.0	9.0	GSX20600C-1.5D	50.0	
		GSX30600C-1.5D	50.0	
		GSX40600C-1.5D	50.0	
		GSXSLT30600C-1.5D	50.0	
	12.0	GSX20600C-2D	50.0	
		GSX40600C-2D	50.0	
	13.0	GSX20600S-2D	50.0	
		GSX30600C-2D	50.0	
		GSX40600S-2D	50.0	
	15.0	ASM2060	50.0	
		ASM2060DL	50.0	
		ASM4060DL	50.0	
		GSV4060-2.5D	60.0	
		GSXVL4060-2.5D	60.0	
	18.0	GSX20600C-3D	50.0	
		GSX20600S-3D	50.0	
		GSX40600C-3D	50.0	
		GSX40600S-3D	50.0	
	24.0	GSX20600C-4D	60.0	
		GSX20600S-4D	60.0	
		GSX40600C-4D	60.0	
		GSX40600S-4D	60.0	
	6.1	13.0	GSX20610S-2D	50.0
	6.2	13.0	GSX20620S-2D	50.0
6.3	13.0	GSX20630S-2D	50.0	
0.2500	0.3750	GSX216C-1.5D	2.0000	
		GSX416C-1.5D	2.0000	
	0.5000	GSX416C-2D	2.0000	
		GSX216C-2D	2.0000	
		GSX216C-3D	2.0000	
		GSX216S-2D	2.0000	
	0.7500	GSX416S-2D	2.0000	
		GSX216S-3D	2.0000	
		GSX416C-3D	2.0000	
	1.0000	GSX416S-3D	2.0000	
		GSX216C-4D	2.5000	
	GSX416C-4D	2.5000		
6.4	13.0	GSX20640S-2D	50.0	
6.5	10.0	GSX20650C-1.5D	60.0	
		GSX40650C-1.5D	60.0	
	13.0	GSX20650C-2D	60.0	
		GSX20650S-2D	60.0	

: Inch Diameters : 0.5mm Increments

Endmill Sizes by Diameter

Square

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF
6.5	13.0	GSX40650C-2D	60.0
		GSX40650S-2D	60.0
	20.0	GSX20650C-3D	70.0
		GSX20650S-3D	70.0
		GSX40650C-3D	70.0
		GSX40650S-3D	70.0
	26.0	GSX20650C-4D	70.0
		GSX20650S-4D	70.0
		GSX40650C-4D	70.0
		GSX40650S-4D	70.0
6.6	13.2	GSX20660S-2D	60.0
6.7	13.4	GSX20670S-2D	60.0
6.8	13.6	GSX20680S-2D	60.0
6.9	13.8	GSX20690S-2D	60.0
7.0	11.0	GSX20700C-1.5D	60.0
		GSX30700C-1.5D	60.0
		GSX40700C-1.5D	60.0
		GSXSLT30700C-1.5D	60.0
	14.0	GSX20700C-2D	60.0
		GSX40700C-2D	60.0
	16.0	GSX20700S-2D	60.0
		GSX30700C-2D	60.0
		GSX40700S-2D	60.0
	18.0	GSV4070-2.5D	70.0
		GSXVL4070-2.5D	70.0
	21.0	GSX20700C-3D	70.0
		GSX20700S-3D	70.0
		GSX40700C-3D	70.0
		GSX40700S-3D	70.0
		GSX20700C-4D	80.0
	28.0	GSX20700S-4D	80.0
		GSX40700C-4D	80.0
		GSX40700S-4D	80.0
	7.1	16.0	GSX20710S-2D
0.2813	0.4220	GSX218C-1.5D	2.5000
		GSX418C-1.5D	2.5000
	0.5626	GSX418C-2D	2.5000
		GSX218C-2D	2.5000
		GSX218C-3D	2.5000
		GSX218S-2D	2.5000
	0.8439	GSX418S-2D	2.5000
		GSX218S-3D	3.0000
		GSX418C-3D	3.0000
	1.1252	GSX418S-3D	3.0000
		GSX218C-4D	3.0000
	GSX418C-4D	3.0000	
7.2	16.0	GSX20720S-2D	60.0
7.3	16.0	GSX20730S-2D	60.0
7.4	16.0	GSX20740S-2D	60.0
7.5	12.0	GSX20750C-1.5D	60.0
		GSX40750C-1.5D	60.0
	15.0	GSX20750C-2D	60.0
		GSX40750C-2D	60.0
	16.0	GSX20750S-2D	60.0
		GSX40750S-2D	60.0
	23.0	GSX20750C-3D	70.0
		GSX20750S-3D	70.0
		GSX40750C-3D	70.0
		GSX40750S-3D	70.0
	30.0	GSX20750C-4D	80.0
		GSX20750S-4D	80.0
		GSX40750C-4D	80.0
		GSX40750S-4D	80.0
7.6	16.0	GSX20760S-2D	60.0
7.7	16.0	GSX20770S-2D	60.0
7.8	16.0	GSX20780S-2D	60.0
7.9	16.0	GSX20790S-2D	60.0
0.3125	0.4688	GSX220C-1.5D	2.5000
		GSX420C-1.5D	2.5000
	0.6250	GSX420C-2D	2.5000
		GSX220C-2D	2.5000
		GSX220C-3D	2.5000

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

Cutting Edge Length List by Diameter

Endmill Sizes by Diameter

Square

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF
0.3125	0.6250	GSX220S-2D	2.5000
		GSX420S-2D	2.5000
	0.9375	GSX220S-3D	3.0000
		GSX420C-3D	3.0000
	1.2500	GSX420S-3D	3.0000
		GSX220C-4D	3.0000
8.0	12.0	GSX420C-4D	3.0000
		GSX20800C-1.5D	60.0
		GSX30800C-1.5D	60.0
		GSX40800C-1.5D	60.0
		GSXSLT30800C-1.5D	60.0
	16.0	GSX20800C-2D	60.0
		GSX40800C-2D	60.0
	18.0	ASM2080	60.0
		ASM2080DL	60.0
		ASM4080DL	60.0
	19.0	GSX20800S-2D	60.0
		GSX30800C-2D	60.0
	20.0	GSX40800S-2D	60.0
		GSV4080-2.5D	80.0
	24.0	GSX20800C-3D	70.0
		GSX20800S-3D	70.0
		GSX40800C-3D	70.0
		GSX40800S-3D	70.0
	32.0	GSX20800C-4D	80.0
		GSX20800S-4D	80.0
		GSX40800C-4D	80.0
		GSX40800S-4D	80.0
8.1	19.0	GSX20810S-2D	60.0
8.2	19.0	GSX20820S-2D	60.0
8.3	19.0	GSX20830S-2D	60.0
8.4	19.0	GSX20840S-2D	60.0
8.5	13.0	GSX20850C-1.5D	70.0
		GSX40850C-1.5D	70.0
	17.0	GSX20850C-2D	70.0
		GSX40850C-2D	70.0
	19.0	GSX20850S-2D	70.0
		GSX40850S-2D	70.0
	26.0	GSX20850C-3D	75.0
		GSX20850S-3D	75.0
		GSX40850C-3D	75.0
		GSX40850S-3D	75.0
	34.0	GSX20850C-4D	90.0
		GSX20850S-4D	90.0
		GSX40850C-4D	90.0
		GSX40850S-4D	90.0
8.6	19.0	GSX20860S-2D	70.0
8.7	19.0	GSX20870S-2D	70.0
8.8	19.0	GSX20880S-2D	70.0
8.9	19.0	GSX20890S-2D	70.0
9.0	14.0	GSX20900C-1.5D	70.0
		GSX30900C-1.5D	70.0
		GSX40900C-1.5D	70.0
		GSXSLT30900C-1.5D	70.0
	18.0	GSX20900C-2D	70.0
		GSX40900C-2D	70.0
		GSX20900S-2D	70.0
		GSX30900C-2D	70.0
	23.0	GSX40900S-2D	70.0
		GSV4090-2.5D	90.0
	27.0	GSXVL4090-2.5D	90.0
		GSX20900C-3D	75.0
		GSX20900S-3D	75.0
		GSX40900C-3D	75.0
		GSX40900S-3D	75.0
	36.0	GSX20900C-4D	90.0
		GSX20900S-4D	90.0
		GSX40900C-4D	90.0
		GSX40900S-4D	90.0
9.1	19.0	GSX20910S-2D	70.0
9.2	19.0	GSX20920S-2D	70.0

: Inch Diameters : 0.5mm Increments

Endmill Sizes by Diameter

Square

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF
9.3	19.0	GSX20930S-2D	70.0
9.4	19.0	GSX20940S-2D	70.0
9.5	15.0	GSX20950C-1.5D	70.0
		GSX40950C-1.5D	70.0
	19.0	GSX20950C-2D	70.0
		GSX40950C-2D	70.0
		GSX40950S-2D	70.0
	20.0	GSX20950S-2D	70.0
		GSX20950C-3D	75.0
	29.0	GSX20950S-3D	75.0
		GSX40950C-3D	75.0
		GSX40950S-3D	75.0
	38.0	GSX20950C-4D	90.0
		GSX20950S-4D	90.0
0.3750	0.5625	GSX40950C-4D	90.0
		GSX40950S-4D	90.0
	0.7500	GSX224C-1.5D	3.0000
		GSX424C-1.5D	3.0000
		GSX424C-2D	3.0000
		GSX224C-2D	3.0000
		GSX224C-3D	3.0000
		GSX224S-2D	3.0000
	1.1250	GSX424S-2D	3.0000
		GSX224S-3D	3.5000
	1.5000	GSX424C-3D	3.5000
		GSX424S-3D	3.5000
	1.5000	GSX224C-4D	3.5000
		GSX424C-4D	3.5000
9.6	20.0	GSX20960S-2D	70.0
9.7	20.0	GSX20970S-2D	70.0
9.8	20.0	GSX20980S-2D	70.0
9.9	20.0	GSX20990S-2D	70.0
10.0	15.0	GSX2100C-1.5D	70.0
		GSX3100C-1.5D	70.0
		GSX4100C-1.5D	70.0
		GSXSLT 3100C-1.5D	70.0
	20.0	GSX2100C-2D	70.0
		GSX4100C-2D	70.0
	22.0	ASM2100	71.0
		ASM2100DL	71.0
		GSX2100S-2D	70.0
		GSX3100C-2D	70.0
	25.0	GSX4100S-2D	70.0
		GSV4100-2.5D	90.0
	30.0	GSXVL4100-2.5D	90.0
		GSX2100C-3D	90.0
		GSX2100S-3D	90.0
		GSX4100C-3D	90.0
	40.0	GSX4100S-3D	90.0
		GSX2100C-4D	90.0
		GSX2100S-4D	90.0
		GSX4100C-4D	90.0
	22.0	GSX4100S-4D	90.0
		ASM4100DL	71.0
10.5	16.0	GSX2105C-1.5D	75.0
		GSX4105C-1.5D	75.0
	21.0	GSX2105C-2D	75.0
		GSX4105C-2D	75.0
	22.0	GSX2105S-2D	75.0
		GSX4105S-2D	75.0
	32.0	GSX2105C-3D	90.0
		GSX2105S-3D	90.0
		GSX4105C-3D	90.0
		GSX4105S-3D	90.0
	42.0	GSX2105C-4D	100.0
		GSX2105S-4D	100.0
		GSX4105C-4D	100.0
		GSX4105S-4D	100.0
11.0	17.0	GSX2110C-1.5D	75.0
		GSX4110C-1.5D	75.0
	22.0	GSX2110C-2D	75.0
		GSX2110S-2D	75.0

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

I7

Cutting Edge Length List by Diameter

Endmill Sizes by Diameter

Square

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF
11.0	28.0	GSX41100C-2D	75.0
		GSX41100S-2D	75.0
		GSV4110-2.5D	90.0
		GSXVL4110-2.5D	90.0
	33.0	GSX21100C-3D	90.0
		GSX21100S-3D	90.0
		GSX41100C-3D	90.0
		GSX41100S-3D	90.0
	44.0	GSX 21100C-4D	100.0
		GSX 21100S-4D	100.0
		GSX 41100C-4D	100.0
		GSX 41100S-4D	100.0
0.4375	0.6563	GSX228C-1.5D	3.0000
		GSX428C-1.5D	3.0000
	0.8750	GSX428C-2D	3.0000
		GSX228C-2D	3.0000
		GSX228C-3D	3.0000
		GSX228S-2D	3.0000
	1.3125	GSX428S-2D	3.0000
		GSX228S-3D	3.5000
		GSX428C-3D	3.5000
		GSX428S-3D	3.5000
	1.7500	GSX228C-4D	4.0000
		GSX428C-4D	4.0000
11.5	18.0	GSX21150C-1.5D	75.0
		GSX41150C-1.5D	75.0
	23.0	GSX21150C-2D	75.0
		GSX21150S-2D	75.0
		GSX41150C-2D	75.0
		GSX41150S-2D	75.0
	35.0	GSX21150C-3D	90.0
		GSX21150S-3D	90.0
		GSX41150C-3D	90.0
		GSX41150S-3D	90.0
	46.0	GSX21150C-4D	100.0
		GSX21150S-4D	100.0
		GSX41150C-4D	100.0
		GSX41150S-4D	100.0
12.0	18.0	GSX21200C-1.5D	75.0
		GSX31200C-1.5D	75.0
		GSX41200C-1.5D	75.0
		GSXSLT31200C-1.5D	75.0
	24.0	GSX21200C-2D	75.0
		GSX41200C-2D	75.0
	25.0	ASM2120	75.0
		ASM2120DL	75.0
	26.0	GSX21200S-2D	75.0
		GSX31200C-2D	75.0
		GSX41200S-2D	75.0
	30.0	GSV4120-2.5D	90.0
		GSXVL4120-2.5D	90.0
12.5	26.0	GSX21200C-3D	90.0
		GSX21200S-3D	90.0
		GSX41200C-3D	90.0
		GSX41200S-3D	90.0
	48.0	GSX21200C-4D	100.0
		GSX21200S-4D	100.0
		GSX41200C-4D	100.0
		GSX41200S-4D	100.0
	2.0000	GSX21250S-2D	75.0
		GSX232C-1.5D	3.0000
		GSX432C-1.5D	3.0000
		GSX432C-2D	3.0000
0.5000	0.7500	GSX232C-2D	3.0000
		GSX232C-3D	3.0000
		GSX232S-2D	3.0000
		GSX432S-2D	3.0000
	1.0000	GSX232S-3D	3.5000
		GSX432C-3D	3.5000
		GSX432S-3D	3.5000
		GSX232C-4D	4.0000

: 0.5mm Increments
: Inch Diameters

Endmill Sizes by Diameter

Square

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF
0.5000	2.0000	GSX432C-4D	4.0000
13.0	20.0	GSX21300C-1.5D	90.0
		GSX41300C-1.5D	90.0
	26.0	GSX21300C-2D	90.0
		GSX21300S-2D	90.0
		GSX41300C-2D	90.0
		GSX41300S-2D	90.0
	39.0	GSX21300C-3D	100.0
		GSX21300S-3D	100.0
		GSX41300C-3D	100.0
		GSX41300S-3D	100.0
	52.0	GSX21300C-4D	110.0
		GSX21300S-4D	110.0
		GSX41300C-4D	110.0
		GSX41300S-4D	110.0
13.5	27.0	GSX41350S-2D	90.0
14.0	21.0	GSX21400C-1.5D	90.0
		GSX41400C-1.5D	90.0
	28.0	GSX21400C-2D	90.0
		GSX21400S-2D	90.0
		GSX41400C-2D	90.0
		GSX41400S-2D	90.0
	32.0	ASM2140	90.0
		GSV4140-2.5D	110.0
	42.0	GSXVL4140-2.5D	110.0
		GSX21400C-3D	110.0
		GSX21400S-3D	110.0
		GSX41400C-3D	110.0
0.5625	56.0	GSX21400C-4D	120.0
		GSX21400S-4D	120.0
		GSX41400C-4D	120.0
		GSX41400S-4D	120.0
	0.8438	GSX236C-1.5D	3.5000
		GSX436C-1.5D	3.5000
	1.1250	GSX236C-2D	3.5000
		GSX236C-3D	3.5000
		GSX236S-2D	3.5000
		GSX236S-3D	3.5000
	1.6875	GSX436C-3D	4.5000
		GSX436S-3D	4.5000
	2.2500	GSX236C-4D	5.0000
		GSX436C-4D	5.0000
15.0	23.0	GSX21500C-1.5D	90.0
		GSX41500C-1.5D	90.0
	30.0	GSX21500C-2D	90.0
		GSX21500S-2D	90.0
		GSX41500C-2D	90.0
		GSX41500S-2D	90.0
	32.0	ASM2150	90.0
		GSV4150-2.5D	110.0
	38.0	GSXVL4150-2.5D	110.0
		GSX21500C-3D	110.0
		GSX21500S-3D	110.0
		GSX41500C-3D	110.0
0.6250	45.0	GSX41500S-3D	110.0
		GSX21500C-4D	120.0
		GSX21500S-4D	120.0
		GSX41500C-4D	120.0
	60.0	GSX41500S-4D	120.0
		GSX240C-1.5D	3.5000
		GSX440C-1.5D	3.5000
		GSX440C-2D	3.5000
	0.9375	GSX240C-2D	3.5000
		GSX240C-3D	3.5000
		GSX240S-2D	3.5000
		GSX440S-2D	3.5000
1.8750	1.2500	GSX240S-3D	4.5000
		GSX440C-3D	4.5000
		GSX440S-3D	4.5000
		GSX440S-3D	4.5000

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

Cutting Edge Length List by Diameter

Endmill Sizes by Diameter

Square

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF
0.6250	2.5000	GSX240C-4D	5.0000
		GSX440C-4D	5.0000
16.0	24.0	GSX21600C-1.5D	90.0
		GSX41600C-1.5D	90.0
	32.0	ASM2160	90.0
		ASM2160DL	90.0
		ASM4160DL	90.0
		GSX21600C-2D	90.0
		GSX21600S-2D	90.0
		GSX41600C-2D	90.0
		GSX41600S-2D	90.0
	40.0	GSV4160-2.5D	115.0
		GSXVL4160-2.5D	115.0
	48.0	GSX21600C-3D	110.0
		GSX21600S-3D	110.0
		GSX41600C-3D	110.0
		GSX41600S-3D	110.0
	64.0	GSX21600C-4D	120.0
		GSX21600S-4D	120.0
		GSX41600C-4D	120.0
		GSX41600S-4D	120.0
17.0	26.0	GSX21700C-1.5D	100.0
		GSX41700C-1.5D	100.0
	34.0	GSX21700C-2D	100.0
		GSX41700C-2D	100.0
	35.0	GSX21700S-2D	100.0
		GSX41700S-2D	100.0
	51.0	GSX21700C-3D	110.0
		GSX21700S-3D	110.0
		GSX41700C-3D	110.0
		GSX41700S-3D	110.0
	68.0	GSX21700C-4D	130.0
		GSX21700S-4D	130.0
		GSX41700C-4D	130.0
		GSX41700S-4D	130.0
0.6875	1.0313	GSX244C-1.5D	4.0000
		GSX444C-1.5D	4.0000
	1.3750	GSX444C-2D	4.0000
		GSX244C-2D	4.0000
		GSX244C-3D	4.0000
		GSX244S-2D	4.0000
	2.0625	GSX444S-2D	4.0000
		GSX244S-3D	4.5000
	2.7500	GSX444C-3D	4.5000
		GSX444S-3D	4.5000
18.0	27.0	GSX21800C-1.5D	100.0
		GSX41800C-1.5D	100.0
	36.0	GSX21800C-2D	100.0
		GSX41800C-2D	100.0
	40.0	GSX21800S-2D	100.0
		GSX41800S-2D	100.0
	45.0	GSV4180-2.5D	120.0
		GSXVL4180-2.5D	120.0
	54.0	GSX21800C-3D	120.0
		GSX21800S-3D	120.0
		GSX41800C-3D	120.0
		GSX41800S-3D	120.0
	72.0	GSX21800C-4D	130.0
		GSX21800S-4D	130.0
		GSX41800C-4D	130.0
		GSX41800S-4D	130.0
19.0	29.0	GSX21900C-1.5D	100.0
		GSX41900C-1.5D	100.0
	38.0	GSX21900C-2D	100.0
		GSX41900C-2D	100.0
	40.0	GSX21900S-2D	100.0
		GSX41900S-2D	100.0
	57.0	GSX21900C-3D	120.0
		GSX21900S-3D	120.0

: 0.5mm Increments

: Inch Diameters

Endmill Sizes by Diameter

Square

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF
19.0	57.0	GSX41900S-3D	120.0
		GSX21900C-4D	140.0
	76.0	GSX21900S-4D	140.0
		GSX41900C-4D	140.0
0.7500	1.1250	GSX41900S-4D	140.0
		GSX248C-1.5D	4.0000
	1.5000	GSX448C-1.5D	4.0000
		GSX448C-2D	4.0000
		GSX248C-2D	4.0000
		GSX248C-3D	4.0000
	2.2500	GSX248S-2D	4.0000
		GSX448S-2D	4.0000
		GSX248S-3D	5.0000
		GSX448C-3D	5.0000
	3.0000	GSX448S-3D	5.0000
		GSX248C-4D	5.5000
		GSX448C-4D	5.5000
20.0	30.0	GSX22000C-1.5D	100.0
		GSX42000C-1.5D	100.0
	40.0	GSX22000C-2D	100.0
		GSX22000S-2D	100.0
		GSX42000C-2D	100.0
		GSX42000S-2D	100.0
	50.0	GSV4200-2.5D	125.0
		GSXVL4200-2.5D	125.0
	60.0	GSX22000C-3D	120.0
		GSX22000S-3D	120.0
		GSX42000C-3D	120.0
		GSX42000S-3D	120.0
	80.0	GSX22000C-4D	140.0
		GSX22000S-4D	140.0
		GSX42000C-4D	140.0
		GSX42000S-4D	140.0
21.0	42.0	GSX22100S-2D	110.0
	44.0	GSX22200S-2D	110.0
		GSX42200S-2D	110.0
0.8750	66.0	GSX42200S-3D	130.0
		GSX256C-1.5D	4.0000
	1.3125	GSX456C-1.5D	4.0000
		GSX456C-2D	4.0000
		GSX256C-2D	4.0000
		GSX256C-3D	4.0000
	1.7500	GSX256S-2D	4.0000
		GSX456S-2D	4.0000
		GSX256S-3D	5.0000
		GSX456C-3D	5.0000
	2.6250	GSX456S-3D	5.0000
		GSX256C-4D	5.5000
	3.5000	GSX456C-4D	5.5000
		GSX22300S-2D	120.0
23.0	46.0	GSX22400S-2D	120.0
	48.0	GSX42400S-2D	120.0
24.0	72.0	GSX22400S-3D	130.0
		GSX22500C-1.5D	120.0
	38.0	GSX42500C-1.5D	120.0
		GSX22500C-2D	120.0
	50.0	GSX22500S-2D	120.0
		GSX42500C-2D	120.0
		GSX22500S-2D	120.0
		GSX42500S-2D	120.0
	63.0	GSV4250-2.5D	140.0
		GSXVL4250-2.5D	140.0
	75.0	GSX22500C-3D	130.0
		GSX22500S-3D	130.0
		GSX42500C-3D	130.0
		GSX42500S-3D	130.0
25.0	100.0	GSX22500C-4D	160.0
		GSX22500S-4D	160.0
		GSX42500C-4D	160.0
		GSX42500S-4D	160.0
	1.5000	GSX2264C-1.5D	4.0000
		GSX464C-1.5D	4.0000
1.0000	2.0000	GSX464C-2D	4.0000

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

Cutting Edge Length List by Diameter

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

Endmill Sizes by Diameter

Square

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF
1.0000	2.0000	GSX264C-2D	4.0000
		GSX264C-3D	4.0000
		GSX264S-2D	4.0000
		GSX464S-2D	4.0000
	3.0000	GSX264S-3D	5.5000
		GSX464C-3D	5.5000
		GSX464S-3D	5.5000
		GSX264C-4D	6.0000
	4.0000	GSX464C-4D	6.0000
		GSX464S-4D	6.0000

Endmill Sizes by Diameter

Radius

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF
3.0	8.0	GSV4030-R02-2.5D	50.0
		GSV4030-R05-2.5D	50.0
		GSX40300-R02-2D	45.0
		GSX40300-R05-2D	45.0
		GSXVL4030-R02-2.5D	50.0
		GSXVL4030-R05-2.5D	50.0
		GSXVL4030-R10-2.5D	50.0
4.0	10.0	GSV4040-R02-2.5D	50.0
		GSV4040-R05-2.5D	50.0
		GSV4040-R10-2.5D	50.0
		GSXVL4040-R02-2.5D	50.0
		GSXVL4040-R05-2.5D	50.0
		GSXVL4040-R10-2.5D	50.0
		GSX40400-R02-2D	45.0
	11.0	GSX40400-R05-2D	45.0
		GSX40400-R10-2D	45.0
		GSX40400-R15-2D	45.0
4.5	12.0	SSEH4045-R05	50.0
		SSEH4045W-R05	50.0
		SSEHVL4045-R05	50.0
		SSEHVL4045-R10	50.0
		SSEHVL4045W-R05	50.0
		SSEHVL4045W-R10	50.0
		GSV4050-R02-2.5D	60.0
		GSV4050-R05-2.5D	60.0
5.0	13.0	GSV4050-R10-2.5D	60.0
		GSX40500-R02-2D	50.0
		GSX40500-R05-2D	50.0
		GSX40500-R10-2D	50.0
		GSXVL4050-R02-2.5D	60.0
		GSXVL4050-R05-2.5D	60.0
		GSXVL4050-R10-2.5D	60.0
		SSEH4050-R05	60.0
		SSEH4050W-R05	60.0
		SSEHVL4050-R05	60.0
		SSEHVL4050-R10	60.0
		SSEHVL4050W-R05	60.0
		SSEHVL4050W-R10	60.0
		GSX40600-R02-2D	50.0
		GSX40600-R05-2D	50.0
6.0	13.0	GSX40600-R10-2D	50.0
		GSX40600-R15-2D	50.0
		SSEH4060-R10	60.0
		SSEH4060W-R10	60.0
		SSEHVL4060-R10	60.0
		SSEHVL4060W-R10	60.0
		GSV4060-R03-2.5D	60.0
	15.0	GSV4060-R05-2.5D	60.0
		GSV4060-R10-2.5D	60.0
		GSV4060-R15-2.5D	60.0
		GSXVL4060-R03-2.5D	60.0
		GSXVL4060-R05-2.5D	60.0
		GSXVL4060-R10-2.5D	60.0
		GSXVL4060-R15-2.5D	60.0
		GSX40800-R02-2D	60.0
8.0	19.0	GSX40800-R05-2D	60.0
		GSX40800-R10-2D	60.0
		GSX40800-R15-2D	60.0
		SSEH4080-R10	80.0
		SSEH4080W-R10	80.0
		SSEHVL4080-R10	80.0

: 0.5mm Increments

: Inch Diameters

Endmill Sizes by Diameter

Radius

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF
8.0	19.0	SSEHVL4080-R10	80.0
		SSEHVL4080W-R10	80.0
	20.0	GSV4080-R03-2.5D	80.0
		GSV4080-R05-2.5D	80.0
		GSV4080-R10-2.5D	80.0
		GSV4080-R15-2.5D	80.0
		GSV4080-R20-2.5D	80.0
		GSXVL4080-R03-2.5D	80.0
		GSXVL4080-R05-2.5D	80.0
		GSXVL4080-R10-2.5D	80.0
		GSXVL4080-R15-2.5D	80.0
		GSXVL4080-R20-2.5D	80.0
10.0	22.0	GSX41000-R02-2D	70.0
		GSX41000-R05-2D	70.0
		GSX41000-R10-2D	70.0
		GSX41000-R15-2D	70.0
		GSX41000-R20-2D	70.0
		SSEH4100-R10	90.0
		SSEH4100-R30	90.0
		SSEH4100W-R10	90.0
		SSEH4100W-R30	90.0
		SSEHVL4100-R10	90.0
		SSEHVL4100-R30	90.0
		SSEHVL4100W-R10	90.0
	SSEHVL4100W-R30	90.0	
	25.0	GSV4100-R03-2.5D	90.0
		GSV4100-R05-2.5D	90.0
		GSV4100-R10-2.5D	90.0
		GSV4100-R15-2.5D	90.0
		GSV4100-R20-2.5D	90.0
		GSXVL4100-R03-2.5D	90.0
		GSXVL4100-R05-2.5D	90.0
		GSXVL4100-R10-2.5D	90.0
		GSXVL4100-R15-2.5D	90.0
GSXVL4100-R20-2.5D		90.0	
12.0	26.0	GSX41200-R02-2D	70.0
		GSX41200-R05-2D	70.0
		GSX41200-R10-2D	70.0
		GSX41200-R15-2D	70.0
		GSX41200-R20-2D	70.0
		SSEH4120-R10	90.0
		SSEH4120-R30	90.0
		SSEH4120W-R10	90.0
		SSEH4120W-R30	90.0
		SSEH4120WS-R10	90.0
		SSEH4120WS-R30	90.0
		SSEHVL4120-R10	90.0
		SSEHVL4120-R30	90.0
		SSEHVL4120W-R10	90.0
		SSEHVL4120W-R30	90.0
		SSEHVL4120WS-R10	90.0
	SSEHVL4120WS-R30	90.0	
	30.0	GSV4120-R05-2.5D	90.0
		GSV4120-R10-2.5D	90.0
		GSV4120-R15-2.5D	90.0
		GSV4120-R20-2.5D	90.0
		GSV4120-R30-2.5D	90.0
GSXVL4120-R05-2.5D		90.0	
GSXVL4120-R10-2.5D		90.0	
GSXVL4120-R15-2.5D		90.0	
16.0	32.0	GSXVL4120-R20-2.5D	90.0
		GSXVL4120-R30-2.5D	90.0
		SSEH4160-R10	115.0
		SSEH4160-R30	115.0
		SSEH4160W-R10	115.0
		SSEH4160W-R30	115.0
		SSEH4160WS-R10	115.0
		SSEH4160WS-R30	115.0
		SSEHVL4160-R10	115.0
		SSEHVL4160-R30	115.0
SSEHVL4160W-R10	115.0		
SSEHVL4160W-R30	115.0		

Cutting Edge Length List by Diameter

Endmill Sizes by Diameter

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF
16.0	32.0	SSEHVL4160WS-R10	115.0
		SSEHVL4160WS-R30	115.0
	40.0	GSV4160-R10-2.5D	115.0
		GSV4160-R15-2.5D	115.0
		GSV4160-R20-2.5D	115.0
		GSV4160-R30-2.5D	115.0
		GSXVL4160-R10-2.5D	115.0
		GSXVL4160-R15-2.5D	115.0
		GSXVL4160-R20-2.5D	115.0
		GSXVL4160-R30-2.5D	115.0
20.0	40.0	SSEH4200W-R10	125.0
		SSEH4200W-R30	125.0
		SSEH4200WS-R10	125.0
		SSEH4200WS-R30	125.0
		SSEHVL4200W-R10	125.0
		SSEHVL4200W-R30	125.0
		SSEHVL4200WS-R10	125.0
		SSEHVL4200WS-R30	125.0
	50.0	GSV4200-R10-2.5D	125.0
		GSV4200-R15-2.5D	125.0
		GSV4200-R20-2.5D	125.0
		GSV4200-R30-2.5D	125.0
		GSXVL4200-R10-2.5D	125.0
		GSXVL4200-R15-2.5D	125.0
		GSXVL4200-R20-2.5D	125.0
		GSXVL4200-R30-2.5D	125.0
25.0	50.0	SSEH4250W-R10	140.0
		SSEH4250W-R30	140.0
		SSEH4250WS-R10	140.0
		SSEH4250WS-R30	140.0
		SSEHVL4250W-R10	140.0
		SSEHVL4250W-R30	140.0
		SSEHVL4250WS-R10	140.0
		SSEHVL4250WS-R30	140.0
	63.0	GSV4250-R10-2.5D	140.0
		GSV4250-R15-2.5D	140.0
		GSV4250-R20-2.5D	140.0
		GSV4250-R30-2.5D	140.0
		GSXVL4250-R10-2.5D	140.0
		GSXVL4250-R15-2.5D	140.0
		GSXVL4250-R20-2.5D	140.0
		GSXVL4250-R30-2.5D	140.0

Endmill Sizes by Diameter

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF
0.1	0.1	SNB200050034DL	45.0
		SNB200050064DL	45.0
0.2	0.2	SNB200100054DL	45.0
		SNB200100104DL	45.0
0.3	0.3	SNB200150054DL	45.0
		SNB200150104DL	45.0
		SNB200150204DL	45.0
		SNB200150304DL	45.0
		SNB200200104DL	45.0
0.4	0.4	SNB200200204DL	45.0
		SNB200200304DL	45.0
		SNB200200404DL	45.0
		GSXB20020	50.0
		SNB200250104DL	45.0
0.5	0.45	SNB200250204DL	45.0
		SNB200250304DL	45.0
		SNB200250404DL	45.0
		SNB200300204DL	45.0
0.6	0.6	SNB200300304DL	45.0
		SNB200300404DL	45.0
		SNB200300504DL	45.0
		SNB200300604DL	45.0
	0.9	GSXB20030	50.0

Radius

Endmill Sizes by Diameter

Dia. DC	Cutting Edge Length APMX	Cat. No.	Overall Length LF
1.0	1.5	GSXB20050	50.0
		SNB200500304DL	45.0
		SNB200500404DL	45.0
		SNB200500604DL	45.0
		SNB200500804DL	50.0
		SNB200501004DL	50.0
1.5	2.3	SNB200750304DL	45.0
		SNB200750604DL	45.0
		SNB200751004DL	50.0
	2.5	GSXB20075	50.0
0.0625	0.0938	GSXB204	2.0000
2.0	3.0	GSXB20100	60.0
		SNB2020DL	60.0
		SNB201000304DL	50.0
		SNB201000604DL	50.0
		SNB201001004DL	50.0
		SNB201001504DL	60.0
		SNB201002004DL	60.0
		GSXB20125	60.0
2.5	4.0	GSXB20150	60.0
3.0	4.5	SNB2030DL	80.0
0.0938	0.1406	GSXB206	2.5000
4.0	6.0	GSXB20200	70.0
		SNB2040DL	80.0
		SNB202001606DL	80.0
		SNB202002006DL	80.0
		SNB202003006DL	80.0
0.1250	0.1875	GSXB208	2.5000
5.0	7.5	GSXB20250	80.0
		SNB2050DL	90.0
0.1563	0.2344	GSXB210	3.0000
6.0	9.0	GSXB20300	80.0
		SNB2060DL	100.0
7.0	11.0	GSXB20350	90.0
0.1875	0.2813	GSXB212	3.0000
8.0	12.0	GSXB20400	90.0
		SNB2080DL	100.0
0.2188	0.3282	GSXB214	3.0000
0.2500	0.3750	GSXB216	3.0000
10.0	15.0	GSXB20500	100.0
		SNB2100DL	120.0
0.2813	0.4220	GSXB218	3.5000
0.3125	0.4688	GSXB220	3.5000
12.0	18.0	GSXB20600	110.0
		SNB2120DL	120.0
14.0	21.0	GSXB20700	110.0
0.3750	0.5625	GSXB224	4.0000
16.0	24.0	GSXB20800	140.0
		SNB2160DL	160.0
0.4375	0.6563	GSXB228	4.0000
18.0	27.0	GSXB20900	140.0
0.5000	0.7500	GSXB232	4.5000
20.0	30.0	GSXB21000	160.0
0.5625	0.8438	GSXB236	4.5000
0.6250	0.9375	GSXB240	5.5000
0.6875	1.0313	GSXB244	5.5000
0.7500	1.1250	GSXB248	6.0000
0.8750	1.3125	GSXB256	6.5000
1.0000	1.5000	GSXB264	7.0000

■ : Inch Diameters

■ : 0.5mm Increments

Endmills

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

Material Selection Guide

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

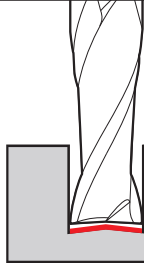
Coated

Uncoated

Target Material (What to machine?)	Cutting Applications	Recommended Tool	Ref. Page
Steel, Cast Iron, Stainless Steel, Titanium Alloy	High Efficiency Machining Chatter Countermeasures	GSXVL GSV	I76,I78 I74
	Medium Finishing to Finishing (Good Machining Accuracy)	GSX	I40 to I72
	Roughing (Large Stock Removal)	GSXVL	I76,I78
Aluminum Alloy	All Aluminum Alloys	ASM	I82 to I84

Target Material (What to machine?)	Cutting Applications	Recommended Tool	Ref. Page
Steel, Cast Iron, Stainless Steel, Titanium Alloy	High Efficiency Machining Chatter Countermeasures	GSXVL GSV	I76,I78 I92
	Medium Finishing to Finishing (Good Machining Accuracy)	GSX	I90
	Roughing (Large Stock Removal)	GSXVL	I76,I94
	Stainless Steel, Titanium Alloy	SSEH SSEHVL	I102,I104 I98,I100

Target Material (What to machine?)	Cutting Applications	Recommended Tool	Ref. Page
Steel, Cast Iron, Stainless Steel, Titanium Alloy	General Machining	GSXB	I27, I112
Aluminum Alloy Copper Alloy	All Aluminum Alloys, Copper	SNB	I115, I116



⚠ 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 Bottom MDF**.

Endmill Coating

■ Endmill Coating

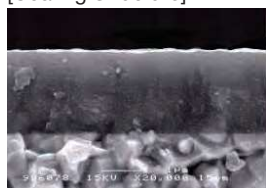
Coating Name	GSX Coat	ZX Coat	AURORA Coat	SUMIDIA Coat
Coating Type	TiAlCrN Type	TiAlN Type	DLC	Diamond
Wear Resistance	◎	○	○	◎
Adhesion Resistance	◎	○	◎	△
Thermal Resistance	◎	○	△	○
Coating Thickness	up to 2μm	up to 2μm	up to 0.5μm	up to 15μm
Features	Excellent thermal resistance and adhesion resistance	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 cast iron milling	For aluminum alloy and copper alloy milling	Milling of CFRP
Main Applicable Products	GSX/GSXB/GSXVL Type	UPMILL Type	ASM/SNB/SNB2 Type	SSDC Type

● GSX Coat

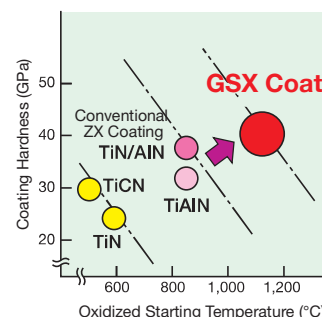
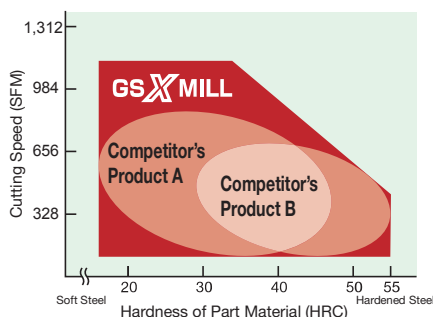


- Micro-grain carbide substrate provides high transverse rupture strength and excellent thermal shock resistance, improving reliability in wet cutting applications.
- Adopts GSX Coat for better wear resistance and thermal resistance, improving reliability and tool life when machining a wide range of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

[Coating Structure]



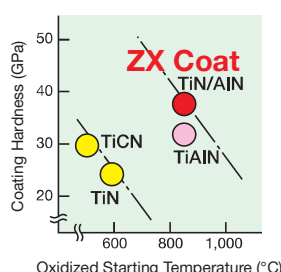
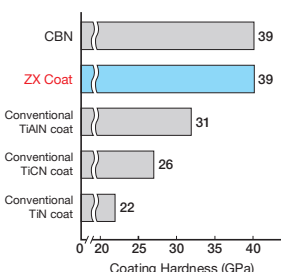
TiAlCrN-based Oxidation-Resistant Film
TiAlN-based Wear-Resistant Film
Ultra-Fine Grain Carbide Substrate



● 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



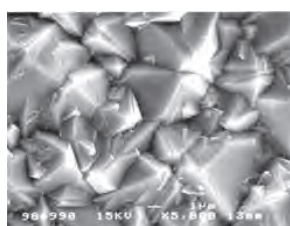
● AURORA Coat



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



AURORA Coat



Competitor's Diamond Coating

● SUMIDIA Coat



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



Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

Global Standard Solid Endmills GSX MILL Series

Endmills

I

Square

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Coated

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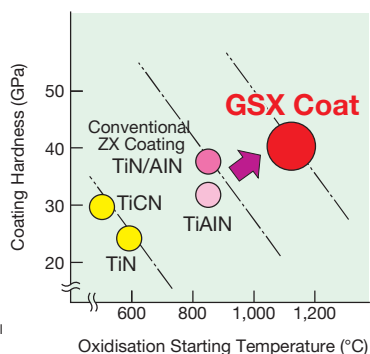
■ Features and Applications

- A wide selection from 3 types of cutting flute configuration and 4 cutting lengths to cover a wide range of applications.
- Micro-grain 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
- Cutting teeth with gash land improve corner cutting edge strength
- New lineup of radius types and 4D size S types

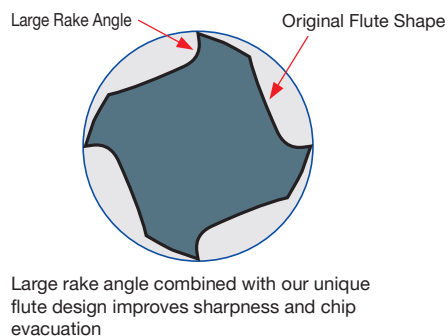
● Wear resistance



● Thermal resistance



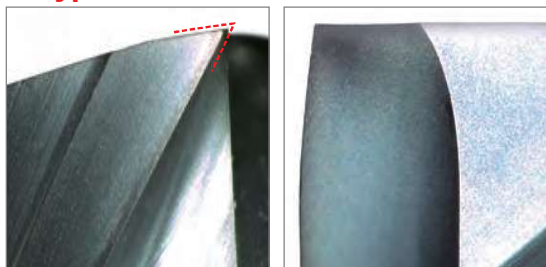
● Improved chip evacuation



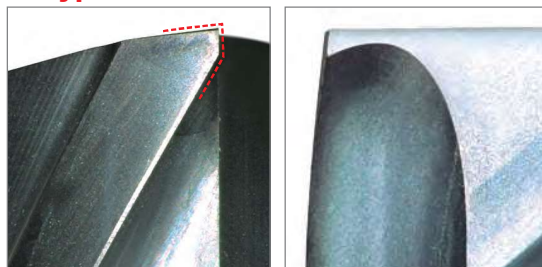
■ 2 cutting edge shapes, expanding machining applications

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

S Type Sharp Corner: Sharper Edge Design

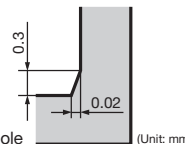


C Type Gash Land: Fracture-Resistant Design



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

Example: Corner on a $\phi 10\text{mm}$ hole



■ Part Material

◎: Great, ○: Suitable, Blank: Not recommended

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

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

■ Recommended Milling Examples

Application	Side Milling		Groove Milling		Groove Finishing	
Form						
	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing
S Type		◎		○ ^{*2}		◎
C Type	◎	○	◎	◎	◎	○

The S type is best for removing inside corners.

*2: Use with low depth of cut.

Global Standard Solid Endmills GSX MILL Series

■ Product Range

Applications	Number of Teeth	Cutting Edge Length					
		1.5D	2D		3D	4D	
		C Type	S Type	C Type	S Type	C Type	C Type
General-purpose	2 Flutes	GSX20000C-1.5D ø0.5 to ø25.0mm	GSX20000S-2D ø0.3 to ø25.0mm	GSX20000C-2D ø0.5 to ø25.0mm	GSX20000S-3D ø0.5 to ø25.0mm	GSX20000C-3D ø0.5 to ø25.0mm	GSX20000C-4D ø0.5 to ø25.0mm
	3 Flutes	GSX30000C-1.5D ø1.0 to ø12.0mm		GSX30000C-2D ø1.0 to ø20.0mm			
	4 Flutes	GSX40000C-1.5D ø1.0 to ø25.0mm	GSX40000S-2D ø1.0 to ø25.0mm	GSX40000C-2D ø1.0 to ø25.0mm	GSX40000S-3D ø1.0 to ø25.0mm	GSX40000C-3D ø1.0 to ø25.0mm	GSX40000C-4D ø1.0 to ø25.0mm
Multi-Purpose	3 Flutes	GSXSLT30000C-1.5D ø1.0 to ø12.0mm					
Radius	4 Flutes		GSX40000-R-2D ø3.0 to ø12.0mm				

■ High Precision

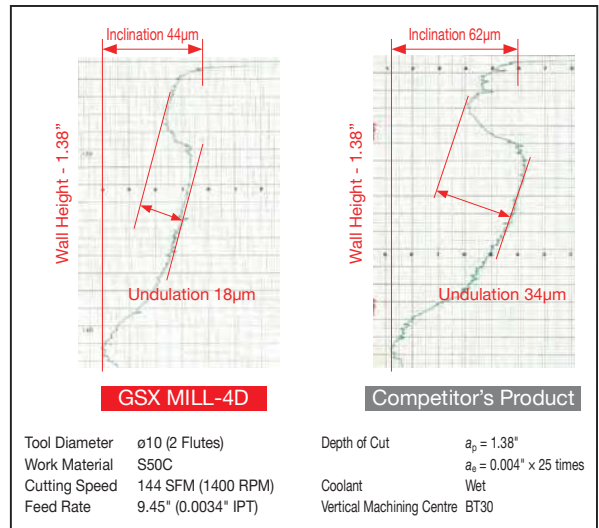
- Diametrical tolerance decreased to 2/3 of the previous type. Also features reduced variation and does not require tool diameter correction when replacing tools.

■ Multi-Purpose

- Optimized flute design of slotted 3 flute (short) type reduces cutting force.
 - (1) Allows drilling, slot milling and other continuous (compound) applications
 - (2) Perfect for use with thin sheets and small machining centers.



■ Long, High Rigidity Flutes (C Type)



■ Application Examples

• Carbon Steel Groove Milling with GSX20000C

Breakage

Gash land for stronger cutting edge.

Tool Diameter: ø6 (2 Flutes)
 Part Material: 1050 Steel
 Cutting Speed: 285 SFM (4,615 RPM)
 Feed Rate: 21.78" IPM (0.0024" IPT)
 Depth of Cut: $a_p = 0.118"$
 $a_e = 0.236"$
 Coolant: Dry
 Vertical Machining Centre: BT50

• Cast Iron Groove Milling with GSX20000C

Large amount of wear

GSX coat for improved wear resistance.

Tool Diameter: ø10 (2 Flutes)
 Part Material: Cast Iron - FCD600
 Cutting Speed: 217 SFM (2,100 RPM)
 Feed Rate: 11.89" IPM (0.0028" IPT)
 Depth of Cut: $a_p = 0.197" \times 5 \text{ times}$
 $a_e = 0.394"$
 Coolant: Dry
 Vertical Machining Centre: BT40

• Stainless Steel Machining with GSX20000C

Coating peel-off

Improved reliability even under wet machining.

Tool Diameter: ø10 (2 Flutes)
 Part Material: 304 Stainless
 Cutting Speed: 164 SFM (1,591 RPM)
 Feed Rate: 5.00" IPM (0.0016" IPT)
 Depth of Cut: $a_p = 0.394"$
 $a_e = 0.0197"$
 Coolant: Wet
 Vertical Machining Centre: BT50

• 1050 Steel Side Milling with GSX20000S

Chipping

The S type delivers optimum sharpness.

Tool Diameter: ø6 (2 Flutes)
 Part Material: 1050 Steel
 Cutting Speed: 285 SFM (4,615 RPM)
 Feed Rate: 21.8" IPM (0.0024" IPT)
 Depth of Cut: $a_p = 0.394"$
 $a_e = 0.012"$
 Coolant: Dry
 Vertical Machining Centre: BT50

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

Global Standard Solid Endmills GSX MILL Series

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated



Recommended Milling Examples

Application	Side Milling		Groove Milling		Groove Finishing	
	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing
GSXVL Type	⊙	○	⊙	⊙	⊙	○
GSV Type	⊙	⊙	○	⊙	⊙	○

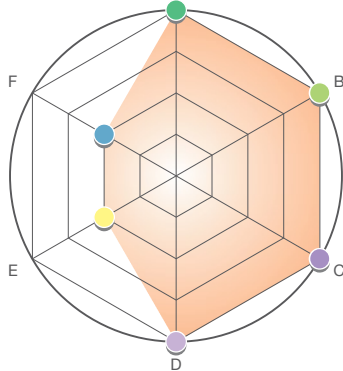
Diameter



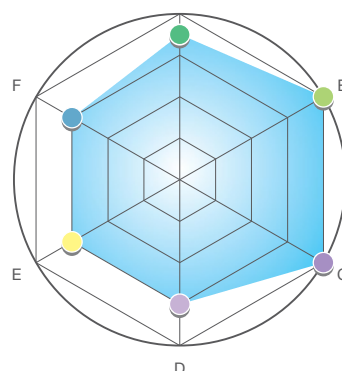
Differentiating GSXVL / GSV Type Use

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

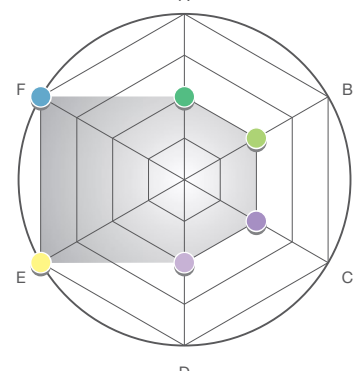
GSXVL Type Anti-Vibration High Load Milling



GSV Type Anti-Vibration/General-Purpose Simple Re-Grinding



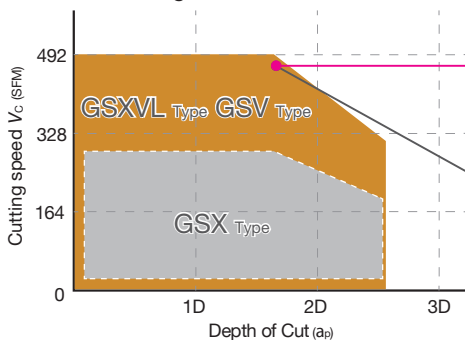
GSX Type General-purpose



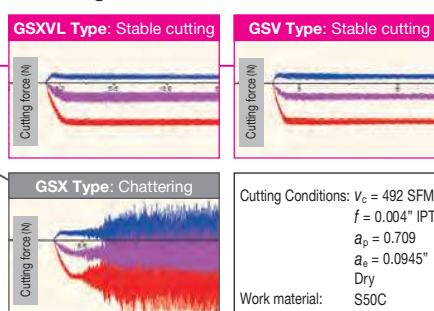
A Chatter Resistance (Groove Milling) **B** Chatter Resistance (Side Milling) **C** Cutting speed v_c **D** Depth of cut a_p **E** Squareness **F** Economy

Cutting Range

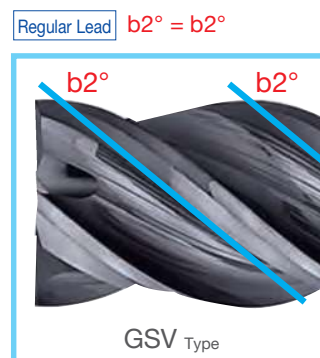
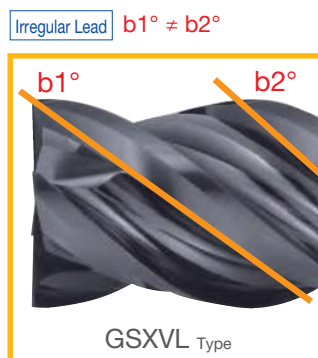
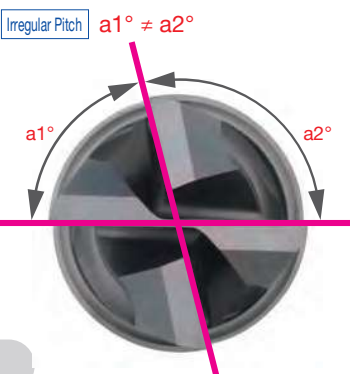
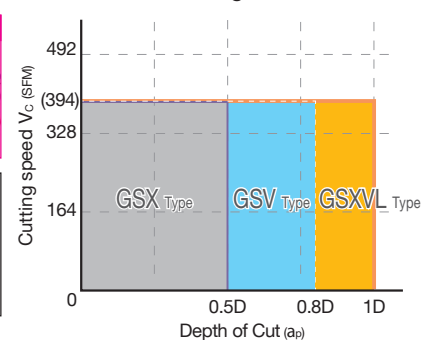
Side Milling



Cutting Force

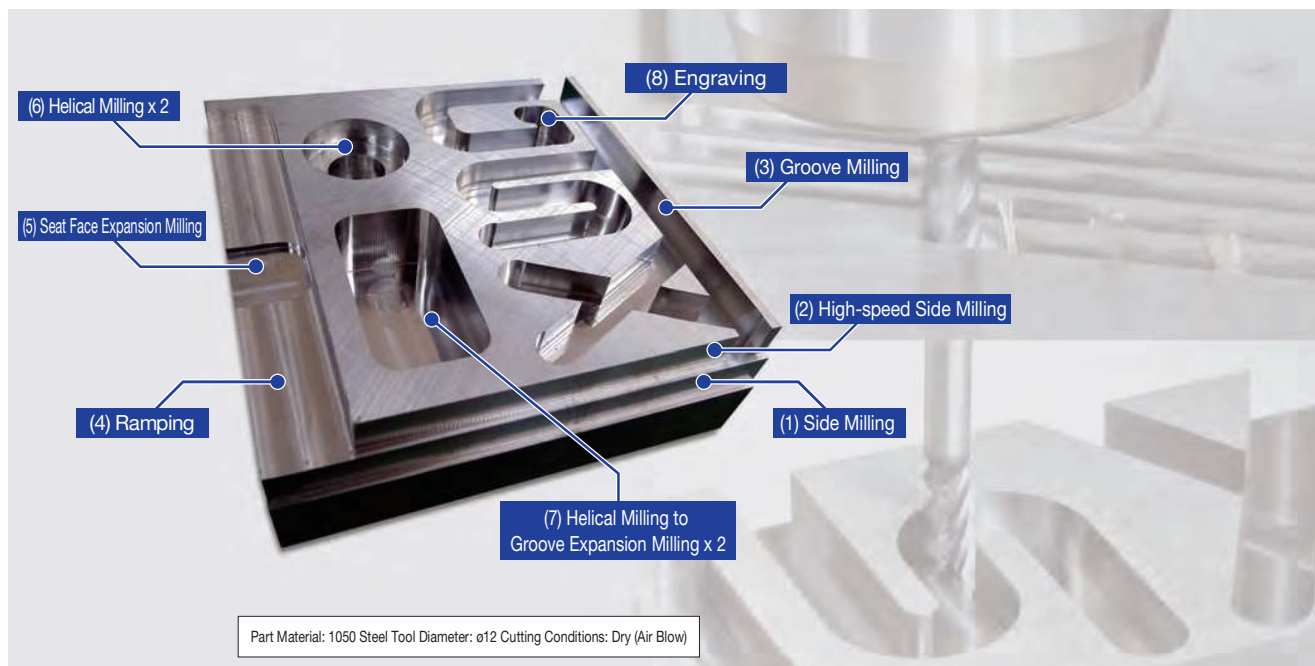


Groove Milling



Global Standard Solid Endmills GSX MILL Series

■ Application Examples



Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

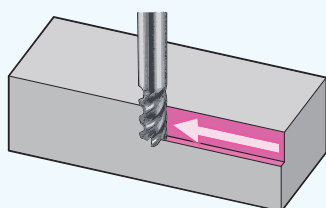
CFRP

Coated

Uncoated

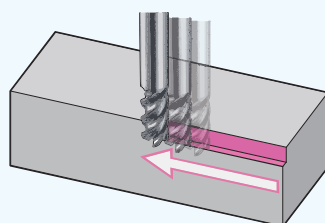
I17

(1) Side Milling GSXVL Type ○ / GSV Type ◎



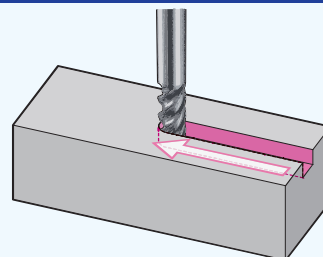
Cutting Conditions: $V_c = 335$ SFM ($n = 4,100$ RPM) Tool Diameter: $\phi 8$
 $V_f = 42.52$ " IPM (0.004" IPT)
 $a_p = 0.945$ ", $a_e = 0.787$ "

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



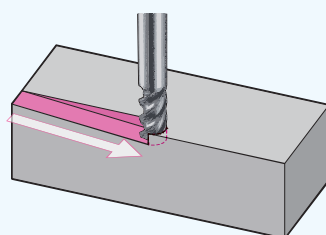
Cutting Conditions: $V_c = 945$ SFM ($n = 4,000$ RPM) Tool Diameter: $\phi 12$
 $V_f = 189$ " IPM (0.012" IPT)
 $a_p = 0.472$ ", $a_e = 0.787$ "

(3) Groove Milling GSXVL Type ◎ / GSV Type ○



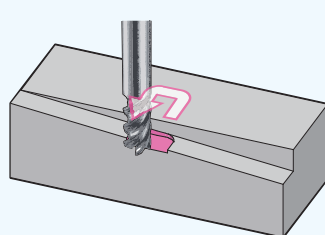
Cutting Conditions: $V_c = 295$ SFM ($n = 2,400$ RPM) Tool Diameter: $\phi 12$
 $V_f = 37.80$ " IPM (0.004" IPT)
 $a_p = 0.472$ "

(4) Ramping GSXVL Type ◎ / GSV Type ○



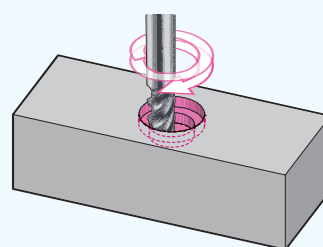
Cutting Conditions: $V_c = 295$ SFM ($n = 2,400$ RPM) Tool Diameter: $\phi 12$
 $V_f = 18.90$ " IPM (0.002" IPT)
 Ramp Angle 5°

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



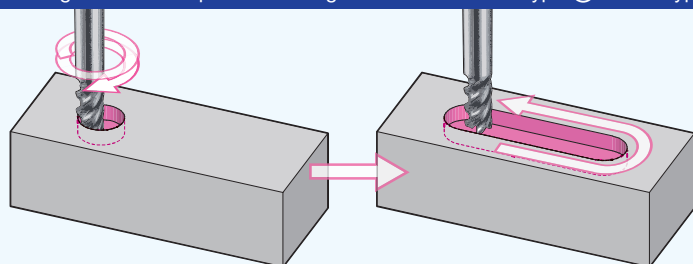
Cutting Conditions: $V_c = 295$ SFM ($n = 2,400$ RPM) Tool Diameter: $\phi 12$
 $V_f = 37.80$ " IPM (0.004" IPT)

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



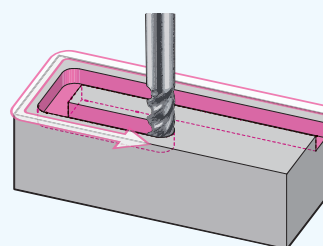
Cutting Conditions: $V_c = 295$ SFM ($n = 2,400$ RPM) Tool Diameter: $\phi 12$
 $V_f = 18.90$ " IPM (0.002" IPT)
 Ramp Angle 3°

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



Cutting Conditions: $V_c = 295$ SFM ($n = 2,400$ RPM) Tool Diameter: $\phi 12$
 [Helical] $V_f = 18.90$ " IPM (0.002" IPT) [Groove Expansion] $V_f = 26.46$ " IPM (0.0028" IPT) [Finishing] $V_f = 75.59$ " IPM (0.0079" IPT)
 Ramp Angle 3°
 $a_p = 0.945$ ", $a_e = 0.004$ "

(8) Engraving GSXVL Type ◎ / GSV Type ○



Cutting Conditions: $V_c = 259$ SFM ($n = 2,100$ RPM¹) Tool Diameter: $\phi 12$
 $V_f = 23.19$ " IPM (0.0028" IPT)
 $a_p = 0.472$ "

Global Standard Solid Endmills GSX MILL Series

Endmills

I

Square

Radius

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Coated

Uncoated

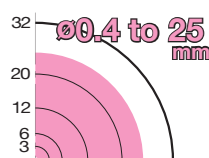
Ballnose Type



Recommended Milling Examples

Application	Radius Milling		Profiling		Pocketing	
Ballnose Type						

Diameter



2 Flutes

1.5D

GSX Coat

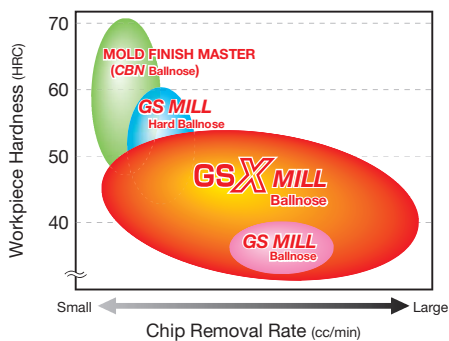
Ballnose R

30° Helix Angle

Improved Thermal Resistance and Wear Resistance

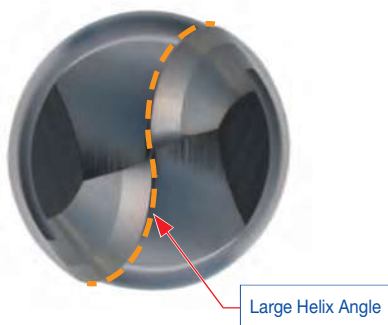
New coating combined with an ultra-fine grain carbide substrate for better thermal and wear resistance.

Application Range



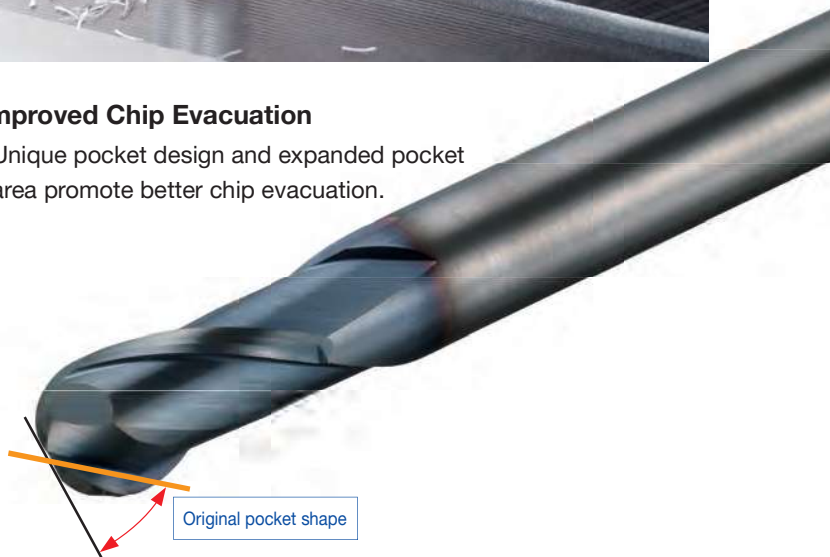
Reduced Cutting Force

Large helix angle on curved cutting edge reduces cutting force

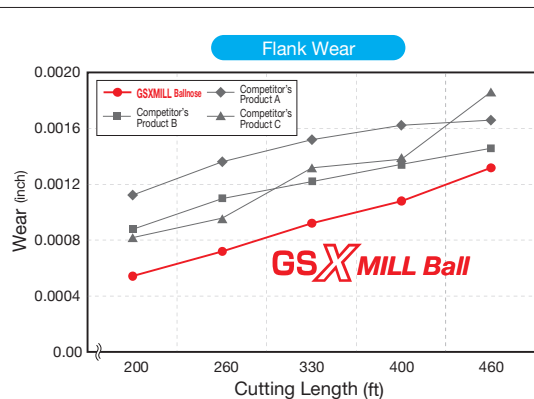


Improved Chip Evacuation

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



Application Examples



GSX Ballnose (Cutting Length 459 ft)



Able to Continue

Conventional Tool (Cutting Length 262 ft)



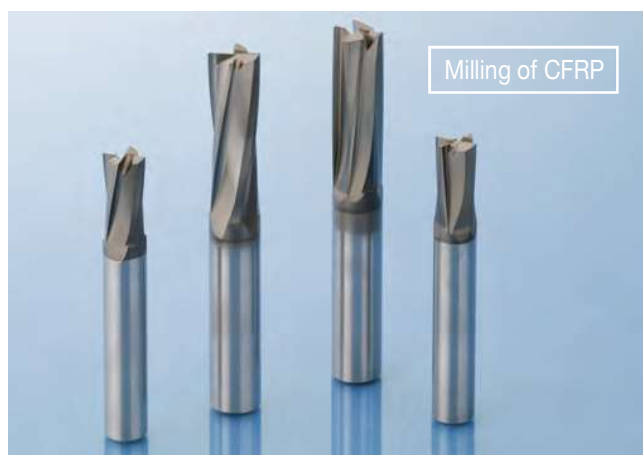
Unable to Continue

Part Material: H13 Tool Steel (50HRC)

Tool Diameter: R3 (2 Flutes)

Cutting Conditions: $V_c = 587$ SFM ($n = 9,500$ RPM), $v_f = 88.58$ IPM ($f_z = 0.0047$ IPT)
 $a_p = 0.0787'' - 0.0393''$, $p_t = 0.0118$ Wet

Equipment: Vertical Machining Center BT40



I89

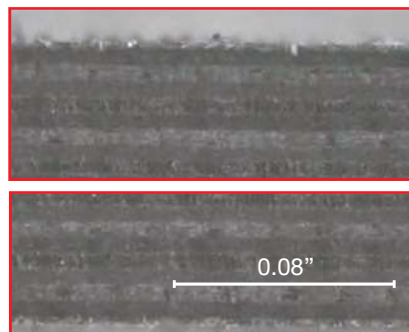
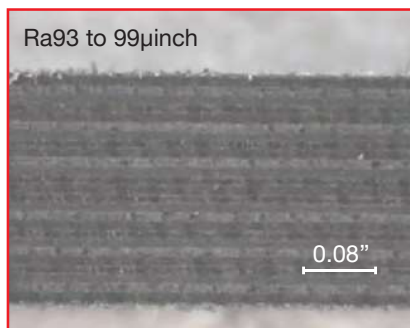
Product Range

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

Performance

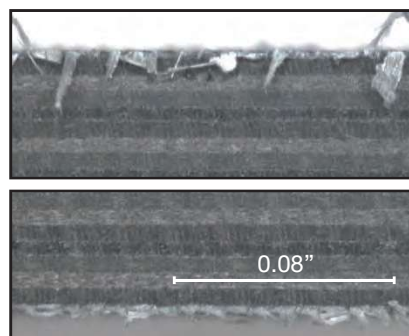
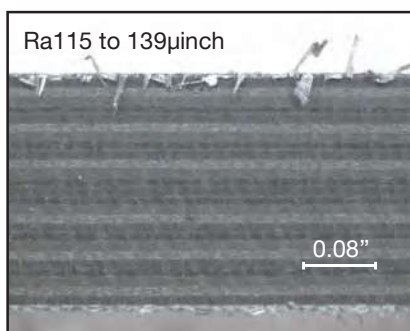
- Surface Finish Comparison

SSDC Type



Work Material: CFRP
 Tool Diameter: ø10 (4 Flutes)
 Cutting Conditions: $v_c = 1,030$ SFM
 $(n = 10,000 \text{ RPM})$
 $v_f = 39.37$ "
 $(f_z = 0.001$ " IPT)
 Dry

Competitor's Product



Results

SSDC Type

High surface quality with no burrs

Competitor's Product

Burrs are formed. Low surface quality

Features and Applications

- Two different types of flute shapes are available.

SSDC Type (Right-hand Helix Type)

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



SSDCRL Type (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.



Radius Endmill for Exotic Alloys SSEH Type Series

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated



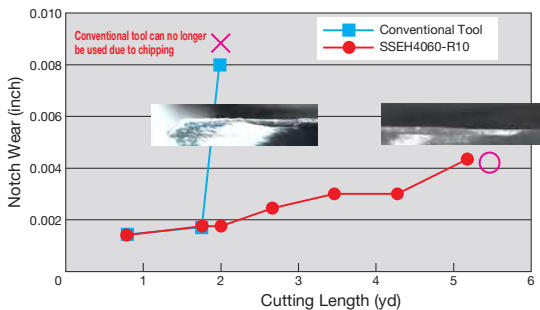
SSEH Type Radius

■ Features and Applications

- Steep 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: $\phi 6 \times R1$

Cutting Conditions: $v_c = 66$ SFM, $f_z = 0.001$ " IPT,
 $a_p = 0.197$ ", $a_e = 0.0197$ " Wet

● Inconel 713 (Side Milling)



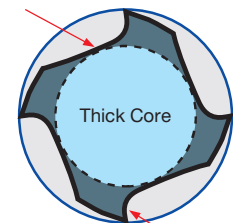
Tool Diameter: $\phi 10 \times R1$ Number of Workpieces: 150pcs/unit

Cutting Conditions: $v_c = 105$ SFM, $f_z = 0.0007$ " IPT,
 $a_p = 0.787$ ", $a_e = 0.0315$ " Dry

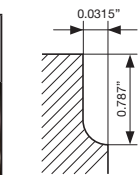
Unique, smooth radius design



Original wide arc flute



Semi-mirrored Rake Face



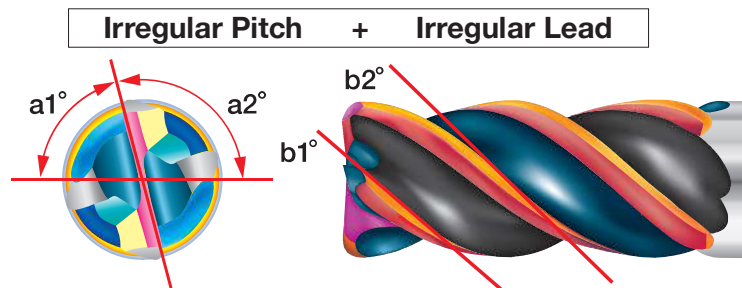
In Sumitomo Electric Hardmetal tests, the special coating with excellent adhesion resistance provided less cutting edge adhesion than the competitor's product and enabled fracture-free machining. The competitor's product suffered from edge adhesion leading to breakage.



SSEH Radius 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 Stainless Steel, Inconel and titanium.
- Reduces chattering for high-speed, high-feed cutting.
- Both coated and uncoated types are in stock to meet various conditions.



■ Application Examples

• Corner Finishing for Titanium Alloy

	SSEH Radius Anti-Vibration Endmill SSEHVL 4120W-30	No Anti-Vibration Mechanism Endmill ø12 × R3.0
Machined Surface	 No chattering	 Chattering occurs
Vibration Data	 Stable cutting	 Increases chattering at entry point corner
Tool Breakage	 No breakage	 Chipping caused by chattering
Cutting Conditions: $v_c = 139$ SFM ($n = 1,125$ RPM) $v_f = 7.87$ " IPM ($f_z = 0.0017$ " IPT) $a_p = 0.197$ ", $a_e = 0.472$ " Wet		

DLC (Diamond-like Carbon) Coating Endmill Series AURORA Coat Endmills

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated



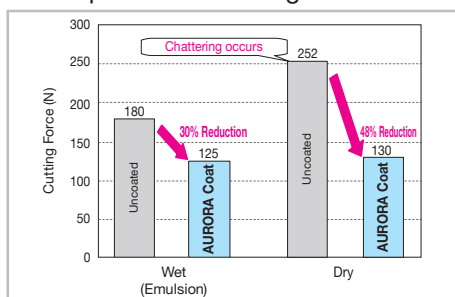
For Copper Electrodes

■ Features and Applications

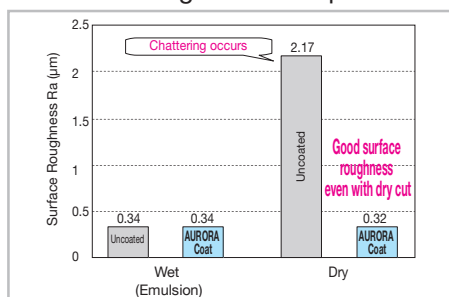
- Very smooth AURORA Coat results in low adhesion as well as a good surface finish
- With lower cutting forces and high rigidity, this series is suitable for low rigidity machines
- Available in 2- and 4-flute square type as well as ballnose type endmills
- Added R0.05 to R2.00mm long neck ballnose endmills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

■ Performance

• Comparison of Cutting Force



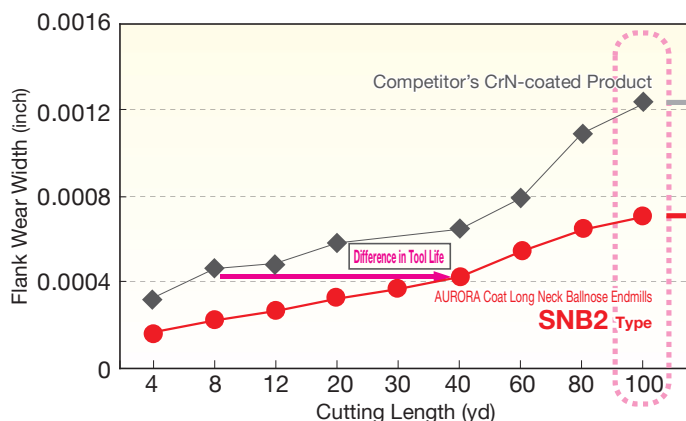
• Surface Roughness Comparison



Work Material: A5052
Tool: ASM4100DL
ø10 (4 Flutes)
Cutting Conditions:
 $v_c = 656$ SFM
 $n = 6,300$ RPM
 $f_z = 0.002$ " IPT
 $v_f = 51.2$ " IPM
 $a_p = 0.40$ "
 $a_e = 0.04$ "
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 structure
- Tool Wear Comparison



Tool	Cutting Length 100m	Cutting Conditions
Competitor's CrN-coated Product		Work Material: Tough-Pitch Copper Tool: R0.3mm Ballnose Endmill Cutting Conditions: $v_c = 187$ SFM $n = 30,000$ RPM $a_p = 0.0014$ " $a_e = 0.0012$ " Oil Mist
SNB2 Type		

For Copper Electrodes

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

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

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

SUMIDIA Binderless Radius Endmills

NPDRS Type

I102



SUMIDIA Binderless Ballnose Endmills

NPDBS Type/**NPDB** Type

I112, I113



SUMIDIA Coat Ballnose Endmills

SDCB Type

I114



For Finishing of Cemented Carbide and Hard Brittle Material

- Adopts nano-polycrystalline diamond for the cutting edge, with higher hardness than single-crystal diamond
- This 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. Provides high-precision machining and long tool life
- Standard finish NPDBS type dramatically reduces machining cost
- Precision finish NPDB type is polish-less to prevent shape deformation

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

- Provides high efficiency rough/medium finishing of carbide molds
- Newly developed diamond coating exhibits stable tool life
- PCD - SUMIDIA Binderless Endmill combination provides the highest-level machining precision

CBN - SUMIBORON Radius Endmills

BNBR Type



CBN - SUMIBORON Ballnose Endmills

BNBP Type



CBN - SUMIBORON Ballnose Endmills

BNBC Type



For Hardened Steel

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
- Cutting edge design suited to profiling and face milling, plus an extensive selection of grades allows a wide range of machining applications

For Copper Electrodes

- Ballnose radii of R0.1mm to R0.5mm are covered by this series
- Adoption of grade with high CBN content provides excellent edge-sharpness performance and wear resistance
- Achieves high quality milling with high precision cutting edge

MOLD FINISH MASTER

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

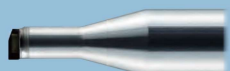
Coated

Uncoated



SUMIDIA Binderless Radius Endmills

NPDRS Type

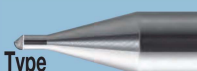


Hard Brittle Material



SUMIDIA Binderless Ballnose Endmills

NPDBS Type/**NPDB** Type



Hard Brittle Material

General Features

SUMIDIA Binderless is polycrystalline diamond that directly binds nano-order diamond particles with high strength without using any binders. Harder than single-crystal diamond, it has no cleavability, enabling machining of hard brittle material 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



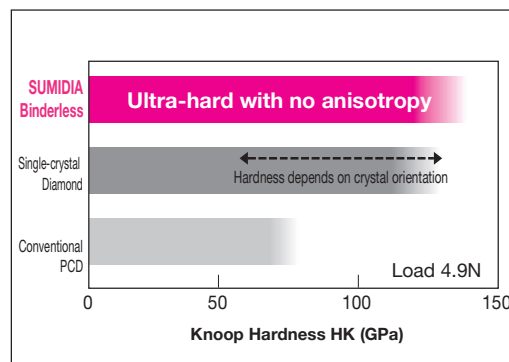
Part Material: Cemented Carbide AF1 (Ultra-Fine Grained Carbide)
Machining Details: 0.40" x 0.40" x depth 0.08"
Tool: NPDRS 1100R005-030
Cutting Conditions: $n = 40,000$ RPM, $v_f = 7.87$ " IPM
 $p_f = 0.0002$ ", Oil Mist
Surface Roughness: Ra 0.015 μ m
Cutting Time: 2 Hours

Application to Medical Use (μ -TAS Mold)

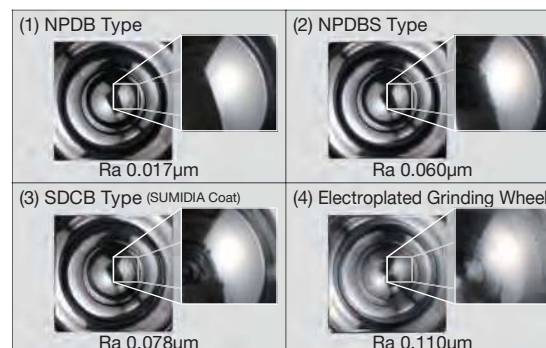


Part Material: Cemented Carbide AF1 (Ultra-Fine Grained Carbide)
Tool: NPDB 1030-010 (R0.3)
Cutting Conditions: $n = 38,000$ RPM, $v_f = 3.74$ " IPM
 $p_f = 0.00004$ ", Wet (Oil-based)
Machining Allowance: 0.00012"
Surface Roughness: Ra 0.016 to 0.020 μ m
Cutting Distance: 9 yds
Cutting Time: Finishing 1 Hour 28 Minutes

Hardness



Hemispherical Surface Milling



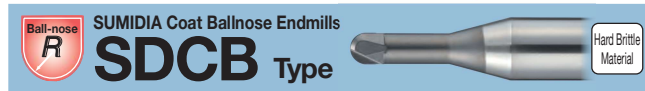
Part Material: Cemented Carbide AF1 (Ultra-Fine Grained Carbide)
Machining Details: $\phi 6$ (Hemispherical Surface Milling)
Tool: (1) NPDB 1050-020
(2) NPDBS 1050-020
(3) SDCB 2R050-020
(4) R0.5, #400
Cutting Conditions: $n = 40,000$ RPM, $v_f = 4.72$ " IPM
 $p_f = 0.0002$ ", Oil Mist
Cutting Time: 1 Hour 30 Minutes

Application to Optical Use (Fly-Eye Lens Mold)



Part Material: Cemented Carbide AF1 (Ultra-Fine Grained Carbide)
Tool: Finishing NPDB 1050-020 (R0.5)
Roughing Diamond Coated Endmill (R0.5)
Cutting Conditions: $n = 60,000$ RPM, $v_f = 11.8$ " IPM
 $p_f = 0.0002$ ", Oil Mist
Surface Roughness: Ra 0.015 μ m
Cutting Time: Finishing 2 Hour 40 Minutes
Roughing 55 Minutes

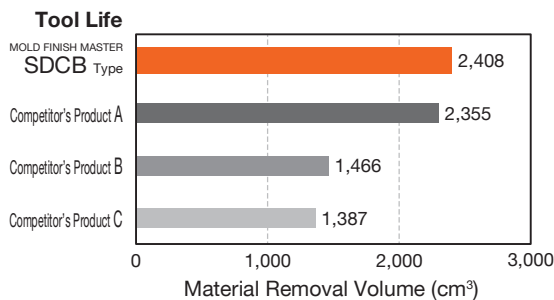
MOLD FINISH MASTER



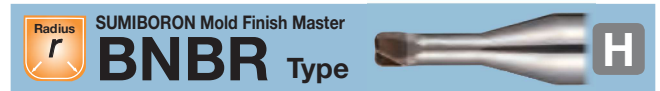
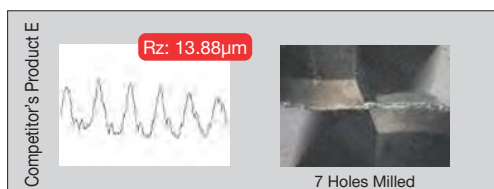
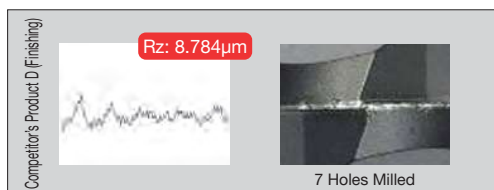
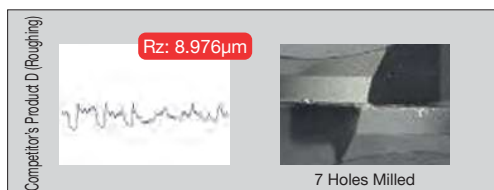
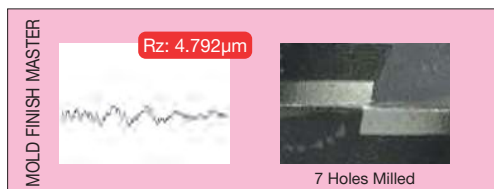
- Produces high efficiency roughing/medium finishing of carbide molds
- Newly developed diamond coating exhibits stable tool life
- SUMIDIA Binderless Endmill combination provides the highest-level machining precision
- $\phi 10\text{mm}$ hemispherical machining



Part Material: Cemented Carbide AF1 (Ultra-Fine Grained Carbide)
 Tool: SDCB 2R100-060
 Cutting Conditions: $n = 30,000\text{ RPM}$, $v_f = 11.8''\text{ IPM}$
 $a_p = 0.012''$, $a_p = 0.004''$, Air Blow

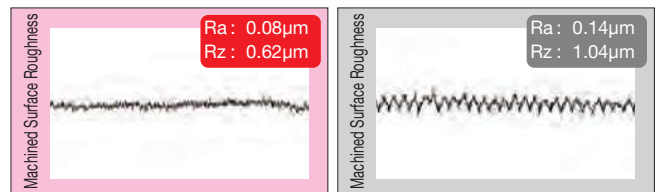


- $\phi 2.0$ (R1.0) number of workpieces and tool damage (Delamination)



- Improved machined surface quality through use of a wiper edge (available on $\phi 1.0\text{mm}$ drills and larger).

Machined Surface Comparison

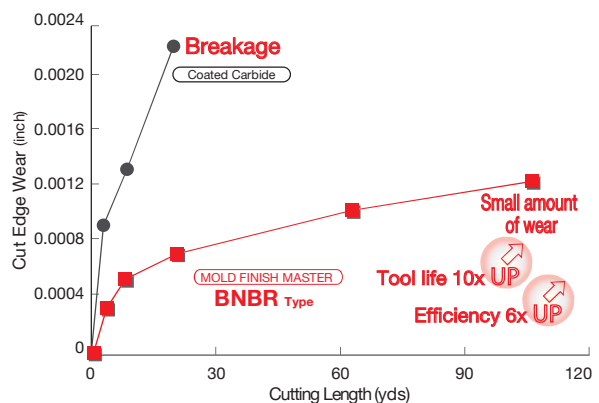


- Combination of CBN SUMIBORON BNX20 with excellent wear resistance and optimal cutting edge design provides longer tool life.

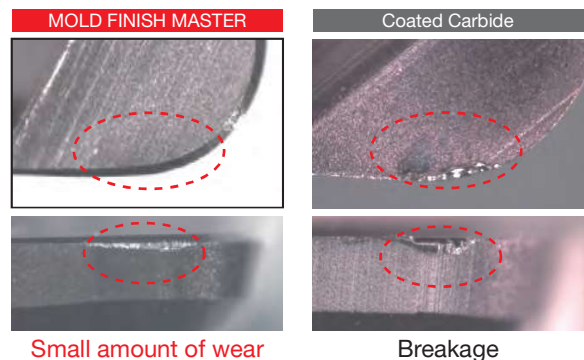


Part Material: STAVAX(52HRC)
 Tool: BNBR 2D200R050-0604 ($\phi 2 \times r 0.5$)
 Cutting Conditions: $n = 20,000\text{ RPM}$, $v_f = 15.75''\text{ IPM}$
 $a_p = 0.0012''$, $p_t = 0.0276''$ Oil Mist

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



Tool Wear Comparison



Work Material: STAVAX(52HRC)
 Tool: BNBR 2D200R050-0604 ($\phi 2 \times r 0.5$)
MOLD FINISH MASTER
 Cutting Conditions: $n = 20,000\text{ RPM}$, $v_f = 31.5''\text{ IPM}$
 $a_p = 0.0012''$, $p_t = 0.0276''$ Oil Mist
Coated Carbide
 Cutting Conditions: $n = 4,800\text{ RPM}$, $v_f = 4.72''\text{ IPM}$
 $a_p = 0.0012''$, $p_t = 0.0276''$ Oil Mist

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

MOLD FINISH MASTER

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

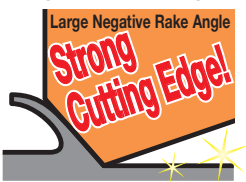
CFRP

Coated

Uncoated

SUMIBORON Mold Finish Master BNBP Type

- Achieves high precision machining with precise ball radius of $\pm 0.005\text{mm}$.
- Combination of SUMIBORON BN350 with excellent fracture resistance and cutting edge designed with negative rake angle provides stable, interrupted cutting.



- Strong cutting edge enables use in roughing applications

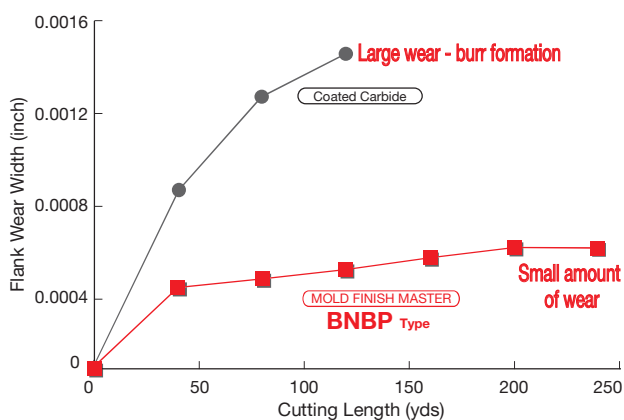


No fracture

Breakage on central edge

Work Material: STAVAX(52HRC)
Tool: BNBP 2R100-0554 (R1.0)
Cutting Conditions: $n = 25,000\text{ RPM}$, $v_f = 59\text{ IPM}$
 $a_p = 0.004\text{''}$, $p_f = 0.008\text{''}$ Oil Mist

- Excellent wear resistance and machined surface quality



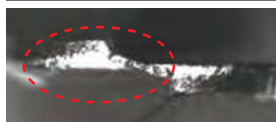
Tool Wear Comparison

MOLD FINISH MASTER (6 passes)



Small amount of wear

Coated Carbide (2 passes)



Large amount of wear



Good machined surface



Burr formation

Work Material: STAVAX(52HRC)
Tool: BNBP 2R030-0154 (R0.3)
Cutting Conditions: $n = 25,000\text{ RPM}$, $v_f = 59\text{ IPM}$
 $a_p = 0.002\text{''}$, $p_f = 0.004\text{''}$ Oil Mist

SUMIBORON Mold Finish Master BNBC Type

For Copper Electrodes

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



- Achieves further improved tool life

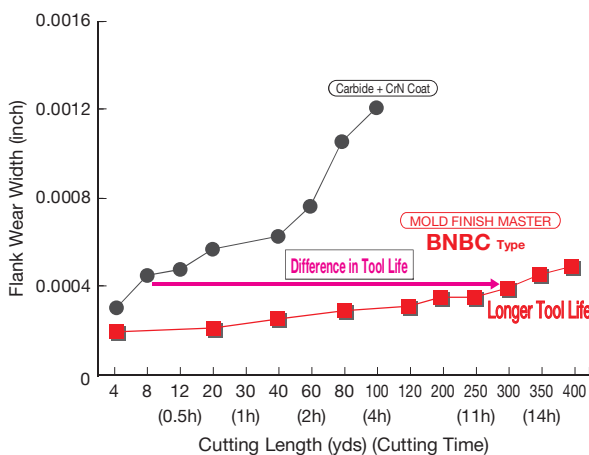


Low Wear (Cutting Length 15.75")

High Wear (Cutting Length 3.94")

Work Material: Tough-Pitch Copper (Side Milling)
Tool: BNBC 2R030-0304 (R0.3)
Cutting Conditions: $n = 30,000\text{ RPM}$, $v_f = 27.56\text{ IPM}$
 $a_p = 0.014\text{''}$, $a_e = 0.0012\text{''}$ Oil Mist

- Adoption of material with high CBN content provides excellent edge-sharpness performance and wear resistance.



Tool Wear Comparison

MOLD FINISH MASTER

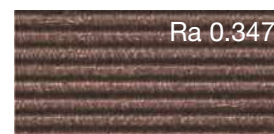


Microwear, can still be used

Competitor's Carbide + CrN-Coated Product



Large amount of wear



Good cutter mark surface on BNBC Type



Work Material: Tough-Pitch Copper
Tool: BNBC 2R030-0304 (R0.3)
Cutting Conditions: $v_c = 187\text{ SFM}$, $n = 30,000\text{ RPM}$
 $f_z = 0.0003\text{'' IPT}$, $v_f = 15.75\text{ IPM}$
 $a_p = 0.0002\text{''}$, $a_e = 0.002\text{''}$ Oil Mist

GSX MILL Ballnose Endmills

GSXB INCH 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

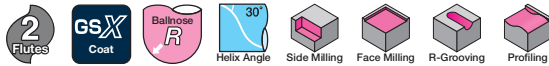


Fig 1

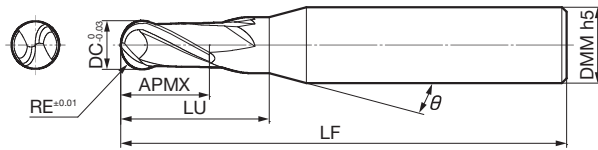
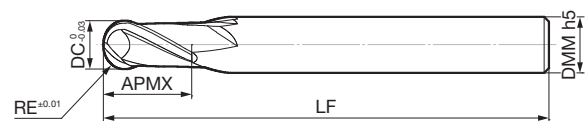


Fig 2



DC	theta
< ø2	10°
ø2 or more	15°

Body

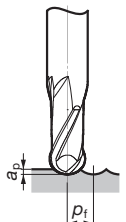
Dimensions (inch)

Cat. No.	Stock	Radius RE	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSXB204	•	0.0313	0.0625	0.0938	0.1331	2.000	0.1250	1
GSXB206	•	0.0469	0.0938	0.1406	0.1800	2.500	0.1250	1
GSXB208	•	0.0625	0.1250	0.1875	-	2.500	0.1250	2
GSXB210	•	0.0781	0.1563	0.2344	0.2934	3.000	0.1875	1
GSXB212	•	0.0938	0.1875	0.2813	-	3.000	0.1875	2
GSXB214	•	0.1094	0.2188	0.3282	0.407	3.000	0.2500	1
GSXB216	•	0.1250	0.2500	0.3750	-	3.000	0.2500	2
GSXB218	•	0.1407	0.2813	0.4220	0.501	3.500	0.3125	1
GSXB220	•	0.1563	0.3125	0.4688	-	3.500	0.3125	2
GSXB224	•	0.1875	0.3750	0.5625	-	4.000	0.3750	2
GSXB228	•	0.2188	0.4375	0.6563	-	4.000	0.4375	2
GSXB232	•	0.2500	0.5000	0.7500	-	4.500	0.5000	2
GSXB236	•	0.2813	0.5625	0.8438	-	4.500	0.5625	2
GSXB240	•	0.3125	0.6250	0.9375	-	5.500	0.6250	2
GSXB244	•	0.3438	0.6875	1.0313	-	5.500	0.6875	2
GSXB248	•	0.3750	0.7500	1.1250	-	6.000	0.7500	2
GSXB256	•	0.4375	0.8750	1.3125	-	6.500	0.8750	2
GSXB264	•	0.5000	1.0000	1.5000	-	7.000	1.0000	2

Grade: ACB20

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	Carbon Steel / Alloy Steel (Below 25HRC)		Carbon Steel / Alloy Steel (Below 50HRC)		Cast Iron Special Cast Iron		Stainless Steel Titanium Alloy	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
RE (inch)								
0.0313	50,000	2,100	35,000	1,150	50,000	2,100	50,000	1,750
0.0469	50,000	2,500	35,000	1,350	50,000	2,500	50,000	2,100
0.0625	50,000	3,000	35,000	1,600	50,000	3,000	50,000	2,500
0.0781	35,000	3,000	24,000	1,650	35,000	3,200	34,000	2,500
0.0938	27,500	3,000	19,000	1,700	35,000	3,900	26,000	2,500
0.1094	22,500	3,000	15,500	1,700	28,000	3,900	21,000	2,500
0.1250	19,000	3,000	13,000	1,700	24,000	3,900	17,500	2,500
0.1407	17,000	3,800	12,000	2,100	20,000	4,100	15,000	2,700
0.1563	15,500	4,300	11,000	2,200	18,000	4,600	12,000	2,500
0.1875	14,000	4,700	10,500	2,500	16,500	5,300	10,500	2,500
0.2188	12,500	4,200	9,000	2,100	14,000	4,500	9,000	2,200
0.2500	11,000	3,500	7,900	1,900	12,500	4,000	7,800	1,900
0.2813	9,000	2,800	6,300	1,500	10,500	3,300	6,300	1,500
0.3125	7,500	2,400	5,200	1,250	8,700	2,800	5,200	1,250
0.3438	6,400	2,100	4,500	1,100	7,400	2,400	4,500	1,100
0.3750	5,600	1,800	3,900	950	6,500	2,100	3,900	950
0.4375	5,000	1,600	3,500	850	5,800	1,900	3,500	850
0.5000	4,500	1,450	3,100	750	5,200	1,700	3,150	750
Standard	a _p	0.02DC	0.02DC	0.02DC	0.02DC	0.02DC	0.02DC	0.02DC
Depth of Cut	p _t	0.05DC	0.05DC	0.05DC	0.05DC	0.05DC	0.05DC	0.05DC

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL Endmills (2 Flutes) GSX 200C-1.5D INCH Type

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



GSX INCH PRODUCTS ARE MADE TO ORDER

Fig 1

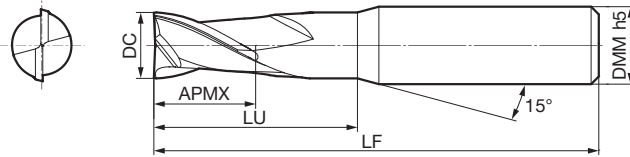
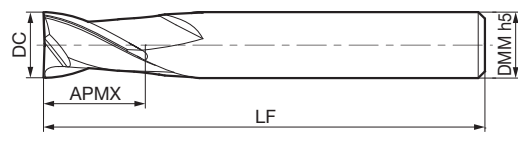


Fig 2



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

Body GSX Inch - Made to Order

Dimensions (inch)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX204C-1.5D		0.0625	0.0938	0.1331	1.500	0.1250	1
GSX206C-1.5D		0.0938	0.1406	0.1800	1.500	0.1250	1
GSX208C-1.5D		0.1250	0.1875	-	2.000	0.1250	2
GSX210C-1.5D		0.1563	0.2344	0.2934	2.000	0.1875	1
GSX212C-1.5D		0.1875	0.2813	-	2.000	0.1875	2
GSX214C-1.5D		0.2188	0.3282	0.407	2.000	0.2500	1
GSX216C-1.5D		0.2500	0.3750	-	2.000	0.2500	2
GSX218C-1.5D		0.2813	0.4219	0.501	2.500	0.3125	1
GSX220C-1.5D		0.3125	0.4688	-	2.500	0.3125	2
GSX224C-1.5D		0.3750	0.5625	-	3.000	0.3750	2
GSX228C-1.5D		0.4375	0.6563	-	3.000	0.4375	2
GSX232C-1.5D		0.5000	0.7500	-	3.000	0.5000	2
GSX236C-1.5D		0.5625	0.8438	-	3.500	0.5625	2
GSX240C-1.5D		0.6250	0.9375	-	3.500	0.6250	2
GSX244C-1.5D		0.6875	1.0313	-	4.000	0.6875	2
GSX248C-1.5D		0.7500	1.1250	-	4.000	0.7500	2
GSX256C-1.5D		0.8750	1.3125	-	4.000	0.8750	2
GSX264C-1.5D		1.0000	1.5000	-	4.000	1.0000	2

Grade: ACF20

Recommended Cutting Conditions

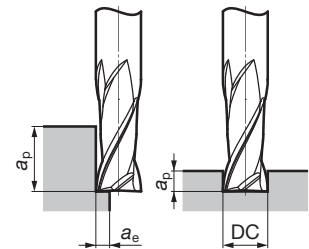
- For stable machining performance use rigid, high-precision machines and holders.
- Use air blow when dry machining.
- Use wet machining for stainless steel, heat-resistant alloy, and titanium alloy applications.
- If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.

Side Milling

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (inch)																
< 0.039	19,600	250	19,600	250	19,600	250	18,300	180	12,700	100	9,000	60	11,000	70	9,000	50
< 0.078	11,200	340	11,200	340	11,200	340	10,500	240	7,300	130	5,300	80	6,400	90	5,300	70
< 0.156	6,400	460	6,400	460	6,400	460	6,000	320	4,200	180	3,000	110	3,600	120	3,000	90
< 0.236	4,600	560	4,600	560	4,600	560	4,300	400	3,000	210	2,200	130	2,700	140	2,200	100
< 0.315	3,400	560	3,400	560	3,400	560	3,200	400	2,200	210	1,600	130	2,000	140	1,600	100
< 0.393	2,800	560	2,800	560	2,800	560	2,600	400	1,800	210	1,300	130	1,600	140	1,300	100
< 0.472	2,300	560	2,300	560	2,300	560	2,200	400	1,500	210	1,100	130	1,300	140	1,100	100
< 0.630	1,700	450	1,700	450	1,700	450	1,600	320	1,100	180	800	100	1,000	110	800	85
< 0.787	1,350	380	1,350	380	1,350	380	1,300	280	900	160	650	90	800	100	650	75
< 1.000	1,080	300	1,080	300	1,080	300	1,040	220	720	130	520	70	640	80	520	60
Standard	1.5DC															
Depth of Cut	0.05DC															
a _p	1.0DC															
a _e	0.02DC															

Groove Milling

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (inch)																
< 0.039	19,600	200	19,600	250	19,600	250	18,300	180	12,700	100	9,000	60	11,000	50	4,500	20
< 0.078	11,200	270	11,200	340	11,200	340	10,500	240	7,300	130	5,300	80	6,400	65	2,650	25
< 0.156	6,400	370	6,400	460	6,400	460	6,000	320	4,200	180	3,000	110	3,600	80	1,500	35
< 0.236	4,600	450	4,600	560	4,600	560	4,300	400	3,000	210	2,200	130	2,700	100	1,100	40
< 0.315	3,400	450	3,400	560	3,400	560	3,200	400	2,200	210	1,600	130	2,000	100	800	40
< 0.393	2,800	450	2,800	560	2,800	560	2,600	400	1,800	210	1,300	130	1,600	100	650	40
< 0.472	2,300	450	2,300	560	2,300	560	2,200	400	1,500	210	1,100	130	1,300	100	500	40
< 0.630	1,700	360	1,700	450	1,700	450	1,600	320	1,100	180	800	100	1,000	80	400	35
< 0.787	1,350	300	1,350	380	1,350	380	1,300	280	900	160	650	90	800	70	320	30
< 1.000	1,080	240	1,080	304	1,080	304	1,040	224	720	128	520	72	640	56	256	24
Standard	0.2DC															
Depth of Cut	0.5DC															
a _p	0.2DC															
a _e	0.05DC															
a _r	0.2DC															



GSX MILL Endmills (2 Flutes) GSX 200C-2D INCH 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 T Alloy / Heat Resistant Alloy Cast Iron



**GSX INCH PRODUCTS
ARE MADE TO ORDER**

Fig 1

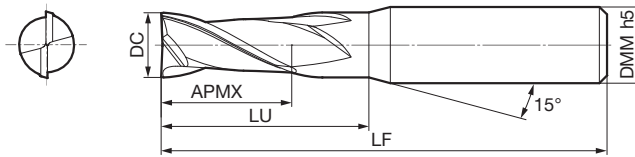
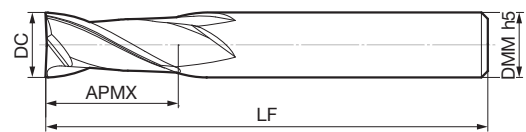


Fig 2



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

Body

GSX Inch - Made to Order

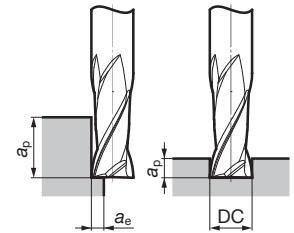
Dimensions (inch)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX204C-2D		0.0625	0.1250	0.1644	1.500	0.1250	1
GSX206C-2D		0.0938	0.1875	0.2269	1.500	0.1250	1
GSX208C-2D		0.1250	0.2500	-	2.000	0.1250	2
GSX210C-2D		0.1563	0.3125	0.3716	2.000	0.1875	1
GSX212C-2D		0.1875	0.3750	-	2.000	0.1875	1
GSX214C-2D		0.2188	0.4376	0.516	2.000	0.2500	1
GSX216C-2D		0.2500	0.5000	-	2.000	0.2500	2
GSX218C-2D		0.2813	0.5626	0.641	2.500	0.3125	1
GSX220C-2D		0.3125	0.6250	-	2.500	0.3125	2
GSX224C-2D		0.3750	0.7500	-	3.000	0.3750	2
GSX228C-2D		0.4375	0.8750	-	3.000	0.4375	2
GSX232C-2D		0.5000	1.0000	-	3.000	0.5000	2
GSX236C-2D		0.5625	1.1250	-	3.500	0.5625	2
GSX240C-2D		0.6250	1.2500	-	3.500	0.6250	2
GSX244C-2D		0.6875	1.3750	-	4.000	0.6875	2
GSX248C-2D		0.7500	1.5000	-	4.000	0.7500	2
GSX256C-2D		0.8750	1.7500	-	4.000	0.8750	2
GSX264C-2D		1.0000	2.0000	-	4.000	1.0000	2

Grade: ACF20

Recommended Cutting Conditions

- For stable machining performance use rigid, high-precision machines and holders.
- Use air blow when dry machining.
- Use wet machining for stainless steel, heat-resistant alloy, and titanium alloy applications.
- 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.
- If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.



Side Milling

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (inch)																
< 0.039	19,600	250	19,600	250	19,600	250	18,300	180	12,700	100	9,000	60	11,000	70	9,000	50
< 0.078	11,200	340	11,200	340	11,200	340	10,500	240	7,300	130	5,300	80	6,400	90	5,300	70
< 0.156	6,400	460	6,400	460	6,400	460	6,000	320	4,200	180	3,000	110	3,600	120	3,000	90
< 0.236	4,600	560	4,600	560	4,600	560	4,300	400	3,000	210	2,200	130	2,700	140	2,200	100
< 0.315	3,400	560	3,400	560	3,400	560	3,200	400	2,200	210	1,600	130	2,000	140	1,600	100
< 0.393	2,800	560	2,800	560	2,800	560	2,600	400	1,800	210	1,300	130	1,600	140	1,300	100
< 0.472	2,300	560	2,300	560	2,300	560	2,200	400	1,500	210	1,100	130	1,300	140	1,100	100
< 0.630	1,700	450	1,700	450	1,700	450	1,600	320	1,100	180	800	100	1,000	110	800	85
< 0.787	1,350	380	1,350	380	1,350	380	1,300	280	900	160	650	90	800	100	650	75
< 1.000	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					
Standard Depth of Cut ae	0.05DC										0.02DC					

Groove Milling

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (inch)																
< 0.039	19,600	200	19,600	250	19,600	250	18,300	180	12,700	100	9,000	60	11,000	50	4,500	20
< 0.078	11,200	270	11,200	340	11,200	340	10,500	240	7,300	130	5,300	80	6,400	65	2,650	25
< 0.156	6,400	370	6,400	460	6,400	460	6,000	320	4,200	180	3,000	110	3,600	80	1,500	35
< 0.236	4,600	450	4,600	560	4,600	560	4,300	400	3,000	210	2,200	130	2,700	100	1,100	40
< 0.315	3,400	450	3,400	560	3,400	560	3,200	400	2,200	210	1,600	130	2,000	100	800	40
< 0.393	2,800	450	2,800	560	2,800	560	2,600	400	1,800	210	1,300	130	1,600	100	650	40
< 0.472	2,300	450	2,300	560	2,300	560	2,200	400	1,500	210	1,100	130	1,300	100	500	40
< 0.630	1,700	360	1,700	450	1,700	450	1,600	320	1,100	180	800	100	1,000	80	400	35
< 0.787	1,350	300	1,350	380	1,350	380	1,300	280	900	160	650	90	800	70	320	30
< 1.000	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					

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL Endmills (2 Flutes) GSX 200C-3D INCH 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



**GSX INCH PRODUCTS
ARE MADE TO ORDER**

Fig 1

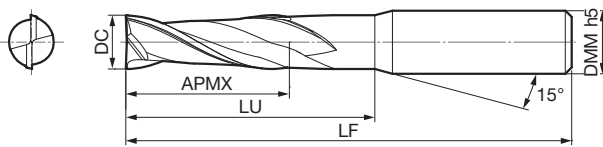
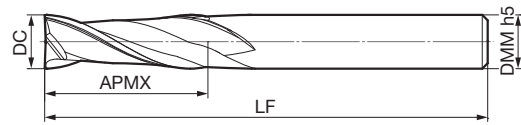


Fig 2



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

Body

GSX Inch - Made to Order

Dimensions (inch)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX204C-3D		0.0625	0.1250	0.1644	1.500	0.1250	1
GSX206C-3D		0.0938	0.1875	0.2269	1.500	0.1250	1
GSX208C-3D		0.1250	0.2500	-	2.000	0.1250	2
GSX210C-3D		0.1563	0.3125	0.3716	2.000	0.1875	1
GSX212C-3D		0.1875	0.3750	-	2.000	0.1875	2
GSX214C-3D		0.2188	0.4376	0.516	2.000	0.2500	1
GSX216C-3D		0.2500	0.5000	-	2.000	0.2500	2
GSX218C-3D		0.2813	0.5626	0.641	2.500	0.3125	1
GSX220C-3D		0.3125	0.6250	-	2.500	0.3125	2
GSX224C-3D		0.3750	0.7500	-	3.000	0.3750	2
GSX228C-3D		0.4375	0.8750	-	3.000	0.4375	2
GSX232C-3D		0.5000	1.0000	-	3.000	0.5000	2
GSX236C-3D		0.5625	1.1250	-	3.500	0.5625	2
GSX240C-3D		0.6250	1.2500	-	3.500	0.6250	2
GSX244C-3D		0.6875	1.3750	-	4.000	0.6875	2
GSX248C-3D		0.7500	1.5000	-	4.000	0.7500	2
GSX256C-3D		0.8750	1.7500	-	4.000	0.8750	2
GSX264C-3D		1.0000	2.0000	-	4.000	1.0000	2

Grade: ACF20

Recommended Cutting Conditions

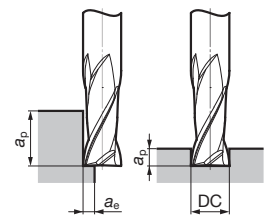
- For stable machining performance use rigid, high-precision machines and holders.
- Use air blow when dry machining.
- Use wet machining for stainless steel, heat-resistant alloy, and titanium alloy applications.
- In some cases, chatter may occur in early stages of milling but will cease after 2m of cutting.
- 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.
- If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.

Side Milling

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (inch)																
< 0.039	16,600	190	16,600	190	16,600	190	15,500	140	10,500	70	7,500	45	9,400	50	7,500	35
< 0.078	9,500	250	9,500	250	9,500	250	9,000	200	6,200	120	4,500	60	5,200	70	4,500	50
< 0.156	5,200	330	5,200	330	5,200	330	4,800	200	3,400	150	2,250	75	2,600	90	2,250	65
< 0.236	3,500	360	3,500	360	3,500	360	3,200	250	2,550	170	1,500	90	1,700	100	1,500	80
< 0.315	2,600	320	2,600	320	2,600	320	2,400	240	1,900	170	1,100	90	1,300	100	1,100	80
< 0.393	2,100	300	2,100	300	2,100	300	1,900	230	1,500	170	900	90	1,000	100	900	80
< 0.472	1,750	280	1,750	280	1,750	280	1,600	230	1,250	170	750	90	850	100	750	80
< 0.630	1,300	240	1,300	240	1,300	240	1,200	200	950	150	550	75	650	85	550	65
< 0.787	1,050	220	1,050	220	1,050	220	950	180	750	140	450	70	500	75	450	60
< 1.000	840	180	840	180	840	180	760	140	600	110	360	55	400	60	360	45
Standard Depth of Cut a_p	2.5DC								2.0DC							
	Below $\phi 3$: 0.05DC, Above $\phi 3$: 0.1DC								0.02DC							

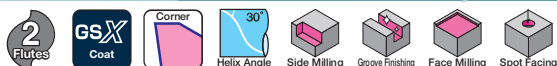
Groove Milling

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (inch)																
< 0.039	16,600	70	16,600	80	16,600	80	15,500	50	10,500	50	7,500	35	9,400	30	3,750	10
< 0.078	9,500	80	9,500	100	9,500	100	9,000	90	6,200	60	4,500	45	5,200	40	2,250	15
< 0.156	5,200	120	5,200	150	5,200	150	4,800	120	3,400	80	2,250	50	2,600	50	1,250	20
< 0.236	3,500	140	3,500	170	3,500	170	3,200	130	2,550	100	1,500	50	1,700	60	950	25
< 0.315	2,600	140	2,600	160	2,600	160	2,400	130	1,900	100	1,100	50	1,300	60	700	25
< 0.393	2,100	130	2,100	150	2,100	150	1,900	120	1,500	90	900	50	1,000	60	550	25
< 0.472	1,750	130	1,750	150	1,750	150	1,600	120	1,250	90	750	50	850	60	450	25
< 0.630	1,300	110	1,300	130	1,300	130	1,200	110	950	80	550	45	650	50	350	20
< 0.787	1,050	100	1,050	120	1,050	120	950	100	750	70	450	40	500	40	280	15
< 1.000	840	80	840	96	840	96	760	80	600	56	360	32	400	32	224	12
Standard Depth of Cut a_p	0.1DC		0.2DC		0.05DC		0.1DC		0.05DC		0.1DC		0.1DC		0.1DC	



GSX MILL Endmills (2 Flutes) GSX 200C-4D INCH 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



**GSX INCH PRODUCTS
ARE MADE TO ORDER**

Fig 1

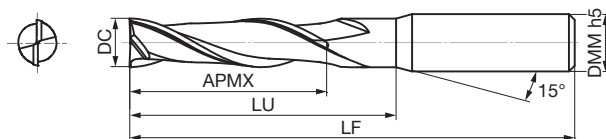
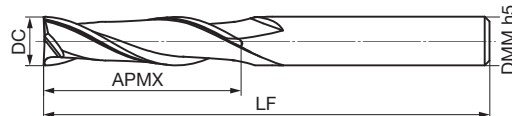


Fig 2



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

Body

GSX Inch - Made to Order

Dimensions (inch)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX204C-4D		0.0625	0.2500	0.2894	1.500	0.1250	1
GSX206C-4D		0.0938	0.3750	0.4144	2.000	0.1250	1
GSX208C-4D		0.1250	0.5000	-	2.000	0.1250	2
GSX210C-4D		0.1563	0.6250	0.6841	2.000	0.1875	1
GSX212C-4D		0.1875	0.7500	-	2.500	0.1875	2
GSX214C-4D		0.2188	0.8752	0.954	2.500	0.2500	1
GSX216C-4D		0.2500	1.0000	-	2.500	0.2500	2
GSX218C-4D		0.2813	1.1252	1.204	3.000	0.3125	1
GSX220C-4D		0.3125	1.2500	-	3.000	0.3125	2
GSX224C-4D		0.3750	1.5000	-	3.500	0.3750	2
GSX228C-4D		0.4375	1.7500	-	4.000	0.4375	2
GSX232C-4D		0.5000	2.0000	-	4.000	0.5000	2
GSX236C-4D		0.5625	2.2500	-	5.000	0.5625	2
GSX240C-4D		0.6250	2.5000	-	5.000	0.6250	2
GSX244C-4D		0.6875	2.7500	-	5.000	0.6875	2
GSX248C-4D		0.7500	3.0000	-	5.500	0.7500	2
GSX256C-4D		0.8750	3.5000	-	5.500	0.8750	2
GSX264C-4D		1.0000	4.0000	-	6.000	1.0000	2

Grade: ACF20

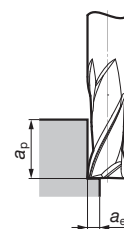
Endmill Identification (GSXMILL Series Only)

GSX 2 04 C - 4D

Series Code Number of Flutes Diameter in 64ths Cutting Edge Length
(4/64 = 0.0625")
C: Gash Land

Recommended Cutting Conditions

- For stable machining performance use rigid, high-precision machines and holders.
- Use air blow when dry machining.
- Use wet machining for stainless steel, heat-resistant alloy, and titanium alloy applications.
- In some cases, chattering may occur in early stages of milling but will cease after 2m of cutting.
- 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.
- This series is not recommended for groove milling.
- If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.



Side Milling

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (inch)																
< 0.039	9,000	130	9,000	130	9,000	130	7,000	95	6,500	50	4,500	30	5,400	40	4,500	25
< 0.078	4,500	180	4,500	180	4,500	180	3,500	120	3,200	70	2,300	40	2,700	50	2,300	35
< 0.156	2,250	240	2,250	240	2,250	240	1,750	160	1,600	95	1,200	60	1,350	65	1,200	40
< 0.236	1,500	300	1,500	300	1,500	300	1,150	170	1,050	110	800	70	900	70	800	50
< 0.315	1,100	260	1,100	260	1,100	260	850	170	800	110	600	70	660	70	600	50
< 0.393	900	250	900	250	900	250	700	160	650	110	460	70	540	70	460	50
< 0.472	750	240	750	240	750	240	580	160	520	110	400	70	450	70	400	50
< 0.630	550	200	550	200	550	200	440	140	400	95	300	55	330	60	300	45
< 0.787	450	180	450	180	450	180	350	120	320	85	240	45	270	50	240	40
< 1.000	360	140	360	140	360	140	280	95	250	65	190	35	210	40	192	30
Standard Depth of Cut a _p	0.08DC				3.5DC				0.04DC				3.0DC			
Depth of Cut a _e																

Endmills

I

Square

Radius

Ballnose

Multi-purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

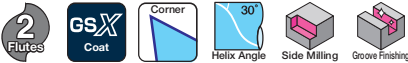
CFRP

Coated

Uncoated

GSX MILL 2 Flute Endmills Sharp Edge GSX 200S-2D INCH 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



**GSX INCH PRODUCTS
ARE MADE TO ORDER**

Fig 1

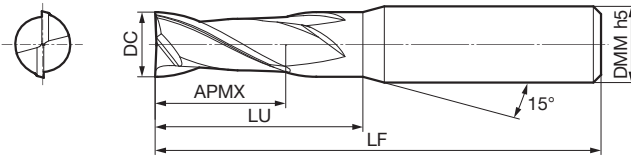
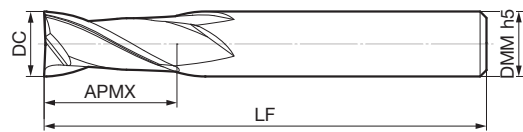


Fig 2



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

Body

GSX Inch - Made to Order

Dimensions (inch)

Endmill Identification (GSXMILL Series Only)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX204S-2D		0.0625	0.1250	0.1644	1.500	0.1250	1
GSX206S-2D		0.0938	0.1875	0.2269	1.500	0.1250	1
GSX208S-2D		0.1250	0.2500	-	2.000	0.1250	2
GSX210S-2D		0.1563	0.3125	0.3716	2.000	0.1875	1
GSX212S-2D		0.1875	0.3750	-	2.000	0.1875	2
GSX214S-2D		0.2188	0.4376	0.516	2.000	0.2500	1
GSX216S-2D		0.2500	0.5000	-	2.000	0.2500	2
GSX218S-2D		0.2813	0.5626	0.641	2.500	0.3125	1
GSX220S-2D		0.3125	0.6250	-	2.500	0.3125	2
GSX224S-2D		0.3750	0.7500	-	3.000	0.3750	2
GSX228S-2D		0.4375	0.8750	-	3.000	0.4375	2
GSX232S-2D		0.5000	1.0000	-	3.000	0.5000	2
GSX236S-2D		0.5625	1.1250	-	3.500	0.5625	2
GSX240S-2D		0.6250	1.2500	-	3.500	0.6250	2
GSX244S-2D		0.6875	1.3750	-	4.000	0.6875	2
GSX248S-2D		0.7500	1.5000	-	4.000	0.7500	2
GSX256S-2D		0.8750	1.7500	-	4.000	0.8750	2
GSX264S-2D		1.0000	2.0000	-	4.000	1.0000	2

Grade: ACF20

Recommended Cutting Conditions

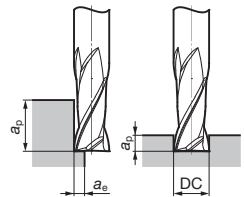
- For stable machining performance use rigid, high-precision machines and holders.
- Use air blow when dry machining.
- Use wet machining for stainless steel, heat-resistant alloy, and titanium alloy applications.
- If chatter is a problem, reduce the spindle speed and feed rate indicated in the table below by the same ratio, or reduce the depth of cut.
- This series is not recommended for groove milling.
- If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.

Side Milling

Work Material	Steel for Structure 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
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (inch)								
< 0.039	16,600	180	16,600	180	15,500	130	10,500	70
< 0.078	9,500	250	9,500	250	9,000	200	6,200	100
< 0.156	5,400	330	5,400	330	5,000	250	3,400	120
< 0.236	4,000	400	4,000	400	3,700	300	2,550	150
< 0.315	3,000	400	3,000	400	2,800	300	1,900	150
< 0.393	2,400	400	2,400	400	2,200	300	1,500	150
< 0.472	2,000	400	2,000	400	1,850	300	1,300	150
< 0.630	1,500	330	1,500	330	1,400	250	950	120
< 0.787	1,200	280	1,200	280	1,100	220	750	110
< 1.000	960	220	960	220	880	170	600	85
Standard Depth of Cut a_p	0.02DC				2.0DC		0.01DC	

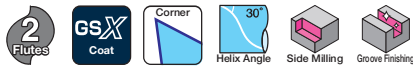
Groove Finishing

Work Material	Steel for Structure 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
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (inch)								
< 0.039	16,600	180	16,600	180	15,500	130	10,500	70
< 0.078	9,500	250	9,500	250	9,000	200	6,200	100
< 0.156	5,400	330	5,400	330	5,000	250	3,400	120
< 0.236	4,000	400	4,000	400	3,700	300	2,550	150
< 0.315	3,000	400	3,000	400	2,800	300	1,900	150
< 0.393	2,400	400	2,400	400	2,200	300	1,500	150
< 0.472	2,000	400	2,000	400	1,850	300	1,300	150
< 0.630	1,500	330	1,500	330	1,400	250	950	120
< 0.787	1,200	280	1,200	280	1,100	220	750	110
< 1.000	960	220	960	220	880	170	600	85
Standard Depth of Cut a_p	0.02DC				1.5DC		Below 0.02DC	



GSX MILL 2 Flute Endmills Sharp Edge GSX 200S-3D INCH 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



**GSX INCH PRODUCTS
ARE MADE TO ORDER**

Fig 1

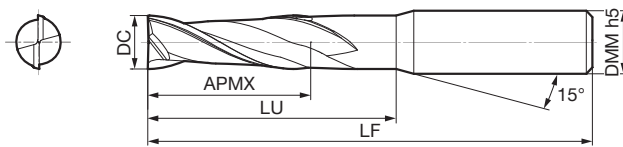
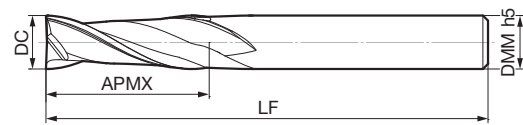


Fig 2



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

Body

GSX Inch - Made to Order

Dimensions (inch)

Endmill Identification (GSXMILL Series Only)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX204S-3D		0.0625	0.1875	0.2269	1.500	0.1250	1
GSX206S-3D		0.0938	0.2813	0.3206	1.500	0.1250	1
GSX208S-3D		0.1250	0.3750	-	2.000	0.1250	2
GSX210S-3D		0.1563	0.4688	0.5278	2.000	0.1875	1
GSX212S-3D		0.1875	0.5625	-	2.000	0.1875	2
GSX214S-3D		0.2188	0.6564	0.735	2.000	0.2500	1
GSX216S-3D		0.2500	0.7500	-	2.000	0.2500	2
GSX218S-3D		0.2813	0.8439	0.923	3.000	0.3125	1
GSX220S-3D		0.3125	0.9375	-	3.000	0.3125	2
GSX224S-3D		0.3750	1.1250	-	3.500	0.3750	2
GSX228S-3D		0.4375	1.3125	-	3.500	0.4375	2
GSX232S-3D		0.5000	1.5000	-	3.500	0.5000	2
GSX236S-3D		0.5625	1.6875	-	4.500	0.5625	2
GSX240S-3D		0.6250	1.8750	-	4.500	0.6250	2
GSX244S-3D		0.6875	2.0625	-	4.500	0.6875	2
GSX248S-3D		0.7500	2.2500	-	5.000	0.7500	2
GSX256S-3D		0.8750	2.6250	-	5.000	0.8750	2
GSX264S-3D		1.0000	3.0000	-	5.500	1.0000	2

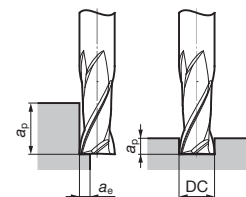
GSX 2 04 S - 3D

Series Code Number of Flutes Diameter in 64ths Cutting Edge Length
(4/64 = 0.0625")
S: Sharp Edge

Grade: ACF20

Recommended Cutting Conditions

- For stable machining performance use rigid, high-precision machines and holders.
- Use air blow when dry machining.
- Use wet machining for stainless steel, heat-resistant alloy, and titanium alloy applications.
- 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.
- This series is not recommended for groove milling.
- If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.



Side Milling

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
< 0.039	14,000	140	14,000	140	14,000	140	13,200	100	8,900	50	6,300	30	8,000	35	6,300	25
< 0.078	8,100	180	8,100	180	8,100	180	7,600	150	5,300	90	3,700	45	4,400	50	3,800	40
< 0.156	4,400	240	4,400	240	4,400	240	4,000	150	2,900	110	1,900	55	2,200	65	1,900	50
< 0.236	2,900	260	2,900	260	2,900	260	2,700	180	2,100	130	1,200	65	1,400	75	1,200	60
< 0.315	2,200	230	2,200	230	2,200	230	2,000	180	1,600	130	900	65	1,100	75	900	60
< 0.393	1,800	220	1,800	220	1,800	220	1,600	170	1,300	130	750	65	850	75	750	60
< 0.472	1,500	200	1,500	200	1,500	200	1,300	170	1,000	130	630	65	700	75	600	60
< 0.630	1,100	170	1,100	170	1,100	170	1,000	150	800	110	450	55	550	65	450	50
< 0.787	850	160	850	160	850	160	800	130	600	100	350	50	400	55	350	45
< 1.000	680	130	680	130	680	130	640	100	480	80	280	40	320	45	280	35
Standard Depth of Cut	2.5DC								2.0DC							
	Below ø3: 0.02DC, Above ø3: 0.05DC								0.01DC							

Groove Finishing

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
< 0.039	14,000	140	14,000	140	14,000	140	13,200	100	8,900	50	6,300	30	8,000	35	6,300	25
< 0.078	8,100	180	8,100	180	8,100	180	7,600	150	5,300	90	3,700	45	4,400	50	3,800	40
< 0.156	4,400	240	4,400	240	4,400	240	4,000	150	2,900	110	1,900	55	2,200	65	1,900	50
< 0.236	2,900	260	2,900	260	2,900	260	2,700	180	2,100	130	1,200	65	1,400	75	1,200	60
< 0.315	2,200	230	2,200	230	2,200	230	2,000	180	1,600	130	900	65	1,100	75	900	60
< 0.393	1,800	220	1,800	220	1,800	220	1,600	170	1,300	130	750	65	850	75	750	60
< 0.472	1,500	200	1,500	200	1,500	200	1,300	170	1,000	130	630	65	700	75	600	60
< 0.630	1,100	170	1,100	170	1,100	170	1,000	150	800	110	450	55	550	65	450	50
< 0.787	850	160	850	160	850	160	800	130	600	100	350	50	400	55	350	45
< 1.000	680	130	680	130	680	130	640	100	480	80	280	40	320	45	280	35
Standard Depth of Cut	1.5DC								Below 0.02DC							

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

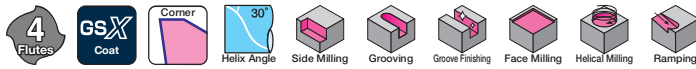
CFRP

Coated

Uncoated

GSX MILL Endmills (4 Flutes) GSX 400C-1.5D INCH 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



GSX INCH PRODUCTS ARE MADE TO ORDER



Fig 1.

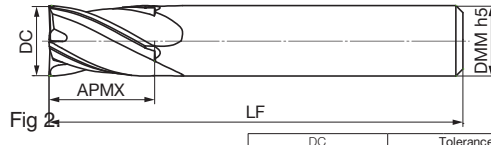


Fig 2.

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

Body

GSX Inch - Made to Order

Dimensions (inch)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX404C-1.5D		0.0625	0.0938	0.1331	1.500	0.1250	1
GSX406C-1.5D		0.0938	0.1406	0.1800	1.500	0.1250	1
GSX408C-1.5D		0.1250	0.1875	-	2.000	0.1250	2
GSX410C-1.5D		0.1563	0.2344	0.2934	2.000	0.1875	1
GSX412C-1.5D		0.1875	0.2813	-	2.000	0.1875	2
GSX414C-1.5D		0.2188	0.3282	0.407	2.000	0.2500	1
GSX416C-1.5D		0.2500	0.3750	-	2.000	0.2500	2
GSX418C-1.5D		0.2813	0.4220	0.501	2.500	0.3125	1
GSX420C-1.5D		0.3125	0.4688	-	2.500	0.3125	2
GSX424C-1.5D		0.3750	0.5625	-	3.000	0.3750	2
GSX428C-1.5D		0.4375	0.6563	-	3.000	0.4375	2
GSX432C-1.5D		0.5000	0.7500	-	3.000	0.5000	2
GSX436C-1.5D		0.5625	0.8438	-	3.500	0.5625	2
GSX440C-1.5D		0.6250	0.9375	-	3.500	0.6250	2
GSX444C-1.5D		0.6875	1.0313	-	4.000	0.6875	2
GSX448C-1.5D		0.7500	1.1250	-	4.000	0.7500	2
GSX456C-1.5D		0.8750	1.3125	-	4.000	0.8750	2
GSX464C-1.5D		1.0000	1.5000	-	4.000	1.0000	2

Grade: ACF20

Side Milling

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (inch)																
< 0.039	24,000	470	24,000	470	24,000	470	21,000	290	14,500	180	10,500	120	12,600	120	10,500	85
< 0.078	12,800	570	12,800	570	12,800	570	12,000	380	8,300	230	6,000	150	7,200	160	6,000	110
< 0.156	6,800	730	6,800	730	6,800	730	6,400	490	4,400	300	3,200	200	3,800	210	3,200	130
< 0.236	4,600	780	4,600	780	4,600	780	4,300	520	3,000	320	2,200	210	2,650	220	2,200	150
< 0.315	3,400	780	3,400	780	3,400	780	3,200	520	2,200	320	1,600	210	2,000	220	1,600	150
< 0.393	2,800	780	2,800	780	2,800	780	2,600	520	1,800	320	1,300	210	1,500	220	1,300	150
< 0.472	2,300	780	2,300	780	2,300	780	2,200	520	1,500	320	1,100	210	1,300	220	1,100	150
< 0.630	1,700	650	1,700	650	1,700	650	1,600	420	1,100	280	800	170	1,000	180	800	120
< 0.787	1,350	600	1,350	600	1,350	600	1,300	380	900	260	650	150	800	160	650	100
< 1.000	1,050	470	1,050	470	1,050	470	1,050	300	720	210	520	120	640	130	520	80
Standard a_p	1.5DC										1.0DC					
Depth of Cut a_e	0.05DC										0.02DC					

Side Milling (High Speed Machining Centre)

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (inch)																
< 0.039	60,000	1,200	60,000	1,200	60,000	1,200	60,000	850	60,000	720	48,000	500	32,000	300		
< 0.078	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		
< 0.156	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		
< 0.236	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		
< 0.315	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		
< 0.393	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		
< 0.472	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		
< 0.630	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		
< 0.787	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		
< 1.000	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 a_p	1.5DC										1.0DC					
Depth of Cut a_e	0.05DC										0.02DC					

Groove Milling

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (inch)																
< 0.039	24,000	380	24,000	470	24,000	470	21,000	290	14,500	180	10,500	120	12,600	85	5,200	30
< 0.078	12,800	460	12,800	570	12,800	570	12,000	380	8,300	230	6,000	150	7,200	110	3,000	40
< 0.156	6,800	580	6,800	730	6,800	730	5,400	490	4,400	300	3,200	200	3,800	130	1,600	55
< 0.236	4,600	620	4,600	780	4,600	780	4,300	520	3,000	320	2,200	210	2,650	160	1,100	65
< 0.315	3,400	620	3,400	780	3,400	780	3,200	520	2,200	320	1,600	210	2,000	160	800	65
< 0.393	2,800	620	2,800	780	2,800	780	2,600	520	1,800	320	1,300	210	1,600	160	650	65
< 0.472	2,300	620	2,300	780	2,300	780	2,200	520	1,500	320	1,100	210	1,300	160	550	65
< 0.630	1,700	520	1,700	560	1,700	560	1,600	420	1,100	280	800	170	1,000	130	400	55
< 0.787	1,350	480	1,350	600	1,350	600	1,300	380	900	260	650	150	800	110	320	50
< 1.000	1,080	384	1,080	480	1,080	480	1,040	304	720	208	520	120	640	88	256	40
Standard a_p	0.2DC		0.5DC				0.2DC				0.05DC		0.2DC			
Depth of Cut a_e																

GSX MILL Endmills (4 Flutes) GSX 400C-2D INCH 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



GSX INCH PRODUCTS ARE MADE TO ORDER



Fig 1.

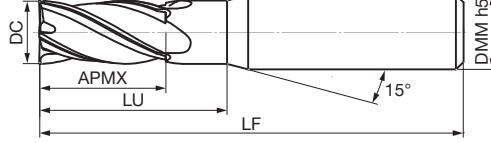


Fig 2.

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

Body

GSX Inch - Made to Order

Dimensions (inch)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX404C-2D		0.0625	0.1250	0.1644	1.500	0.1250	1
GSX406C-2D		0.0938	0.1875	0.2269	1.500	0.1250	1
GSX408C-2D		0.1250	0.2500	-	2.000	0.1250	2
GSX410C-2D		0.1563	0.3125	0.3716	2.000	0.1875	1
GSX412C-2D		0.1875	0.3750	-	2.000	0.1875	2
GSX414C-2D		0.2188	0.4376	0.516	2.000	0.2500	1
GSX416C-2D		0.2500	0.5000	-	2.000	0.2500	2
GSX418C-2D		0.2813	0.5626	0.641	2.500	0.3125	1
GSX420C-2D		0.3125	0.6250	-	2.500	0.3125	2
GSX424C-2D		0.3750	0.7500	-	3.000	0.3750	2
GSX428C-2D		0.4375	0.8750	-	3.000	0.4375	2
GSX432C-2D		0.5000	1.0000	-	3.000	0.5000	2
GSX436C-2D		0.5625	1.1250	-	3.500	0.5625	2
GSX440C-2D		0.6250	1.2500	-	3.500	0.6250	2
GSX444C-2D		0.6875	1.3750	-	4.000	0.6875	2
GSX448C-2D		0.7500	1.5000	-	4.000	0.7500	2
GSX456C-2D		0.8750	1.7500	-	4.000	0.8750	2
GSX464C-2D		1.0000	2.0000	-	4.000	1.0000	2

Grade: ACF20

Side Milling

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (inch)																
< 0.039	24,000	470	24,000	470	24,000	470	21,000	290	14,500	180	10,500	120	12,600	120	10,500	85
< 0.078	12,800	570	12,800	570	12,800	570	12,000	380	8,300	230	6,000	150	7,200	160	6,000	110
< 0.156	6,800	730	6,800	730	6,800	730	6,400	490	4,400	300	3,200	200	3,800	210	3,200	130
< 0.236	4,600	780	4,600	780	4,600	780	4,300	520	3,000	320	2,200	210	2,650	220	2,200	150
< 0.315	3,400	780	3,400	780	3,400	780	3,200	520	2,200	320	1,600	210	2,000	220	1,600	150
< 0.393	2,800	780	2,800	780	2,800	780	2,600	520	1,800	320	1,300	210	1,500	220	1,300	150
< 0.472	2,300	780	2,300	780	2,300	780	2,200	520	1,500	320	1,100	210	1,300	220	1,100	150
< 0.630	1,700	650	1,700	650	1,700	650	1,600	420	1,100	280	800	170	1,000	180	800	120
< 0.787	1,350	600	1,350	600	1,350	600	1,300	380	900	260	650	150	800	160	650	100
< 1.000	1,000	480	1,000	480	1,000	480	1,000	300	700	200	500	120	640	120	500	80
Standard a_p	1.5DC										1.0DC					
Depth of Cut a_e	0.05DC										0.02DC					

Side Milling (High Speed Machining Centre)

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (inch)																
< 0.039	60,000	1,200	60,000	1,200	60,000	1,200	60,000	850	60,000	720	48,000	500	32,000	300	-	-
< 0.078	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	-	-
< 0.156	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	-	-
< 0.236	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	-	-
< 0.315	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	-	-
< 0.393	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	-	-
< 0.472	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	-	-
< 0.630	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	-	-
< 0.787	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	-	-
< 1.000	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 a_p	1.5DC										1.0DC					
Depth of Cut a_e	0.05DC										0.02DC					

Groove Milling

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (inch)																
< 0.039	24,000	380	24,000	470	24,000	470	21,000	290	14,500	180	10,500	120	12,600	85	5,200	30
< 0.078	12,800	460	12,800	570	12,800	570	12,000	380	8,300	230	6,000	150	7,200	110	3,000	40
< 0.156	6,800	580	6,800	730	6,800	730	5,400	490	4,400	300	3,200	200	3,800	130	1,600	55
< 0.236	4,600	620	4,600	780	4,600	780	4,300	520	3,000	320	2,200	210	2,650	160	1,100	65
< 0.315	3,400	620	3,400	780	3,400	780	3,200	520	2,200	320	1,600	210	2,000	160	800	65
< 0.393	2,800	620	2,800	780	2,800	780	2,600	520	1,800	320	1,300	210	1,600	160	650	65
< 0.472	2,300	620	2,300	780	2,300	780	2,200	520	1,500	320	1,100	210	1,300	160	550	65
< 0.630	1,700	520	1,700	560	1,700	560	1,600	420	1,100	280	800	170	1,000	130	400	55
< 0.787	1,350	480	1,350	600	1,350	600	1,300	380	900	260	650	150	800	110	320	50
< 1.000	1,000	380	1,000	450	1,000	450	1,000	300	700	200	500	120	640	80	250	40
Standard a_p	0.2DC		0.5DC				0.2DC		0.05DC		0.2DC		0.2DC			
Depth of Cut																

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

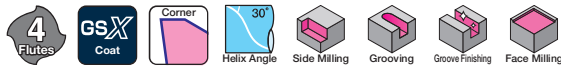
CFRP

Coated

Uncoated

GSX MILL Endmills (4 Flutes) GSX 400C-3D INCH 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



**GSX INCH PRODUCTS
ARE MADE TO ORDER**

Fig 1

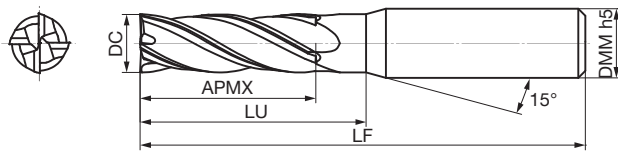
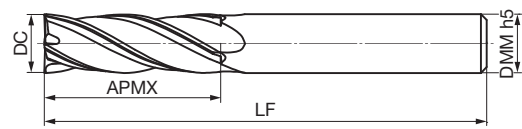


Fig 2



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

Body

GSX Inch - Made to Order

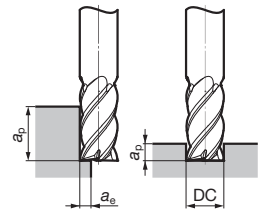
Dimensions (inch)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX404C-3D		0.0625	0.1875	0.2269	1.500	0.1250	1
GSX406C-3D		0.0938	0.2813	0.3206	1.500	0.1250	1
GSX408C-3D		0.1250	0.3750	-	2.000	0.1250	2
GSX410C-3D		0.1563	0.4688	0.5278	2.000	0.1875	1
GSX412C-3D		0.1875	0.5625	-	2.000	0.1875	2
GSX414C-3D		0.2188	0.6564	0.735	2.000	0.2500	1
GSX416C-3D		0.2500	0.7500	-	2.000	0.2500	2
GSX418C-3D		0.2813	0.8439	0.923	3.000	0.3125	1
GSX420C-3D		0.3125	0.9375	-	3.000	0.3125	2
GSX424C-3D		0.3750	1.1250	-	3.500	0.3750	2
GSX428C-3D		0.4375	1.3125	-	3.500	0.4375	2
GSX432C-3D		0.5000	1.5000	-	3.500	0.5000	2
GSX436C-3D		0.5625	1.6875	-	4.500	0.5625	2
GSX440C-3D		0.6250	1.8750	-	4.500	0.6250	2
GSX444C-3D		0.6875	2.0625	-	4.500	0.6875	2
GSX448C-3D		0.7500	2.2500	-	5.000	0.7500	2
GSX456C-3D		0.8750	2.6250	-	5.000	0.8750	2
GSX464C-3D		1.0000	3.0000	-	5.500	1.0000	2

Grade: ACF20

Recommended Cutting Conditions

- For stable machining performance use rigid, high-precision machines and holders.
- Use air blow when dry machining.
- Use wet machining for stainless steel, heat-resistant alloy, and titanium alloy applications.
- In some cases, chatter may occur in early stages of milling but will cease after 2m of cutting.
- 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.
- If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.



Side Milling

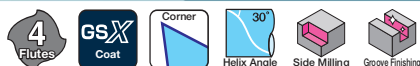
Work Material	Steel for Structure SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat-Resistant Alloy Titanium Alloy	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (inch)																
< 0.039	21,000	360	21,000	360	21,000	360	19,000	220	13,000	140	9,000	90	10,500	90	9,000	65
< 0.078	10,500	360	10,500	360	10,500	360	9,600	290	7,500	180	4,500	110	5,200	120	4,500	85
< 0.156	5,200	500	5,200	500	5,200	500	4,800	370	4,000	280	2,250	150	2,600	160	2,250	100
< 0.236	3,500	560	3,500	560	3,500	560	3,200	400	2,700	300	1,500	160	1,700	170	1,500	120
< 0.315	2,600	520	2,600	520	2,600	520	2,400	400	2,000	300	1,100	160	1,300	170	1,100	120
< 0.393	2,100	500	2,100	500	2,100	500	1,900	400	1,600	300	900	160	1,000	160	900	120
< 0.472	1,750	500	1,750	500	1,750	500	1,600	400	1,350	300	750	150	850	160	750	120
< 0.630	1,300	420	1,300	420	1,300	420	1,200	330	1,000	260	550	120	650	140	550	100
< 0.787	1,050	380	1,050	380	1,050	380	950	290	800	230	450	110	500	120	450	90
< 1.000	840	300	840	300	840	300	760	230	640	180	360	85	400	95	360	70
Standard a _p	2.5DC															
Depth of Cut a _e	Below ø3: 0.05DC, Above ø3 to Below ø8: 0.1DC, Above ø8: 0.15DC															
	0.02DC															

Groove Milling

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (inch)																
< 0.039	16,600	140	16,600	140	16,600	140	15,500	100	10,500	100	7,500	70	9,400	60	3,750	20
< 0.078	9,500	160	9,500	160	9,500	160	9,000	180	6,200	120	4,500	90	5,200	80	2,250	30
< 0.156	5,200	160	5,200	180	5,200	180	4,800	160	3,400	110	2,200	65	2,600	70	1,250	25
< 0.236	3,500	160	3,500	200	3,500	200	3,200	160	2,550	120	1,500	65	1,700	70	950	25
< 0.315	2,600	160	2,600	200	2,600	200	2,400	160	1,900	120	1,100	65	1,300	70	700	25
< 0.393	2,100	160	2,100	200	2,100	200	1,900	160	1,500	120	900	65	1,000	70	550	25
< 0.472	1,750	160	1,750	200	1,750	200	1,600	160	1,250	120	750	65	850	70	450	25
< 0.630	1,300	160	1,300	200	1,300	200	1,200	160	950	120	550	65	650	70	350	25
< 0.787	1,050	160	1,050	200	1,050	200	950	160	750	120	450	65	500	70	280	55
< 1.000	840	128	840	160	840	160	760	128	600	96	360	52	400	56	224	44
Standard a _p	0.1DC		0.2DC				0.05DC				0.1DC					

GSX MILL 4 Flute Endmills Sharp Edge GSX 400C-4D INCH 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



GSX INCH PRODUCTS ARE MADE TO ORDER

Fig 1

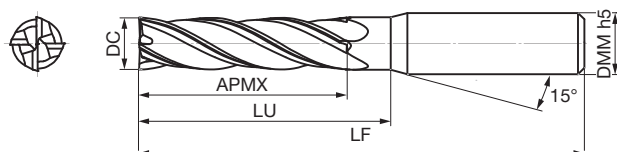
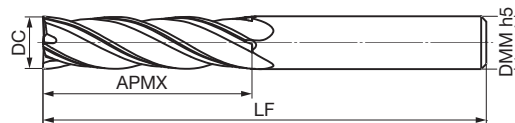


Fig 2



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

Body

GSX Inch - Made to Order

Dimensions (inch)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX404C-4D		0.0625	0.2500	0.2894	1.500	0.1250	1
GSX406C-4D		0.0938	0.3750	0.4144	1.500	0.1250	1
GSX408C-4D		0.1250	0.5000	-	2.000	0.1250	2
GSX410C-4D		0.1563	0.6250	0.6841	2.000	0.1875	1
GSX412C-4D		0.1875	0.7500	-	2.500	0.1875	2
GSX414C-4D		0.2188	0.8752	0.954	2.500	0.2500	1
GSX416C-4D		0.2500	1.0000	-	2.500	0.2500	2
GSX418C-4D		0.2813	1.1252	1.204	3.000	0.3125	1
GSX420C-4D		0.3125	1.2500	-	3.000	0.3125	2
GSX424C-4D		0.3750	1.5000	-	3.500	0.3750	2
GSX428C-4D		0.4375	1.7500	-	4.000	0.4375	2
GSX432C-4D		0.5000	2.0000	-	4.000	0.5000	2
GSX436C-4D		0.5625	2.2500	-	5.000	0.5625	2
GSX440C-4D		0.6250	2.5000	-	5.000	0.6250	2
GSX444C-4D		0.6875	2.7500	-	5.000	0.6875	2
GSX448C-4D		0.7500	3.0000	-	5.500	0.7500	2
GSX456C-4D		0.8750	3.5000	-	5.500	0.8750	2
GSX464C-4D		1.0000	4.0000	-	6.000	1.0000	2

Grade: ACF20

Endmill Identification (GSXMILL Series Only)

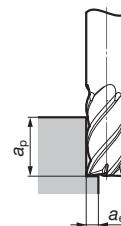
GSX 4 04 C - 4D

Series Code Number Diameter Cutting Cutting
of Flutes in 64ths Edge Length
(4/64 = 0.0625")

C: Gash Land

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, chatter 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	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (inch)																
< 0.039	7,950	120	7,950	120	7,950	120	6,250	70	5,750	50	4,000	35	4,850	35	4,000	35
< 0.078	4,050	120	4,050	120	4,050	120	3,100	90	2,850	70	2,050	50	2,400	50	2,050	35
< 0.156	1,950	170	1,950	170	1,950	170	1,650	100	1,400	90	710	35	1,200	45	1,050	30
< 0.236	1,350	130	1,350	130	1,350	130	1,000	140	930	120	700	55	800	40	700	30
< 0.315	970	190	970	190	970	190	740	140	720	120	520	55	560	40	490	30
< 0.393	770	180	770	180	770	180	630	120	570	100	360	50	490	40	410	30
< 0.472	640	170	640	170	640	170	500	120	460	100	350	55	400	40	350	30
< 0.630	460	140	460	140	460	140	370	100	360	90	260	50	280	40	270	30
< 0.787	390	130	390	130	390	130	310	90	280	70	210	45	240	40	210	30
< 1.000	310	100	310	100	310	100	250	70	220	55	170	35	190	30	170	25
Standard a _p	2.5DC								2.0DC							
Depth of Cut a _e	Below ø3: 0.02DC, Above ø3 to Below ø8: 0.05DC, Above ø8: 0.07DC								0.01DC							

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

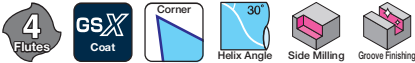
CFRP

Coated

Uncoated

GSX MILL 4 Flute Endmills Sharp Edge GSX 400S-2D INCH 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



**GSX INCH PRODUCTS
ARE MADE TO ORDER**

Fig 1

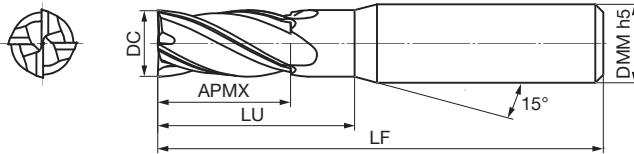
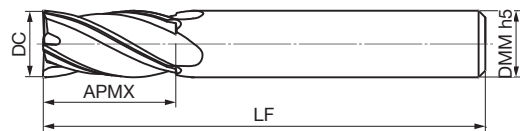


Fig 2



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

Body

GSX Inch - Made to Order

Dimensions (inch)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX404S-2D		0.0625	0.1250	0.1644	1.500	0.1250	1
GSX406S-2D		0.0938	0.1875	0.2269	1.500	0.1250	1
GSX408S-2D		0.1250	0.2500	-	2.000	0.1250	2
GSX410S-2D		0.1563	0.3125	0.3716	2.000	0.1875	1
GSX412S-2D		0.1875	0.3750	-	2.000	0.1875	2
GSX414S-2D		0.2188	0.4376	0.516	2.000	0.2500	1
GSX416S-2D		0.2500	0.5000	-	2.000	0.2500	2
GSX418S-2D		0.2813	0.5626	0.641	2.500	0.3125	1
GSX420S-2D		0.3125	0.6250	-	2.500	0.3125	2
GSX424S-2D		0.3750	0.7500	-	3.000	0.3750	2
GSX428S-2D		0.4375	0.8750	-	3.000	0.4375	2
GSX432S-2D		0.5000	1.0000	-	3.000	0.5000	2
GSX436S-2D		0.5625	1.1250	-	3.500	0.5625	2
GSX440S-2D		0.6250	1.2500	-	3.500	0.6250	2
GSX444S-2D		0.6875	1.3750	-	4.000	0.6875	2
GSX448S-2D		0.7500	1.5000	-	4.000	0.7500	2
GSX456S-2D		0.8750	1.7500	-	4.000	0.8750	2
GSX464S-2D		1.0000	2.0000	-	4.000	1.0000	2

Grade: ACF20

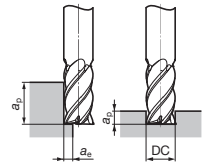
Endmill Identification (GSXMILL Series Only)

GSX 4 04 S - 2D

Series Code Number Diameter Cutting Cutting
of Flutes in 64ths Edge Length
(4/64 = 0.0625")
S: Sharp Edge

Recommended Cutting Conditions

- For stable machining performance use rigid, high-precision machines and holders.
- Use air blow when dry machining.
- Use wet machining for stainless steel, heat-resistant alloy, and titanium alloy applications.
- If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.



Side Milling

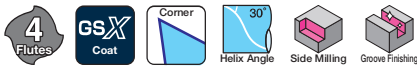
Work Material	Steel for Structure SS		Carbon Steel SC (150 to 250HB)		Cast Iron FC		Alloy Steel SCM (25 to 35HRC)		Tempered Steel, Hardened Steel NAK, HPM (35 to 45HRC)		Hardened Steel (45 to 55HRC)		Stainless Steel SUS304, SUS316		Heat-Resistant Alloy Titanium Alloy	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (inch)																
< 0.039	22,000	360	22,000	360	22,000	360	19,000	220	13,000	140	9,500	90	11,300	90	9,500	65
< 0.078	11,500	440	11,500	440	11,500	440	11,000	290	7,500	180	5,400	110	6,500	120	5,400	85
< 0.156	6,000	560	6,000	560	6,000	560	5,800	370	4,000	230	2,900	150	3,400	160	2,900	100
< 0.236	4,200	600	4,200	600	4,200	600	4,000	400	2,700	240	2,000	160	2,400	170	2,000	120
< 0.315	3,000	600	3,000	600	3,000	600	2,800	400	2,000	240	1,450	160	1,800	170	1,450	120
< 0.393	2,500	600	2,500	600	2,500	600	2,350	400	1,600	240	1,200	160	1,450	170	1,200	120
< 0.472	2,100	600	2,100	600	2,100	600	2,000	400	1,350	240	1,000	160	1,200	170	1,000	120
< 0.630	1,500	500	1,500	500	1,500	500	1,450	320	1,000	210	750	130	900	140	750	90
< 0.787	1,200	460	1,200	460	1,200	460	1,150	290	800	200	600	110	700	120	600	75
< 1.000	960	370	960	370	960	370	920	230	640	160	480	85	560	95	480	60
Standard Depth of Cut a _p	2.0DC										0.03DC					
Depth of Cut a _e	0.01DC															

Groove Finishing

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (inch)																
< 0.039	22,000	360	22,000	360	22,000	360	19,000	220	13,000	140	9,500	90	11,300	90	9,500	65
< 0.078	11,500	440	11,500	440	11,500	440	11,000	290	7,500	180	5,400	110	6,500	120	5,400	85
< 0.156	6,000	560	6,000	560	6,000	560	5,800	370	4,000	230	2,900	150	3,400	160	2,900	100
< 0.236	4,200	600	4,200	600	4,200	600	4,000	400	2,700	240	2,000	160	2,400	170	2,000	120
< 0.315	3,000	600	3,000	600	3,000	600	2,800	400	2,000	240	1,450	160	1,800	170	1,450	120
< 0.393	2,500	600	2,500	600	2,500	600	2,350	400	1,600	240	1,200	160	1,450	170	1,200	120
< 0.472	2,100	600	2,100	600	2,100	600	2,000	400	1,350	240	1,000	160	1,200	170	1,000	120
< 0.630	1,500	500	1,500	500	1,500	500	1,450	320	1,000	210	750	130	900	140	750	90
< 0.787	1,200	460	1,200	460	1,200	460	1,150	290	800	200	600	110	700	120	600	75
< 1.000	960	370	960	370	960	370	920	230	640	160	480	85	560	95	480	60
Standard Depth of Cut a _p	1.5DC										Below 0.02DC					
Depth of Cut a _e																

GSX MILL 4 Flute Endmills Sharp Edge GSX 400S-3D INCH 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



**GSX INCH PRODUCTS
ARE MADE TO ORDER**

Fig 1

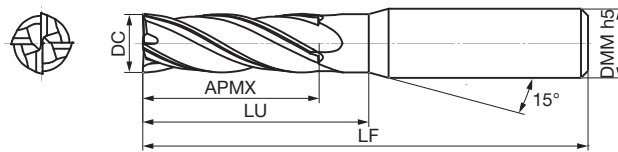
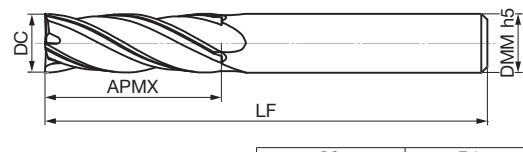


Fig 2



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

Body

GSX Inch - Made to Order

Dimensions (inch)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX404S-3D		0.0625	0.1875	0.2269	1.500	0.1250	1
GSX406S-3D		0.0938	0.2813	0.3206	1.500	0.1250	1
GSX408S-3D		0.1250	0.3750	-	2.000	0.1250	2
GSX410S-3D		0.1563	0.4688	0.5278	2.000	0.1875	1
GSX412S-3D		0.1875	0.5625	-	2.000	0.1875	2
GSX414S-3D		0.2188	0.6564	0.735	2.000	0.2500	1
GSX416S-3D		0.2500	0.7500	-	2.000	0.2500	2
GSX418S-3D		0.2813	0.8439	0.923	3.000	0.3125	1
GSX420S-3D		0.3125	0.9375	-	3.000	0.3125	2
GSX424S-3D		0.3750	1.1250	-	3.500	0.3750	2
GSX428S-3D		0.4375	1.3125	-	3.500	0.4375	2
GSX432S-3D		0.5000	1.5000	-	3.500	0.5000	2
GSX436S-3D		0.5625	1.6875	-	4.500	0.5625	2
GSX440S-3D		0.6250	1.8750	-	4.500	0.6250	2
GSX444S-3D		0.6875	2.0625	-	4.500	0.6875	2
GSX448S-3D		0.7500	2.2500	-	5.000	0.7500	2
GSX456S-3D		0.8750	2.6250	-	5.000	0.8750	2
GSX464S-3D		1.0000	3.0000	-	5.500	1.0000	2

Grade: ACF20

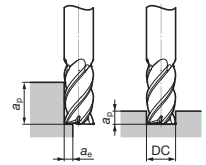
Endmill Identification (GSXMILL Series Only)

GSX 4 04 S - 3D

Series Code Number of Flutes Diameter in 64ths Cutting Edge Length
(4/64 = 0.0625")
S: Sharp Edge

Recommended Cutting Conditions

- For stable machining performance use rigid, high-precision machines and holders.
- Use air blow when dry machining.
- Use wet machining for stainless steel, heat-resistant alloy, and titanium alloy applications.
- If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.



Side Milling

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (inch)																
< 0.039	18,500	250	18,500	250	18,500	250	17,000	150	11,500	100	8,000	65	9,400	65	8,000	45
< 0.078	9,400	250	9,400	250	9,400	250	8,500	200	6,700	130	4,000	65	4,600	90	4,000	60
< 0.156	4,500	350	4,500	350	4,500	350	4,300	250	3,500	210	2,000	110	2,300	110	2,000	70
< 0.236	3,100	400	3,100	400	3,100	400	2,800	300	2,400	220	1,300	120	1,500	120	1,300	90
< 0.315	2,300	380	2,300	380	2,300	380	2,100	300	1,800	220	950	120	1,100	120	900	90
< 0.393	1,800	350	1,800	350	1,800	350	1,700	300	1,400	220	700	120	900	120	800	90
< 0.472	1,500	350	1,500	350	1,500	350	1,400	300	1,200	220	650	110	750	120	650	90
< 0.630	1,100	300	1,100	300	1,100	300	1,000	240	900	190	480	90	550	100	490	70
< 0.787	900	280	900	280	900	280	850	210	700	170	400	80	440	90	400	60
< 1.000	720	220	720	220	720	220	680	170	560	130	320	60	352	70	320	50
Standard Depth of Cut a _p	2.5DC															
Below ø3: 0.02DC, Above ø3 to Below ø8: 0.05DC, Above ø8: 0.07DC	0.01DC															

Groove Finishing

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (inch)																
< 0.039	18,500	250	18,500	250	18,500	250	17,000	150	11,500	100	8,000	65	9,400	65	8,000	45
< 0.078	9,400	250	9,400	250	9,400	250	8,500	200	6,700	130	4,000	65	4,600	90	4,000	60
< 0.156	4,500	350	4,500	350	4,500	350	4,300	250	3,500	210	2,000	110	2,300	110	2,000	70
< 0.236	3,100	400	3,100	400	3,100	400	2,800	300	2,400	220	1,300	120	1,500	120	1,300	90
< 0.315	2,300	380	2,300	380	2,300	380	2,100	300	1,800	220	950	120	1,100	120	900	90
< 0.393	1,800	350	1,800	350	1,800	350	1,700	300	1,400	220	700	120	900	120	800	90
< 0.472	1,500	350	1,500	350	1,500	350	1,400	300	1,200	220	650	110	750	120	650	90
< 0.630	1,100	300	1,100	300	1,100	300	1,000	240	900	190	480	90	550	100	490	70
< 0.787	900	280	900	280	900	280	850	210	700	170	400	80	440	90	400	60
< 1.000	720	220	720	220	720	220	680	170	560	130	320	60	352	70	320	50
Standard Depth of Cut a _p	1.5DC															
Below 0.02DC																

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL Endmills (2 Flutes) GSX 2000C-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



Fig 1

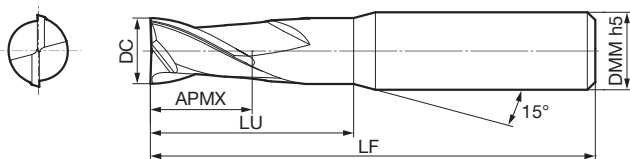
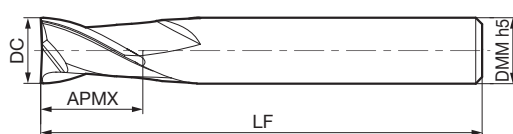


Fig 2



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
GSX20050C-1.5D	★	0.5	1.0	1.4	40	4	1
GSX20100C-1.5D	★	1.0	1.5	2.5	40	4	1
GSX20150C-1.5D	★	1.5	2.3	3.3	40	4	1
GSX20200C-1.5D	★	2.0	3.0	4.0	40	4	1
GSX20250C-1.5D	★	2.5	3.8	4.8	40	4	1
GSX20300C-1.5D	★	3.0	4.5	6.0	45	6	1
GSX20350C-1.5D	★	3.5	5.3	6.8	45	6	1
GSX20400C-1.5D	★	4.0	6.0	7.5	45	6	1
GSX20450C-1.5D	★	4.5	6.8	8.3	50	6	1
GSX20500C-1.5D	★	5.0	7.5	9.5	50	6	1
GSX20550C-1.5D	★	5.5	8.3	10.3	50	6	1
GSX20600C-1.5D	★	6.0	9.0	-	50	6	2
GSX20650C-1.5D	★	6.5	10.0	12.0	60	8	1
GSX20700C-1.5D	★	7.0	11.0	13.0	60	8	1
GSX20750C-1.5D	★	7.5	12.0	14.0	60	8	1
GSX20800C-1.5D	★	8.0	12.0	-	60	8	2
GSX20850C-1.5D	★	8.5	13.0	15.0	70	10	1
GSX20900C-1.5D	★	9.0	14.0	16.0	70	10	1
GSX20950C-1.5D	★	9.5	15.0	17.0	70	10	1
GSX21000C-1.5D	★	10.0	15.0	-	70	10	2
GSX21050C-1.5D	★	10.5	16.0	18.5	75	12	1
GSX21100C-1.5D	★	11.0	17.0	19.5	75	12	1
GSX21150C-1.5D	★	11.5	18.0	20.5	75	12	1
GSX21200C-1.5D	★	12.0	18.0	-	75	12	2
GSX21300C-1.5D	★	13.0	20.0	23.5	90	16	1
GSX21400C-1.5D	★	14.0	21.0	24.5	90	16	1
GSX21500C-1.5D	★	15.0	23.0	26.5	90	16	1
GSX21600C-1.5D	★	16.0	24.0	-	90	16	2
GSX21700C-1.5D	★	17.0	26.0	30.5	100	20	1
GSX21800C-1.5D	★	18.0	27.0	31.5	100	20	1
GSX21900C-1.5D	★	19.0	29.0	33.5	100	20	1
GSX22000C-1.5D	★	20.0	30.0	-	100	20	2
GSX22500C-1.5D	★	25.0	38.0	-	120	25	2

Grade: ACF20

Endmill Identification (GSXMILL Series Only)

GSX 2 1000 C - 1.5D

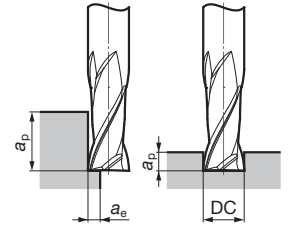
Series Code Number of Teeth Dia. Cutting Edge C: Gash Land Cutting Edge Length

GSX MILL Endmills (2 Flutes)

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	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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	a _p	1.5DC										1.0DC				
	a _e	0.05DC										0.02DC				

Groove Milling

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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	a _p	0.2DC		0.5DC				0.2DC		0.05DC		0.2DC				

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL 2 Flute Endmills Sharp Edge 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

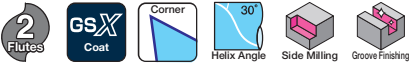


Fig 1

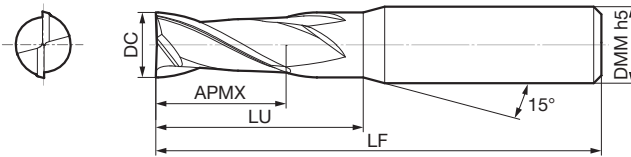
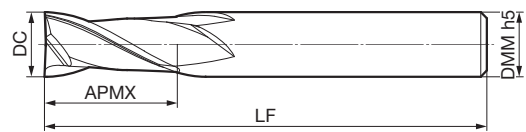


Fig 2



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
GSX20030S-2D	★	0.3	0.6	1.0	40	4	1
GSX20040S-2D	★	0.4	0.8	1.2	40	4	1
GSX20050S-2D	★	0.5	1.3	1.7	40	4	1
GSX20060S-2D	★	0.6	1.3	1.8	40	4	1
GSX20070S-2D	★	0.7	1.4	1.9	40	4	1
GSX20080S-2D	★	0.8	1.6	2.1	40	4	1
GSX20090S-2D	★	0.9	1.8	2.3	40	4	1
GSX20100S-2D	★	1.0	2.5	3.5	40	4	1
GSX20110S-2D	★	1.1	2.5	3.5	40	4	1
GSX20120S-2D	★	1.2	2.5	3.5	40	4	1
GSX20130S-2D	★	1.3	2.6	3.6	40	4	1
GSX20140S-2D	★	1.4	2.8	3.8	40	4	1
GSX20150S-2D	★	1.5	3.8	4.8	40	4	1
GSX20150S-2D-S3	★	1.5	3.8	4.8	38	3	1
GSX20160S-2D	★	1.6	3.8	4.8	40	4	1
GSX20170S-2D	★	1.7	3.8	4.8	40	4	1
GSX20180S-2D	★	1.8	3.8	4.8	40	4	1
GSX20190S-2D	★	1.9	3.8	4.8	40	4	1
GSX20200S-2D	★	2.0	5.0	6.0	40	4	1
GSX20200S-2D-S3	★	2.0	5.0	6.0	38	3	1
GSX20210S-2D	★	2.1	6.0	7.0	40	4	1
GSX20220S-2D	★	2.2	6.0	7.0	40	4	1
GSX20230S-2D	★	2.3	6.0	7.0	40	4	1
GSX20240S-2D	★	2.4	6.0	7.0	40	4	1
GSX20250S-2D	★	2.5	6.3	7.3	40	4	1
GSX20260S-2D	★	2.6	7.0	8.0	40	4	1
GSX20270S-2D	★	2.7	7.0	8.0	40	4	1
GSX20280S-2D	★	2.8	7.0	8.0	40	4	1
GSX20290S-2D	★	2.9	7.0	8.0	40	4	1
GSX20300S-2D	★	3.0	7.5	9.0	45	6	1
GSX20300S-2D-S3	★	3.0	7.5	-	38	3	2
GSX20310S-2D	★	3.1	7.5	9.0	45	6	1
GSX20320S-2D	★	3.2	7.5	9.0	45	6	1
GSX20330S-2D	★	3.3	7.5	9.0	45	6	1
GSX20340S-2D	★	3.4	7.5	9.0	45	6	1
GSX20350S-2D	★	3.5	8.8	10.3	45	6	1
GSX20360S-2D	★	3.6	8.8	10.3	45	6	1
GSX20370S-2D	★	3.7	8.8	10.3	45	6	1
GSX20380S-2D	★	3.8	8.8	10.3	45	6	1
GSX20390S-2D	★	3.9	8.8	10.3	45	6	1
GSX20400S-2D	★	4.0	11.0	14.0	45	6	1
GSX20400S-2D-S4	★	4.0	11.0	-	45	4	2
GSX20410S-2D	★	4.1	11.0	14.0	45	6	1
GSX20420S-2D	★	4.2	11.0	14.0	45	6	1
GSX20430S-2D	★	4.3	11.0	14.0	45	6	1

Grade: ACF20

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL 2 Flute Endmills Sharp Edge GSX 20000S-2D Type

General Steel Carbon Steel Alloy Steel Pre-hardened Steel Tempered Steel / Die Steel Hardened Steel 45 to 53HRC Hardened Steel 55 to 60HRC Stainless Steel Ti Alloy / Heat Resistant Alloy Cast Iron

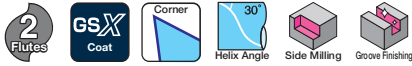


Fig 1

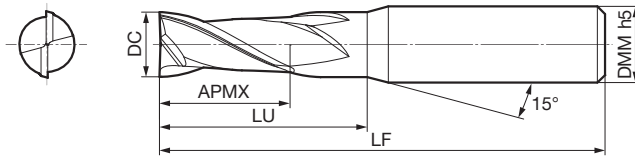
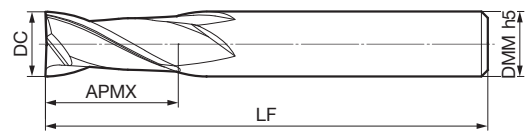


Fig 2



DC	Tolerance
$D \leq 3.0$	0 -0.015
$3.0 < D \leq 12$	0 -0.020
$12.0 < D$	0 -0.030

Body (Diameter $\phi 4.4$ to 8.8mm)

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX20440S-2D	★	4.4	11.0	14.0	45	6	1
GSX20450S-2D	★	4.5	11.3	12.8	50	6	1
GSX20460S-2D	★	4.6	11.3	12.8	50	6	1
GSX20470S-2D	★	4.7	11.3	12.8	50	6	1
GSX20480S-2D	★	4.8	11.3	12.8	50	6	1
GSX20490S-2D	★	4.9	11.3	12.8	50	6	1
GSX20500S-2D	★	5.0	13.0	19.6	50	6	1
GSX20510S-2D	★	5.1	13.0	19.6	50	6	1
GSX20520S-2D	★	5.2	13.0	19.6	50	6	1
GSX20530S-2D	★	5.3	13.0	19.6	50	6	1
GSX20540S-2D	★	5.4	13.0	19.6	50	6	1
GSX20550S-2D	★	5.5	13.0	19.6	50	6	1
GSX20560S-2D	★	5.6	13.0	19.6	50	6	1
GSX20570S-2D	★	5.7	13.0	19.6	50	6	1
GSX20580S-2D	★	5.8	13.0	19.6	50	6	1
GSX20590S-2D	★	5.9	13.0	19.6	50	6	1
GSX20600S-2D	★	6.0	13.0	-	50	6	2
GSX20610S-2D	★	6.1	13.0	19.6	50	8	1
GSX20620S-2D	★	6.2	13.0	19.6	50	8	1
GSX20630S-2D	★	6.3	13.0	19.6	50	8	1
GSX20640S-2D	★	6.4	13.0	19.6	50	8	1
GSX20650S-2D	★	6.5	13.0	19.6	60	8	1
GSX20660S-2D	★	6.6	13.2	19.8	60	8	1
GSX20670S-2D	★	6.7	13.4	20.0	60	8	1
GSX20680S-2D	★	6.8	13.6	20.2	60	8	1
GSX20690S-2D	★	6.9	13.8	20.4	60	8	1
GSX20700S-2D	★	7.0	16.0	21.1	60	8	1
GSX20710S-2D	★	7.1	16.0	21.1	60	8	1
GSX20720S-2D	★	7.2	16.0	21.1	60	8	1
GSX20730S-2D	★	7.3	16.0	21.1	60	8	1
GSX20740S-2D	★	7.4	16.0	21.1	60	8	1
GSX20750S-2D	★	7.5	16.0	21.1	60	8	1
GSX20760S-2D	★	7.6	16.0	21.1	60	8	1
GSX20770S-2D	★	7.7	16.0	21.1	60	8	1
GSX20780S-2D	★	7.8	16.0	21.1	60	8	1
GSX20790S-2D	★	7.9	16.0	21.1	60	8	1
GSX20800S-2D	★	8.0	19.0	-	60	8	2
GSX20810S-2D	★	8.1	19.0	24.1	60	10	1
GSX20820S-2D	★	8.2	19.0	24.1	60	10	1
GSX20830S-2D	★	8.3	19.0	24.1	60	10	1
GSX20840S-2D	★	8.4	19.0	24.1	60	10	1
GSX20850S-2D	★	8.5	19.0	24.1	70	10	1
GSX20860S-2D	★	8.6	19.0	24.1	70	10	1
GSX20870S-2D	★	8.7	19.0	24.1	70	10	1
GSX20880S-2D	★	8.8	19.0	24.1	70	10	1

Grade: ACF20

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL 2 Flute Endmills Sharp Edge 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

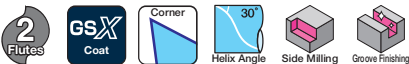


Fig 1

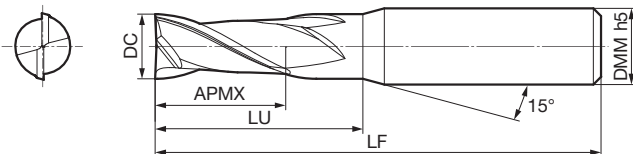
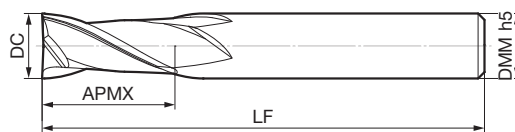


Fig 2



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
GSX20890S-2D	★	8.9	19.0	24.1	70	10	1
GSX20900S-2D	★	9.0	19.0	24.1	70	10	1
GSX20910S-2D	★	9.1	19.0	24.1	70	10	1
GSX20920S-2D	★	9.2	19.0	24.1	70	10	1
GSX20930S-2D	★	9.3	19.0	24.1	70	10	1
GSX20940S-2D	★	9.4	19.0	24.1	70	10	1
GSX20950S-2D	★	9.5	20.0	25.1	70	10	1
GSX20960S-2D	★	9.6	20.0	25.1	70	10	1
GSX20970S-2D	★	9.7	20.0	25.1	70	10	1
GSX20980S-2D	★	9.8	20.0	25.1	70	10	1
GSX20990S-2D	★	9.9	20.0	25.1	70	10	1
GSX21000S-2D	★	10.0	22.0	-	70	10	2
GSX21050S-2D	★	10.5	22.0	24.5	75	12	1
GSX21100S-2D	★	11.0	22.0	24.5	75	12	1
GSX21150S-2D	★	11.5	23.0	25.5	75	12	1
GSX21200S-2D	★	12.0	26.0	-	75	12	2
GSX21250S-2D	★	12.5	26.0	29.5	75	16	1
GSX21300S-2D	★	13.0	26.0	29.5	90	16	1
GSX21400S-2D	★	14.0	28.0	31.5	90	16	1
GSX21500S-2D	★	15.0	30.0	33.5	90	16	1
GSX21600S-2D	★	16.0	32.0	-	90	16	2
GSX21700S-2D	★	17.0	35.0	39.5	100	20	1
GSX21800S-2D	★	18.0	40.0	44.5	100	20	1
GSX21900S-2D	★	19.0	40.0	44.5	100	20	1
GSX22000S-2D	★	20.0	40.0	-	100	20	2
GSX22100S-2D	★	21.0	42.0	47.0	110	25	1
GSX22200S-2D	★	22.0	44.0	49.0	110	25	1
GSX22300S-2D	★	23.0	46.0	51.0	120	25	1
GSX22400S-2D	★	24.0	48.0	53.0	120	25	1
GSX22500S-2D	★	25.0	50.0	-	120	25	2

Grade: ACF20

Endmill Identification (GSXMILL Series Only)

GSX 2 0150 S - 2D - S3

Series Code Number of Teeth Dia. Cutting Edge S: Sharp Edge Cutting Edge Length Shank Dia.

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

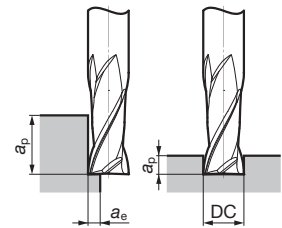
Coated

Uncoated

GSX MILL 2 Flute Endmills Sharp Edge 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	Steel for Structure 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	
	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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	2.0DC															
	0.02DC								0.01DC							

Groove Finishing

Work Material Cutting Conditions	Steel for Structure 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	
	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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	1.5DC															
	Below 0.02DC															

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL Endmills (2 Flutes) 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



Fig 1

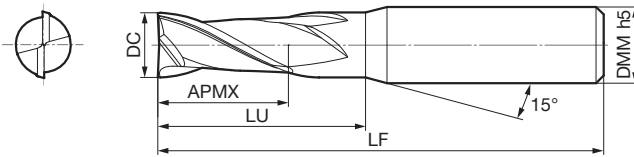
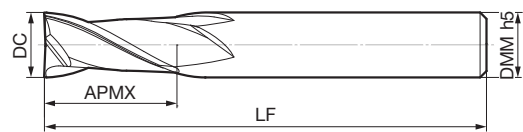


Fig 2



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
GSX20050C-2D	★	0.5	1.0	1.4	40	4	1
GSX20100C-2D	★	1.0	2.0	3.0	40	4	1
GSX20150C-2D	★	1.5	3.0	4.0	40	4	1
GSX20200C-2D	★	2.0	4.0	5.0	40	4	1
GSX20250C-2D	★	2.5	5.0	6.0	40	4	1
GSX20300C-2D	★	3.0	6.0	7.5	45	6	1
GSX20350C-2D	★	3.5	7.0	8.5	45	6	1
GSX20400C-2D	★	4.0	8.0	9.5	45	6	1
GSX20450C-2D	★	4.5	9.0	10.5	50	6	1
GSX20500C-2D	★	5.0	10.0	12.0	50	6	1
GSX20550C-2D	★	5.5	11.0	13.0	50	6	1
GSX20600C-2D	★	6.0	12.0	-	50	6	2
GSX20650C-2D	★	6.5	13.0	15.0	60	8	1
GSX20700C-2D	★	7.0	14.0	16.0	60	8	1
GSX20750C-2D	★	7.5	15.0	17.0	60	8	1
GSX20800C-2D	★	8.0	16.0	-	60	8	2
GSX20850C-2D	★	8.5	17.0	19.0	70	10	1
GSX20900C-2D	★	9.0	18.0	20.0	70	10	1
GSX20950C-2D	★	9.5	19.0	21.0	70	10	1
GSX21000C-2D	★	10.0	20.0	-	70	10	2
GSX21050C-2D	★	10.5	21.0	23.5	75	12	1
GSX21100C-2D	★	11.0	22.0	24.5	75	12	1
GSX21150C-2D	★	11.5	23.0	25.5	75	12	1
GSX21200C-2D	★	12.0	24.0	-	75	12	2
GSX21300C-2D	★	13.0	26.0	29.5	90	16	1
GSX21400C-2D	★	14.0	28.0	31.5	90	16	1
GSX21500C-2D	★	15.0	30.0	33.5	90	16	1
GSX21600C-2D	★	16.0	32.0	-	90	16	2
GSX21700C-2D	★	17.0	34.0	38.5	100	20	1
GSX21800C-2D	★	18.0	36.0	40.5	100	20	1
GSX21900C-2D	★	19.0	38.0	42.5	100	20	1
GSX22000C-2D	★	20.0	40.0	-	100	20	2
GSX22500C-2D	★	25.0	50.0	-	120	25	2

Grade: ACF20

Endmill Identification (GSXMILL Series Only)

GSX 2 0050 C - 2D

Series Code Number of Teeth Dia. Cutting Edge C: Gash Land Cutting Edge Length

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

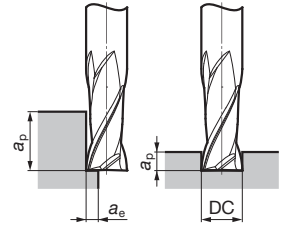
Uncoated

GSX MILL Endmills (2 Flutes)

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	Steel for Structure 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)		
	1.0	19,600	250	19,600	250	19,600	250	18,300	180	12,700	100	9,000	60	11,000	70	9,000	50
	2.0	11,200	340	11,200	340	11,200	340	10,500	240	7,300	130	5,300	80	6,400	90	5,300	70
	4.0	6,400	460	6,400	460	6,400	460	6,000	320	4,200	180	3,000	110	3,600	120	3,000	90
	6.0	4,600	560	4,600	560	4,600	560	4,300	400	3,000	210	2,200	130	2,700	140	2,200	100
	8.0	3,400	560	3,400	560	3,400	560	3,200	400	2,200	210	1,600	130	2,000	140	1,600	100
	10.0	2,800	560	2,800	560	2,800	560	2,600	400	1,800	210	1,300	130	1,600	140	1,300	100
	12.0	2,300	560	2,300	560	2,300	560	2,200	400	1,500	210	1,100	130	1,300	140	1,100	100
	16.0	1,700	450	1,700	450	1,700	450	1,600	320	1,100	180	800	100	1,000	110	800	85
	20.0	1,350	380	1,350	380	1,350	380	1,300	280	900	160	650	90	800	100	650	75
	25.0	1,000	300	1,000	300	1,000	300	1,000	220	700	120	500	70	640	80	500	60
Standard Depth of Cut	a _p	1.5DC										1.0DC					
	a _e	0.05DC										0.02DC					

Groove Milling

Work Material Cutting Conditions		Steel for Structure 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	a _p	0.2DC		0.5DC				0.2DC		0.05DC		0.2DC					

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL 2 Flute Endmills Sharp Edge GSX 2000S-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

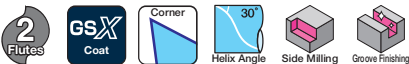


Fig 1

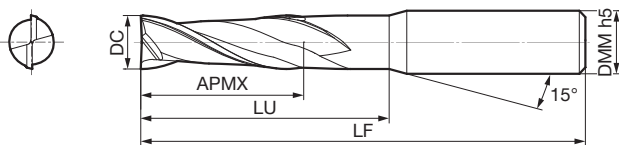
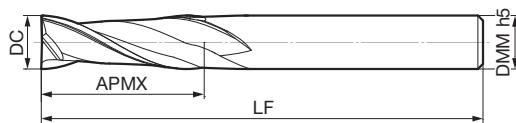


Fig 2



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
GSX20050S-3D	★	0.5	1.5	1.9	40	4	1
GSX20100S-3D	★	1.0	3.0	4.0	40	4	1
GSX20150S-3D	★	1.5	4.5	5.5	40	4	1
GSX20200S-3D	★	2.0	6.0	7.0	40	4	1
GSX20250S-3D	★	2.5	7.5	8.5	40	4	1
GSX20260S-3D	★	2.6	8.0	9.5	50	4	1
GSX20270S-3D	★	2.7	8.5	10.0	50	4	1
GSX20280S-3D	★	2.8	9.0	10.5	50	4	1
GSX20290S-3D	★	2.9	9.0	10.5	50	4	1
GSX20300S-3D	★	3.0	9.0	10.5	50	6	1
GSX20350S-3D	★	3.5	12.0	13.5	50	6	1
GSX20400S-3D	★	4.0	12.0	13.5	50	6	1
GSX20450S-3D	★	4.5	15.0	16.5	50	6	1
GSX20500S-3D	★	5.0	15.0	17.0	50	6	1
GSX20550S-3D	★	5.5	18.0	20.0	50	6	1
GSX20600S-3D	★	6.0	18.0	-	50	6	2
GSX20650S-3D	★	6.5	20.0	22.0	70	8	1
GSX20700S-3D	★	7.0	21.0	23.0	70	8	1
GSX20750S-3D	★	7.5	23.0	25.0	70	8	1
GSX20800S-3D	★	8.0	24.0	-	70	8	2
GSX20850S-3D	★	8.5	26.0	28.0	75	10	1
GSX20900S-3D	★	9.0	27.0	29.0	75	10	1
GSX20950S-3D	★	9.5	29.0	31.0	75	10	1
GSX21000S-3D	★	10.0	30.0	-	90	10	2
GSX21050S-3D	★	10.5	32.0	34.5	90	12	1
GSX21100S-3D	★	11.0	33.0	35.5	90	12	1
GSX21150S-3D	★	11.5	35.0	37.5	90	12	1
GSX21200S-3D	★	12.0	36.0	-	90	12	2
GSX21300S-3D	★	13.0	39.0	42.5	100	16	1
GSX21400S-3D	★	14.0	42.0	45.5	110	16	1
GSX21500S-3D	★	15.0	45.0	48.5	110	16	1
GSX21600S-3D	★	16.0	48.0	-	110	16	2
GSX21700S-3D	★	17.0	51.0	55.5	110	20	1
GSX21800S-3D	★	18.0	54.0	58.5	120	20	1
GSX21900S-3D	★	19.0	57.0	61.5	120	20	1
GSX22000S-3D	★	20.0	60.0	-	120	20	2
GSX22400S-3D	★	24.0	72.0	77.0	130	25	1
GSX22500S-3D	★	25.0	75.0	-	130	25	2

Grade: ACF20

Endmill Identification (GSXMILL Series Only)

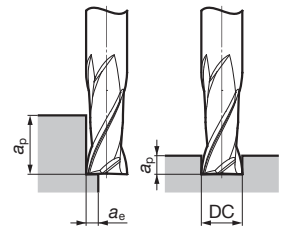
GSX 2 0050 S - 3D

Series Code Number of Teeth Dia. Cutting Edge S: Sharp Edge Cutting Edge Length

GSX MILL 2 Flute Endmills Sharp Edge 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	Steel for Structure 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		
	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	
	DC (mm)																
	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	a _p	2.5DC								2.0DC							
	a _e	Below ø3: 0.02DC, Above ø3: 0.05DC								0.01DC							

Groove Finishing

Work Material Cutting Conditions	Steel for Structure 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		
	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	
DC (mm)	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	a _p	1.5DC															
	a _e	Below 0.02DC															

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL Endmills (2 Flutes) 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



Fig 1

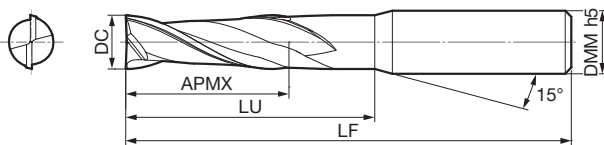
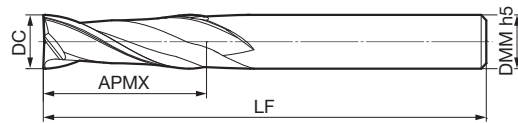


Fig 2



DC	Tolerance
$D \leq 3.0$	0 -0.015
$3.0 < D \leq 12$	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
GSX20050C-3D	★	0.5	1.5	1.9	40	4	1
GSX20100C-3D	★	1.0	3.0	4.0	40	4	1
GSX20150C-3D	★	1.5	4.5	5.5	40	4	1
GSX20200C-3D	★	2.0	6.0	7.0	40	4	1
GSX20250C-3D	★	2.5	7.5	8.5	40	4	1
GSX20300C-3D	★	3.0	9.0	10.5	50	6	1
GSX20350C-3D	★	3.5	11.0	12.5	50	6	1
GSX20400C-3D	★	4.0	12.0	13.5	50	6	1
GSX20450C-3D	★	4.5	14.0	15.5	50	6	1
GSX20500C-3D	★	5.0	15.0	17.0	50	6	1
GSX20550C-3D	★	5.5	17.0	19.0	50	6	1
GSX20600C-3D	★	6.0	18.0	-	50	6	2
GSX20650C-3D	★	6.5	20.0	22.0	70	8	1
GSX20700C-3D	★	7.0	21.0	23.0	70	8	1
GSX20750C-3D	★	7.5	23.0	25.0	70	8	1
GSX20800C-3D	★	8.0	24.0	-	70	8	2
GSX20850C-3D	★	8.5	26.0	28.0	75	10	1
GSX20900C-3D	★	9.0	27.0	29.0	75	10	1
GSX20950C-3D	★	9.5	29.0	31.0	75	10	1
GSX21000C-3D	★	10.0	30.0	-	90	10	2
GSX21050C-3D	★	10.5	32.0	34.5	90	12	1
GSX21100C-3D	★	11.0	33.0	35.5	90	12	1
GSX21150C-3D	★	11.5	35.0	37.5	90	12	1
GSX21200C-3D	★	12.0	36.0	-	90	12	2
GSX21300C-3D	★	13.0	39.0	42.5	100	16	1
GSX21400C-3D	★	14.0	42.0	45.5	110	16	1
GSX21500C-3D	★	15.0	45.0	48.5	110	16	1
GSX21600C-3D	★	16.0	48.0	-	110	16	2
GSX21700C-3D	★	17.0	51.0	55.5	110	20	1
GSX21800C-3D	★	18.0	54.0	58.5	120	20	1
GSX21900C-3D	★	19.0	57.0	61.5	120	20	1
GSX22000C-3D	★	20.0	60.0	-	120	20	2
GSX22500C-3D	★	25.0	75.0	-	130	25	2

Grade: ACF20

Endmill Identification (GSXMILL Series Only)

GSX 2 0100 C - 3D

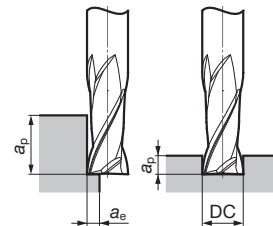
Series Code Number of Teeth Dia. Cutting Edge C: Gash Land Cutting Edge Length

GSX MILL Endmills (2 Flutes)

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, chatter 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	Steel for Structure 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		
	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	
DC (mm)	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	a _p	2.5DC								2.0DC							
	a _e	Below ø3: 0.05DC, Above ø3: 0.1DC								0.02DC							

Groove Milling

Work Material Cutting Conditions	Steel for Structure 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	Feed Rate	Spindle Speed	Feed Rate	Spindle Speed	Feed Rate	Spindle Speed	Feed Rate	Spindle Speed	Feed Rate	Spindle Speed	Feed Rate	Spindle Speed	Feed Rate	Spindle Speed	Feed Rate
		(min ⁻¹)	(mm/min)	(min ⁻¹)	(mm/min)	(min ⁻¹)	(mm/min)	(min ⁻¹)	(mm/min)	(min ⁻¹)	(mm/min)	(min ⁻¹)	(mm/min)	(min ⁻¹)	(mm/min)	(min ⁻¹)	(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	a _p	0.1DC		0.2DC						0.05DC		0.1DC					

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL 2 Flute Endmills Sharp Edge 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

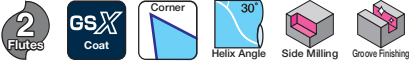


Fig 1

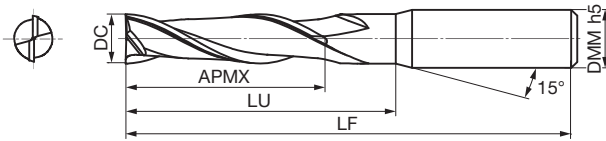
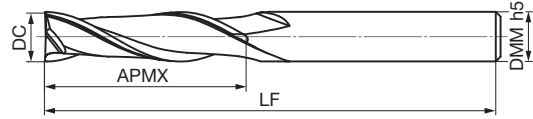


Fig 2



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
GSX20050S-4D	★	0.5	2.0	2.4	40	4	1
GSX20100S-4D	★	1.0	5.0	6.0	40	4	1
GSX20150S-4D	★	1.5	7.0	8.0	40	4	1
GSX20200S-4D	★	2.0	9.0	10.0	40	4	1
GSX20250S-4D	★	2.5	12.0	13.0	50	4	1
GSX20300S-4D	★	3.0	12.0	13.5	50	6	1
GSX20350S-4D	★	3.5	14.0	15.5	50	6	1
GSX20400S-4D	★	4.0	16.0	17.5	50	6	1
GSX20450S-4D	★	4.5	18.0	19.5	60	6	1
GSX20500S-4D	★	5.0	20.0	22.0	60	6	1
GSX20550S-4D	★	5.5	22.0	24.0	60	6	1
GSX20600S-4D	★	6.0	24.0	-	60	6	2
GSX20650S-4D	★	6.5	26.0	28.0	70	8	1
GSX20700S-4D	★	7.0	28.0	30.0	80	8	1
GSX20750S-4D	★	7.5	30.0	32.0	80	8	1
GSX20800S-4D	★	8.0	32.0	-	80	8	2
GSX20850S-4D	★	8.5	34.0	36.0	90	10	1
GSX20900S-4D	★	9.0	36.0	38.0	90	10	1
GSX20950S-4D	★	9.5	38.0	40.0	90	10	1
GSX21000S-4D	★	10.0	40.0	-	90	10	2
GSX21050S-4D	★	10.5	42.0	44.5	100	12	1
GSX21100S-4D	★	11.0	44.0	46.5	100	12	1
GSX21150S-4D	★	11.5	46.0	48.5	100	12	1
GSX21200S-4D	★	12.0	48.0	-	100	12	2
GSX21300S-4D	★	13.0	52.0	55.5	110	16	1
GSX21400S-4D	★	14.0	56.0	59.5	120	16	1
GSX21500S-4D	★	15.0	60.0	63.5	120	16	1
GSX21600S-4D	★	16.0	64.0	-	120	16	2
GSX21700S-4D	★	17.0	68.0	72.5	130	20	1
GSX21800S-4D	★	18.0	72.0	76.5	130	20	1
GSX21900S-4D	★	19.0	76.0	80.5	140	20	1
GSX22000S-4D	★	20.0	80.0	-	140	20	2
GSX22500S-4D	★	25.0	100.0	-	160	25	2

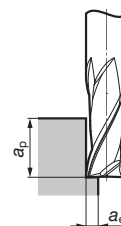
Grade: ACF20

Endmill Identification (GSXMILL Series Only)

GSX 2 0100 S - 4D

Series Code Number of Teeth Dia. Cutting Edge S: Sharp Edge Cutting Edge Length

GSX MILL 2 Flute Endmills Sharp Edge 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	Steel for Structure 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	
	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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	2.5DC Below ø3: 0.02DC, Above ø3: 0.05DC								2.0DC 0.01DC							

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL Endmills (2 Flutes) 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

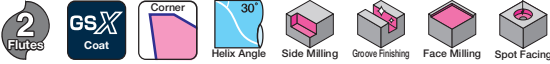


Fig 1

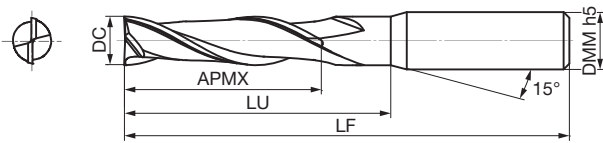
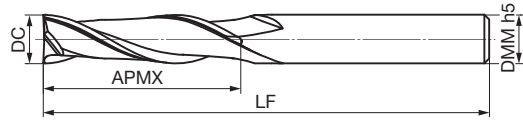


Fig 2



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
GSX20050C-4D	★	0.5	2.0	2.4	40	4	1
GSX20100C-4D	★	1.0	4.0	5.0	40	4	1
GSX20150C-4D	★	1.5	6.0	7.0	40	4	1
GSX20200C-4D	★	2.0	8.0	9.0	40	4	1
GSX20250C-4D	★	2.5	10.0	11.0	50	4	1
GSX20300C-4D	★	3.0	12.0	13.5	50	6	1
GSX20350C-4D	★	3.5	14.0	15.5	50	6	1
GSX20400C-4D	★	4.0	16.0	17.5	50	6	1
GSX20450C-4D	★	4.5	18.0	19.5	60	6	1
GSX20500C-4D	★	5.0	20.0	22.0	60	6	1
GSX20550C-4D	★	5.5	22.0	24.0	60	6	1
GSX20600C-4D	★	6.0	24.0	-	60	6	2
GSX20650C-4D	★	6.5	26.0	28.0	70	8	1
GSX20700C-4D	★	7.0	28.0	30.0	80	8	1
GSX20750C-4D	★	7.5	30.0	32.0	80	8	1
GSX20800C-4D	★	8.0	32.0	-	80	8	2
GSX20850C-4D	★	8.5	34.0	36.0	90	10	1
GSX20900C-4D	★	9.0	36.0	38.0	90	10	1
GSX20950C-4D	★	9.5	38.0	40.0	90	10	1
GSX21000C-4D	★	10.0	40.0	-	90	10	2
GSX21050C-4D	★	10.5	42.0	44.5	100	12	1
GSX21100C-4D	★	11.0	44.0	46.5	100	12	1
GSX21150C-4D	★	11.5	46.0	48.5	100	12	1
GSX21200C-4D	★	12.0	48.0	-	100	12	2
GSX21300C-4D	★	13.0	52.0	55.5	110	16	1
GSX21400C-4D	★	14.0	56.0	59.5	120	16	1
GSX21500C-4D	★	15.0	60.0	63.5	120	16	1
GSX21600C-4D	★	16.0	64.0	-	120	16	2
GSX21700C-4D	★	17.0	68.0	72.5	130	20	1
GSX21800C-4D	★	18.0	72.0	76.5	130	20	1
GSX21900C-4D	★	19.0	76.0	80.5	140	20	1
GSX22000C-4D	★	20.0	80.0	-	140	20	2
GSX22500C-4D	★	25.0	100.0	-	160	25	2

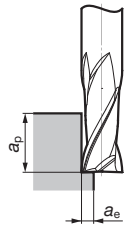
Grade: ACF20

Endmill Identification (GSXMILL Series Only)

GSX 2 0100 C - 4D

Series Code Number of Teeth Dia. Cutting Edge C. Gash Land Cutting Edge Length

GSX MILL Endmills (2 Flutes) 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, chatter 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	Steel for Structure 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	
	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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	a _p		a _p		a _p		a _p		a _p		a _p		a _p		a _p	
	0.08DC		0.08DC		0.08DC		0.08DC		0.08DC		0.04DC		0.04DC		0.04DC	

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL Endmills (3 Flutes) 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



Fig 1

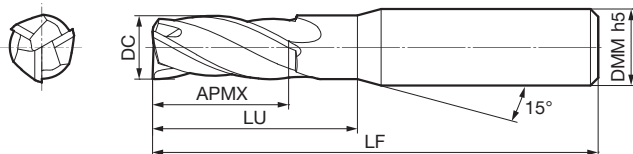
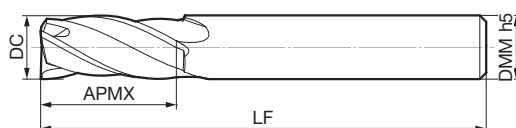


Fig 2



DC	Tolerance
$D \leq 3.0$	0 -0.015
$3.0 < D \leq 12$	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
GSX30100C-1.5D	★	1.0	1.5	2.5	40	4	1
GSX30150C-1.5D	★	1.5	2.3	3.3	40	4	1
GSX30200C-1.5D	★	2.0	3.0	4.0	40	4	1
GSX30250C-1.5D	★	2.5	3.8	4.8	40	4	1
GSX30300C-1.5D	★	3.0	4.5	6.0	45	6	1
GSX30400C-1.5D	★	4.0	6.0	7.5	45	6	1
GSX30500C-1.5D	★	5.0	7.5	9.5	50	6	1
GSX30600C-1.5D	★	6.0	9.0	-	50	6	2
GSX30700C-1.5D	★	7.0	11.0	13.0	60	8	1
GSX30800C-1.5D	★	8.0	12.0	-	60	8	2
GSX30900C-1.5D	★	9.0	14.0	16.0	70	10	1
GSX31000C-1.5D	★	10.0	15.0	-	70	10	2
GSX31200C-1.5D	★	12.0	18.0	-	75	12	2

Grade: ACF20

Endmill Identification (GSXMILL Series Only)

GSX 3 0100 C - 1.5D

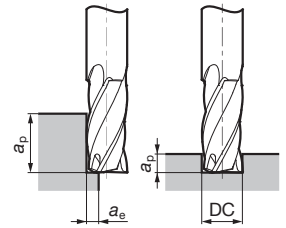
Series Code Number of Teeth Dia. Cutting Edge C: Gash Land Cutting Edge Length

GSX MILL Endmills (3 Flutes)

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	Steel for Structure 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	
	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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	a_p		a_e		1.5DC		0.05DC		1.0DC		0.02DC					

Groove Milling

Work Material Cutting Conditions	Steel for Structure 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	
	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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	a_p		0.2DC		0.5DC		0.2DC		0.05DC		0.2DC		0.2DC			

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL Endmills (3 Flutes) 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



Fig 1

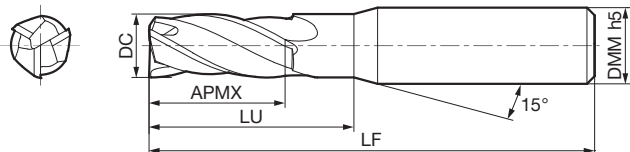
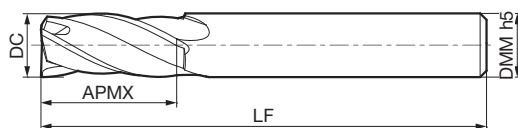


Fig 2



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
GSX30100C-2D	★	1.0	2.5	3.5	40	4	1
GSX30150C-2D	★	1.5	3.8	4.8	40	4	1
GSX30200C-2D	★	2.0	5.0	6.0	40	4	1
GSX30250C-2D	★	2.5	6.3	7.3	40	4	1
GSX30300C-2D	★	3.0	7.5	9.0	45	6	1
GSX30400C-2D	★	4.0	11.0	12.5	45	6	1
GSX30500C-2D	★	5.0	13.0	15.0	50	6	1
GSX30600C-2D	★	6.0	13.0	-	50	6	2
GSX30700C-2D	★	7.0	16.0	18.0	60	8	1
GSX30800C-2D	★	8.0	19.0	-	60	8	2
GSX30900C-2D	★	9.0	19.0	21.0	70	10	1
GSX31000C-2D	★	10.0	22.0	-	70	10	2
GSX31200C-2D	★	12.0	26.0	-	75	12	2

Grade: ACF20

Endmill Identification (GSXMILL Series Only)

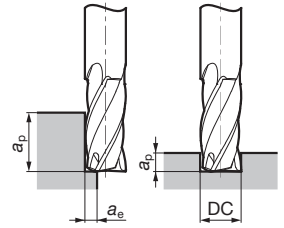
GSX 3 0100 C - 2D

Series Code Number of Teeth Dia. Cutting Edge C: Gash Land Cutting Edge Length

GSX MILL Endmills (3 Flutes) 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	Steel for Structure 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	
	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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		ae		1.5DC		0.05DC		1.0DC		0.02DC					

Groove Milling

Work Material Cutting Conditions	Steel for Structure 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	
	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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					

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL Endmills (4 Flutes) GSX 4000C-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



Fig 1

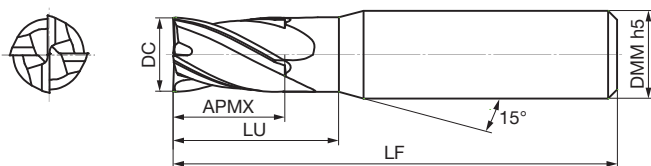
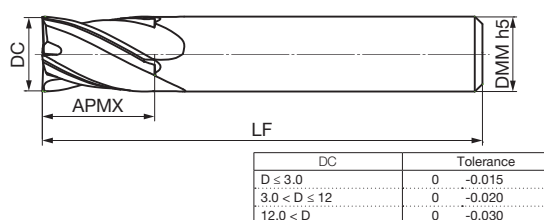


Fig 2



Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX40100C-1.5D	★	1.0	1.5	2.5	40	4	1
GSX40150C-1.5D	★	1.5	2.3	3.3	40	4	1
GSX40200C-1.5D	★	2.0	3.0	4.0	40	4	1
GSX40250C-1.5D	★	2.5	3.8	4.8	40	4	1
GSX40300C-1.5D	★	3.0	4.5	6.0	45	6	1
GSX40350C-1.5D	★	3.5	5.3	6.8	45	6	1
GSX40400C-1.5D	★	4.0	6.0	7.5	45	6	1
GSX40450C-1.5D	★	4.5	6.8	8.3	50	6	1
GSX40500C-1.5D	★	5.0	7.5	9.5	50	6	1
GSX40550C-1.5D	★	5.5	8.3	10.3	50	6	1
GSX40600C-1.5D	★	6.0	9.0	-	50	6	2
GSX40650C-1.5D	★	6.5	10.0	12.0	60	8	1
GSX40700C-1.5D	★	7.0	11.0	13.0	60	8	1
GSX40750C-1.5D	★	7.5	12.0	14.0	60	8	1
GSX40800C-1.5D	★	8.0	12.0	-	60	8	2
GSX40850C-1.5D	★	8.5	13.0	15.0	70	10	1
GSX40900C-1.5D	★	9.0	14.0	16.0	70	10	1
GSX40950C-1.5D	★	9.5	15.0	17.0	70	10	1
GSX41000C-1.5D	★	10.0	15.0	-	70	10	2
GSX41050C-1.5D	★	10.5	16.0	18.5	75	12	1
GSX41100C-1.5D	★	11.0	17.0	19.5	75	12	1
GSX41150C-1.5D	★	11.5	18.0	20.5	75	12	1
GSX41200C-1.5D	★	12.0	18.0	-	75	12	2
GSX41300C-1.5D	★	13.0	20.0	23.5	90	16	1
GSX41400C-1.5D	★	14.0	21.0	24.5	90	16	1
GSX41500C-1.5D	★	15.0	23.0	26.5	90	16	1
GSX41600C-1.5D	★	16.0	24.0	-	90	16	2
GSX41700C-1.5D	★	17.0	26.0	30.5	100	20	1
GSX41800C-1.5D	★	18.0	27.0	31.5	100	20	1
GSX41900C-1.5D	★	19.0	29.0	33.5	100	20	1
GSX42000C-1.5D	★	20.0	30.0	-	100	20	2
GSX42500C-1.5D	★	25.0	38.0	-	120	25	2

Grade: ACF20

Endmill Identification (GSXMILL Series Only)

GSX 4 0100 C - 1.5D

Series Code Number of Teeth Dia. Cutting Edge C: Gash Land Cutting Edge Length

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

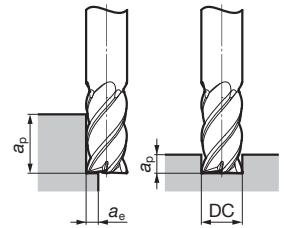
Uncoated

GSX MILL Endmills (4 Flutes)

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	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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	1.5DC										1.0DC					
	0.05DC										0.02DC					

Side Milling (High Speed Machining Centre)

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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	1.5DC										1.0DC					
	0.05DC										0.02DC					

Groove Milling

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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	0.2DC		0.5DC						0.2DC		0.05DC		0.2DC			

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL 4 Flute Endmills Sharp Edge 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

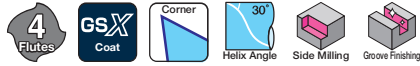


Fig 1

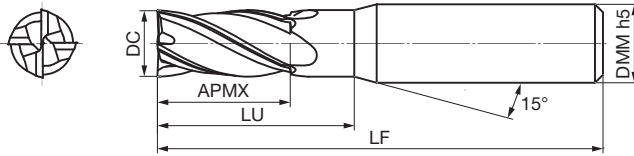
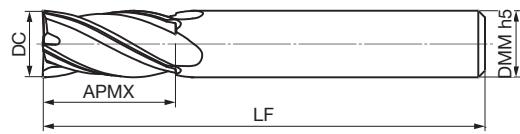


Fig 2



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
GSX40100S-2D	★	1.0	2.5	3.5	40	4	1
GSX40100S-2D-S3	★	1.0	2.5	3.5	38	3	1
GSX40150S-2D	★	1.5	3.8	4.8	40	4	1
GSX40200S-2D	★	2.0	5.0	6.0	40	4	1
GSX40200S-2D-S3	★	2.0	5.0	6.0	38	3	1
GSX40250S-2D	★	2.5	6.3	7.3	40	4	1
GSX40300S-2D	★	3.0	7.5	9.0	45	6	1
GSX40300S-2D-S3	★	3.0	7.5	-	38	3	2
GSX40350S-2D	★	3.5	8.8	10.0	45	6	1
GSX40400S-2D	★	4.0	11.0	14.0	45	6	1
GSX40400S-2D-S4	★	4.0	11.0	-	45	4	2
GSX40450S-2D	★	4.5	11.3	12.8	50	6	1
GSX40500S-2D	★	5.0	13.0	19.6	50	6	1
GSX40550S-2D	★	5.5	13.0	19.6	50	6	1
GSX40600S-2D	★	6.0	13.0	-	50	6	2
GSX40650S-2D	★	6.5	13.0	19.6	60	8	1
GSX40700S-2D	★	7.0	16.0	21.1	60	8	1
GSX40750S-2D	★	7.5	16.0	21.1	60	8	1
GSX40800S-2D	★	8.0	19.0	-	60	8	2
GSX40850S-2D	★	8.5	19.0	24.1	70	10	1
GSX40900S-2D	★	9.0	19.0	24.1	70	10	1
GSX40950S-2D	★	9.5	19.0	24.1	70	10	1
GSX41000S-2D	★	10.0	22.0	-	70	10	2
GSX41050S-2D	★	10.5	22.0	24.5	75	12	1
GSX41100S-2D	★	11.0	22.0	24.5	75	12	1
GSX41150S-2D	★	11.5	23.0	25.5	75	12	1
GSX41200S-2D	★	12.0	26.0	-	75	12	2
GSX41300S-2D	★	13.0	26.0	29.5	90	16	1
GSX41350S-2D	★	13.5	27.0	30.5	90	16	1
GSX41400S-2D	★	14.0	28.0	31.5	90	16	1
GSX41500S-2D	★	15.0	30.0	33.5	90	16	1
GSX41600S-2D	★	16.0	32.0	-	90	16	2
GSX41700S-2D	★	17.0	35.0	39.5	100	20	1
GSX41800S-2D	★	18.0	40.0	44.5	100	20	1
GSX41900S-2D	★	19.0	40.0	44.5	100	20	1
GSX42000S-2D	★	20.0	40.0	-	100	20	2
GSX42200S-2D	★	22.0	44.0	49.0	110	25	1
GSX42400S-2D	★	24.0	48.0	53.0	120	25	1
GSX42500S-2D	★	25.0	50.0	-	120	25	2

Grade: ACF20

Endmill Identification (GSXMILL Series Only)

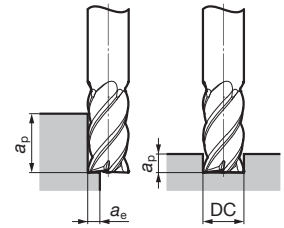
GSX 4 0100 S - 2D - S3

Series Code Number of Teeth Dia. Cutting Edge S: Sharp Edge Cutting Edge Length Shank Dia.

GSX MILL 4 Flute Endmills Sharp Edge 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	Steel for Structure 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	
	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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 a _p a _e	2.0DC										0.03DC					
											0.01DC					

Groove Finishing

Work Material Cutting Conditions	Steel for Structure 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	
	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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 a _p a _e	1.5DC										Below 0.02DC					

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL Endmills (4 Flutes) 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



Fig 1

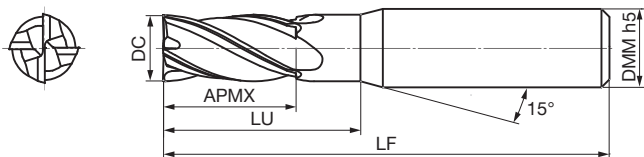
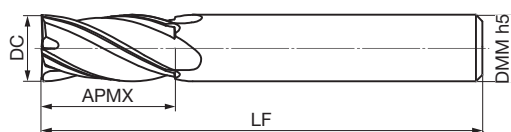


Fig 2



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
GSX40100C-2D	★	1.0	2.0	3.0	40	4	1
GSX40150C-2D	★	1.5	3.0	4.0	40	4	1
GSX40200C-2D	★	2.0	4.0	5.0	40	4	1
GSX40250C-2D	★	2.5	5.0	6.0	40	4	1
GSX40300C-2D	★	3.0	6.0	7.5	45	6	1
GSX40350C-2D	★	3.5	7.0	8.5	45	6	1
GSX40400C-2D	★	4.0	8.0	9.5	45	6	1
GSX40450C-2D	★	4.5	9.0	10.5	50	6	1
GSX40500C-2D	★	5.0	10.0	12.0	50	6	1
GSX40550C-2D	★	5.5	11.0	13.0	50	6	1
GSX40600C-2D	★	6.0	12.0	-	50	6	2
GSX40650C-2D	★	6.5	13.0	15.0	60	8	1
GSX40700C-2D	★	7.0	14.0	16.0	60	8	1
GSX40750C-2D	★	7.5	15.0	17.0	60	8	1
GSX40800C-2D	★	8.0	16.0	-	60	8	2
GSX40850C-2D	★	8.5	17.0	19.0	70	10	1
GSX40900C-2D	★	9.0	18.0	20.0	70	10	1
GSX40950C-2D	★	9.5	19.0	21.0	70	10	1
GSX41000C-2D	★	10.0	20.0	-	70	10	2
GSX41050C-2D	★	10.5	21.0	23.5	75	12	1
GSX41100C-2D	★	11.0	22.0	24.5	75	12	1
GSX41150C-2D	★	11.5	23.0	25.5	75	12	1
GSX41200C-2D	★	12.0	24.0	-	75	12	2
GSX41300C-2D	★	13.0	26.0	29.5	90	16	1
GSX41400C-2D	★	14.0	28.0	31.5	90	16	1
GSX41500C-2D	★	15.0	30.0	33.5	90	16	1
GSX41600C-2D	★	16.0	32.0	-	90	16	2
GSX41700C-2D	★	17.0	34.0	39.5	100	20	1
GSX41800C-2D	★	18.0	36.0	40.5	100	20	1
GSX41900C-2D	★	19.0	38.0	42.5	100	20	1
GSX42000C-2D	★	20.0	40.0	-	100	20	2
GSX42500C-2D	★	25.0	50.0	-	120	25	2

Grade: ACF20

Endmill Identification (GSXMILL Series Only)

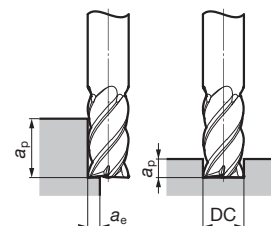
GSX 4 0100 C - 2D

Series Code Number of Teeth Dia. Cutting Edge C: Gash Land Cutting Edge Length

GSX MILL Endmills (4 Flutes) 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	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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 ap	1.5DC										1.0DC					
Depth of Cut ae	0.05DC										0.02DC					

Side Milling (High Speed Machining Centre)

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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 ap	1.5DC										1.0DC					
Depth of Cut ae	0.05DC										0.02DC					

Groove Milling

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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 ap	0.2DC		0.5DC				0.2DC		0.05DC		0.2DC					

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL 4 Flute Endmills Sharp Edge 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

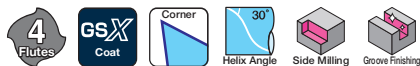


Fig 1

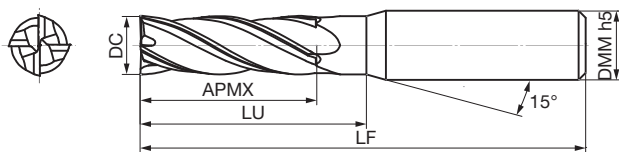
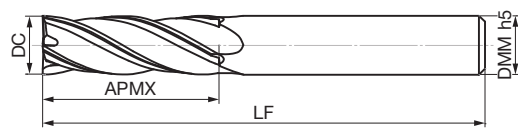


Fig 2



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
GSX40100S-3D	★	1.0	3.0	4.0	40	4	1
GSX40150S-3D	★	1.5	4.5	5.5	40	4	1
GSX40200S-3D	★	2.0	6.0	7.0	40	4	1
GSX40250S-3D	★	2.5	8.0	9.0	40	4	1
GSX40300S-3D	★	3.0	9.0	10.5	50	6	1
GSX40350S-3D	★	3.5	11.0	12.5	50	6	1
GSX40400S-3D	★	4.0	12.0	13.5	50	6	1
GSX40450S-3D	★	4.5	15.0	16.5	50	6	1
GSX40500S-3D	★	5.0	15.0	17.0	50	6	1
GSX40550S-3D	★	5.5	18.0	20.0	50	6	1
GSX40600S-3D	★	6.0	18.0	-	50	6	2
GSX40650S-3D	★	6.5	20.0	22.0	70	8	1
GSX40700S-3D	★	7.0	21.0	23.0	70	8	1
GSX40750S-3D	★	7.5	23.0	25.0	70	8	1
GSX40800S-3D	★	8.0	24.0	-	70	8	2
GSX40850S-3D	★	8.5	26.0	28.0	75	10	1
GSX40900S-3D	★	9.0	27.0	29.0	75	10	1
GSX40950S-3D	★	9.5	29.0	31.0	75	10	1
GSX41000S-3D	★	10.0	30.0	-	90	10	2
GSX41050S-3D	★	10.5	32.0	34.5	90	12	1
GSX41100S-3D	★	11.0	33.0	35.5	90	12	1
GSX41150S-3D	★	11.5	35.0	37.5	90	12	1
GSX41200S-3D	★	12.0	36.0	-	90	12	2
GSX41300S-3D	★	13.0	39.0	42.5	100	16	1
GSX41400S-3D	★	14.0	42.0	45.5	110	16	1
GSX41500S-3D	★	15.0	45.0	48.5	110	16	1
GSX41600S-3D	★	16.0	48.0	-	110	16	2
GSX41700S-3D	★	17.0	51.0	55.5	110	20	1
GSX41800S-3D	★	18.0	54.0	58.5	120	20	1
GSX41900S-3D	★	19.0	57.0	61.5	120	20	1
GSX42000S-3D	★	20.0	60.0	-	120	20	2
GSX42200S-3D	★	22.0	66.0	71.0	130	25	1
GSX42500S-3D	★	25.0	75.0	-	130	25	2

Grade: ACF20

Endmill Identification (GSXMILL Series Only)

GSX 4 0100 S - 3D

Series Code Number of Teeth Dia. Cutting Edge S: Sharp Edge Cutting Edge Length

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

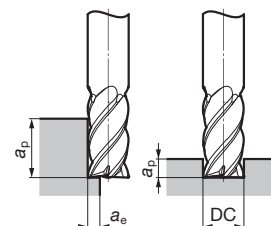
Coated

Uncoated

GSX MILL 4 Flute Endmills Sharp Edge 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	Steel for Structure 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	
	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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	2.5DC								2.0DC							
	Below ø3: 0.02DC, Above ø3 to ø8: 0.05DC, Above ø8: 0.07DC								0.01DC							

Groove Finishing

Work Material / Cutting Conditions	Steel for Structure 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	
	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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	1.5DC															
	Below 0.02DC															

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL Endmills (4 Flutes) 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

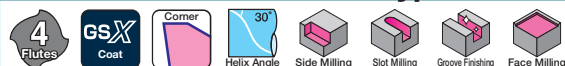


Fig 1

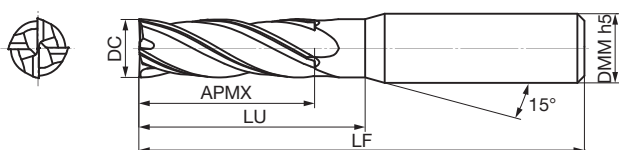
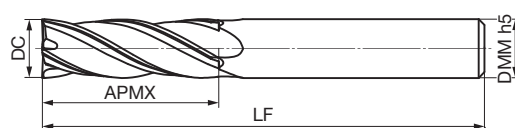


Fig 2



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
GSX40100C-3D	★	1.0	3.0	4.0	40	4	1
GSX40150C-3D	★	1.5	4.5	5.5	40	4	1
GSX40200C-3D	★	2.0	6.0	7.0	40	4	1
GSX40250C-3D	★	2.5	7.5	8.5	40	4	1
GSX40300C-3D	★	3.0	9.0	10.5	50	6	1
GSX40350C-3D	★	3.5	11.0	12.5	50	6	1
GSX40400C-3D	★	4.0	12.0	13.5	50	6	1
GSX40450C-3D	★	4.5	14.0	15.5	50	6	1
GSX40500C-3D	★	5.0	15.0	17.0	50	6	1
GSX40550C-3D	★	5.5	17.0	19.0	50	6	1
GSX40600C-3D	★	6.0	18.0	-	50	6	2
GSX40650C-3D	★	6.5	20.0	22.0	70	8	1
GSX40700C-3D	★	7.0	21.0	23.0	70	8	1
GSX40750C-3D	★	7.5	23.0	25.0	70	8	1
GSX40800C-3D	★	8.0	24.0	-	70	8	2
GSX40850C-3D	★	8.5	26.0	28.0	75	10	1
GSX40900C-3D	★	9.0	27.0	29.0	75	10	1
GSX40950C-3D	★	9.5	29.0	31.0	75	10	1
GSX41000C-3D	★	10.0	30.0	-	90	10	2
GSX41050C-3D	★	10.5	32.0	34.5	90	12	1
GSX41100C-3D	★	11.0	33.0	35.5	90	12	1
GSX41150C-3D	★	11.5	35.0	37.5	90	12	1
GSX41200C-3D	★	12.0	36.0	-	90	12	2
GSX41300C-3D	★	13.0	39.0	42.5	100	16	1
GSX41400C-3D	★	14.0	42.0	45.5	110	16	1
GSX41500C-3D	★	15.0	45.0	48.5	110	16	1
GSX41600C-3D	★	16.0	48.0	-	110	16	2
GSX41700C-3D	★	17.0	51.0	55.5	110	20	1
GSX41800C-3D	★	18.0	54.0	58.5	120	20	1
GSX41900C-3D	★	19.0	57.0	61.5	120	20	1
GSX42000C-3D	★	20.0	60.0	-	120	20	2
GSX42500C-3D	★	25.0	75.0	-	130	25	2

Grade: ACF20

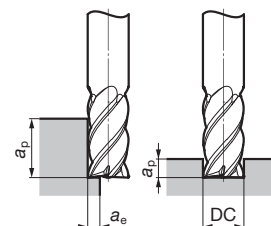
Endmill Identification (GSXMILL Series Only)

GSX 4 0100 C - 3D

Series Code Number of Teeth Dia. Cutting Edge C: Gash Land Cutting Edge Length

GSX MILL Endmills (4 Flutes)

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, chatter 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	Steel for Structure 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	
	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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	2.5DC										2.0DC					
	Below ø3: 0.05DC , Above ø3 to Below ø8: 0.1DC, Above ø8: 0.15DC										0.02DC					

Groove Milling

Work Material Cutting Conditions	Steel for Structure 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	
	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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	0.1DC		0.2DC						0.05DC			0.1DC				

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL 4 Flute Endmills Sharp Edge 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

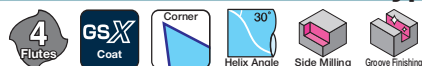


Fig 1

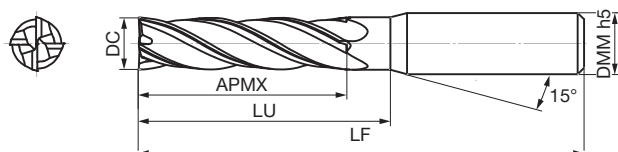
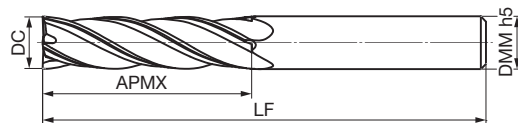


Fig 2



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
GSX40100S-4D	★	1.0	4.0	5.0	40	4	1
GSX40150S-4D	★	1.5	6.0	7.0	40	4	1
GSX40200S-4D	★	2.0	8.0	9.0	40	4	1
GSX40250S-4D	★	2.5	10.0	11.0	50	4	1
GSX40300S-4D	★	3.0	12.0	13.5	50	6	1
GSX40350S-4D	★	3.5	14.0	15.5	50	6	1
GSX40400S-4D	★	4.0	16.0	17.5	50	6	1
GSX40450S-4D	★	4.5	18.0	19.5	60	6	1
GSX40500S-4D	★	5.0	20.0	22.0	60	6	1
GSX40550S-4D	★	5.5	22.0	24.0	60	6	1
GSX40600S-4D	★	6.0	24.0	-	60	6	2
GSX40650S-4D	★	6.5	26.0	28.0	70	8	1
GSX40700S-4D	★	7.0	28.0	30.0	80	8	1
GSX40750S-4D	★	7.5	30.0	32.0	80	8	1
GSX40800S-4D	★	8.0	32.0	-	80	8	2
GSX40850S-4D	★	8.5	34.0	36.0	90	10	1
GSX40900S-4D	★	9.0	36.0	38.0	90	10	1
GSX40950S-4D	★	9.5	39.0	41.0	90	10	1
GSX41000S-4D	★	10.0	40.0	-	90	10	2
GSX41050S-4D	★	10.5	42.0	44.5	100	12	1
GSX41100S-4D	★	11.0	44.0	46.5	100	12	1
GSX41150S-4D	★	11.5	46.0	48.5	100	12	1
GSX41200S-4D	★	12.0	48.0	-	100	12	2
GSX41300S-4D	★	13.0	52.0	55.5	110	16	1
GSX41400S-4D	★	14.0	56.0	59.5	120	16	1
GSX41500S-4D	★	15.0	60.0	63.5	120	16	1
GSX41600S-4D	★	16.0	64.0	-	120	16	2
GSX41700S-4D	★	17.0	68.0	72.5	130	20	1
GSX41800S-4D	★	18.0	72.0	76.5	130	20	1
GSX41900S-4D	★	19.0	76.0	80.5	140	20	1
GSX42000S-4D	★	20.0	80.0	-	140	20	2
GSX42500S-4D	★	25.0	100.0	-	160	25	2

Grade: ACF20

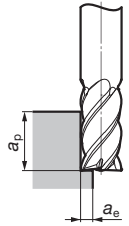
Endmill Identification (GSXMILL Series Only)

GSX 4 0100 S - 4D

Series Code Number of Teeth Dia. Cutting Edge S: Sharp Edge Cutting Edge Length

GSX MILL 4 Flute Endmills Sharp Edge

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, chatter 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	Steel for Structure 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	
	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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	2.5DC								2.0DC							
Depth of Cut	Below ø3: 0.02DC, Above ø3 to ø8: 0.05DC, Above ø8: 0.07DC								0.01DC							

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL Endmills (4 Flutes) 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



Fig 1

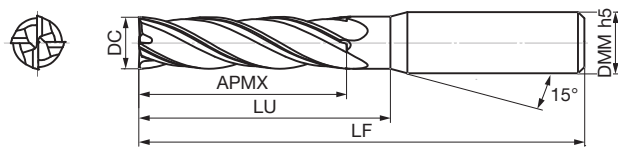
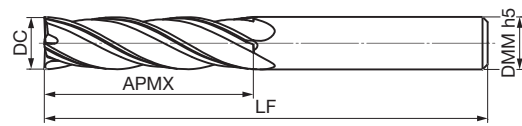


Fig 2



DC	Tolerance
$D \leq 3.0$	0 -0.015
$3.0 < D \leq 12$	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
GSX40100C-4D	★	1.0	4.0	5.0	40	4	1
GSX40150C-4D	★	1.5	6.0	7.0	40	4	1
GSX40200C-4D	★	2.0	8.0	9.0	40	4	1
GSX40250C-4D	★	2.5	10.0	11.0	50	4	1
GSX40300C-4D	★	3.0	12.0	13.5	50	6	1
GSX40350C-4D	★	3.5	14.0	15.5	50	6	1
GSX40400C-4D	★	4.0	16.0	17.5	50	6	1
GSX40450C-4D	★	4.5	18.0	19.5	60	6	1
GSX40500C-4D	★	5.0	20.0	22.0	60	6	1
GSX40550C-4D	★	5.5	22.0	24.0	60	6	1
GSX40600C-4D	★	6.0	24.0	-	60	6	2
GSX40650C-4D	★	6.5	26.0	28.0	70	8	1
GSX40700C-4D	★	7.0	28.0	30.0	80	8	1
GSX40750C-4D	★	7.5	30.0	32.0	80	8	1
GSX40800C-4D	★	8.0	32.0	-	80	8	2
GSX40850C-4D	★	8.5	34.0	36.0	90	10	1
GSX40900C-4D	★	9.0	36.0	28.0	90	10	1
GSX40950C-4D	★	9.5	39.0	41.0	90	10	1
GSX41000C-4D	★	10.0	40.0	-	90	10	2
GSX41050C-4D	★	10.5	42.0	44.5	100	12	1
GSX41100C-4D	★	11.0	44.0	46.5	100	12	1
GSX41150C-4D	★	11.5	46.0	48.5	100	12	1
GSX41200C-4D	★	12.0	48.0	-	100	12	2
GSX41300C-4D	★	13.0	52.0	55.5	110	16	1
GSX41400C-4D	★	14.0	56.0	59.5	120	16	1
GSX41500C-4D	★	15.0	60.0	63.5	120	16	1
GSX41600C-4D	★	16.0	64.0	-	120	16	2
GSX41700C-4D	★	17.0	68.0	72.5	130	20	1
GSX41800C-4D	★	18.0	72.0	76.5	130	20	1
GSX41900C-4D	★	19.0	76.0	80.5	140	20	1
GSX42000C-4D	★	20.0	80.0	-	140	20	2
GSX42500C-4D	★	25.0	100.0	-	160	25	2

Grade: ACF20

Endmill Identification (GSXMILL Series Only)

GSX 4 0100 C - 4D

Series Code Number of Teeth Dia. Cutting Edge C: Gash Land Cutting Edge Length

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

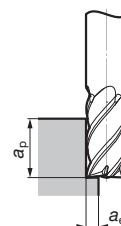
Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL Endmills (4 Flutes) 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, chatter 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	Steel for Structure 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	
	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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	3.5DC										3.0DC					
	Below ø3: 0.04DC, ø3 ≤ D < ø8: 0.08DC, ø8 and above: 0.1DC										0.02DC					

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL 4 Flute Endmills Anti-vibration Type 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



Fig 1

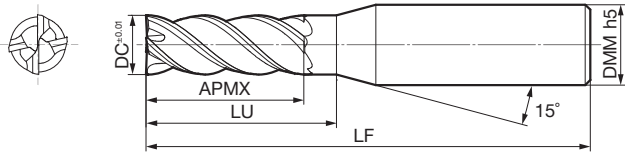
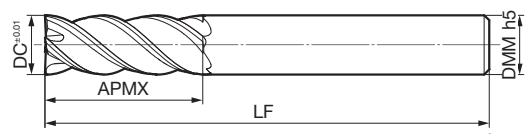


Fig 2



Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSV4020-2.5D	★	2.0	5	6.5	50	4	1
GSV4030-2.5D	★	3.0	8	9.5	50	6	1
GSV4040-2.5D	★	4.0	10	11.5	50	6	1
GSV4050-2.5D	★	5.0	13	14.5	60	6	1
GSV4060-2.5D	★	6.0	15	-	60	6	2
GSV4070-2.5D	★	7.0	18	20.0	70	8	1
GSV4080-2.5D	★	8.0	20	-	80	8	2
GSV4090-2.5D	★	9.0	23	25.0	90	10	1
GSV4100-2.5D	★	10.0	25	-	90	10	2
GSV4110-2.5D	★	11.0	28	30.5	90	12	1
GSV4120-2.5D	★	12.0	30	-	90	12	2
GSV4140-2.5D	★	14.0	35	37.5	110	16	1
GSV4150-2.5D	★	15.0	38	41.0	110	16	1
GSV4160-2.5D	★	16.0	40	-	115	16	2
GSV4180-2.5D	★	18.0	45	48.0	120	20	1
GSV4200-2.5D	★	20.0	50	-	125	20	2
GSV4250-2.5D	★	25.0	63	-	140	25	2

Grade: ACF20

Endmill Identification (GSXMILL Series Only)

GSV 4 120 - 2.5D

Series Code Number of Teeth Dia. Cutting Edge Length

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

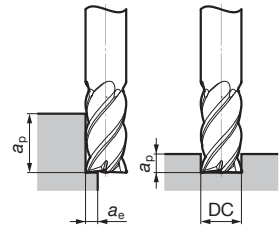
Uncoated

GSX MILL 4 Flute Endmills Anti-vibration Type

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	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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)										
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	1.5DC									
	ap		ae		0.2DC		0.05DC		0.1DC	
									0.05DC	

Groove Milling

Work Material	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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)										
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	0.8DC									
	ap		ae		0.16DC		0.4DC		0.16DC	

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL 4 Flute Endmills Anti-vibration Type 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



Fig 1

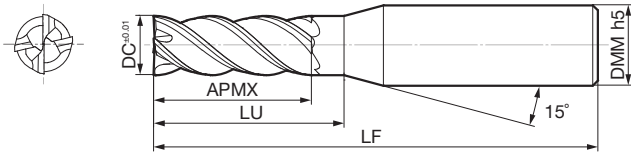
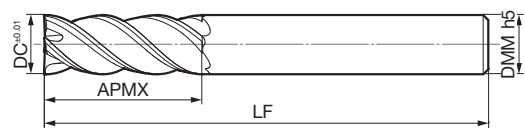


Fig 2



Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSXVL4020-2.5D	★	2.0	5	6.5	50	4	1
GSXVL4030-2.5D	★	3.0	8	9.5	50	6	1
GSXVL4040-2.5D	★	4.0	10	11.5	50	6	1
GSXVL4050-2.5D	★	5.0	13	14.5	60	6	1
GSXVL4060-2.5D	★	6.0	15	-	60	6	2
GSXVL4070-2.5D	★	7.0	18	20.0	70	8	1
GSXVL4080-2.5D	★	8.0	20	-	80	8	2
GSXVL4090-2.5D	★	9.0	23	25.0	90	10	1
GSXVL4100-2.5D	★	10.0	25	-	90	10	2
GSXVL4110-2.5D	★	11.0	28	30.5	90	12	1
GSXVL4120-2.5D	★	12.0	30	-	90	12	2
GSXVL4140-2.5D	★	14.0	35	37.5	110	16	1
GSXVL4150-2.5D	★	15.0	38	41.0	110	16	1
GSXVL4160-2.5D	★	16.0	40	-	115	16	2
GSXVL4180-2.5D	★	18.0	45	48.0	120	20	1
GSXVL4200-2.5D	★	20.0	50	-	125	20	2
GSXVL4250-2.5D	★	25.0	63	-	140	25	2

Grade: ACF20

Endmill Identification (GSXMILL Series Only)

GSXVL 4 020 - 2.5D

Series Code Number of Teeth Dia. Cutting Edge Length

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

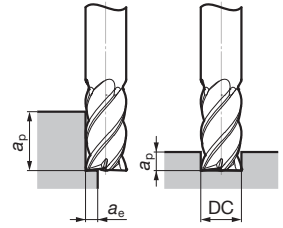
Coated

Uncoated

GSX MILL 4 Flute Endmills Anti-vibration Type 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	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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)										
2.0	13,000	1,000	10,000	800	8,000	700	10,000	580	5,000	200
4.0	9,600	1,200	8,000	1,000	6,000	800	5,500	650	3,000	230
6.0	6,800	1,500	5,600	1,200	4,200	900	3,800	680	2,100	240
8.0	5,200	1,600	4,400	1,300	3,200	950	2,800	650	1,600	250
10.0	4,200	1,500	3,500	1,200	2,600	800	2,300	600	1,300	210
12.0	3,500	1,400	3,000	1,200	2,200	700	1,900	550	1,100	180
14.0	3,000	1,200	2,600	1,100	1,800	600	1,600	500	900	150
16.0	2,700	1,100	2,200	1,000	1,600	600	1,400	480	760	130
18.0	2,400	1,000	2,000	900	1,400	570	1,300	450	680	120
20.0	2,200	900	1,700	800	1,200	550	1,100	400	600	100
25.0	1,700	680	1,400	630	1,000	450	890	310	480	82
Standard Depth of Cut	a _p	1.5DC								
	a _e	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	
		Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)											
2.0		13,000	750	10,000	550	8,400	500	6,500	300	4,000	140
4.0		8,200	800	6,000	600	5,200	500	4,000	330	2,000	130
6.0		6,100	1,100	4,000	600	3,500	580	2,700	350	1,350	150
8.0		4,600	1,000	3,000	580	2,600	570	2,000	330	1,000	140
10.0		3,600	1,000	2,400	550	2,100	510	1,600	200	800	130
12.0		3,100	920	2,000	500	1,700	450	1,300	280	660	110
14.0		2,600	750	1,700	450	1,500	400	1,100	250	570	100
16.0		2,300	670	1,500	420	1,300	350	1,000	230	500	90
18.0		2,000	620	1,300	380	1,100	330	900	200	430	80
20.0		1,900	600	1,200	360	1,000	320	800	180	380	70
25.0		1,500	470	1,000	300	790	250	640	140	300	55
Standard Depth of Cut	a _p	1.0DC				0.2DC		0.5DC		0.2DC	

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

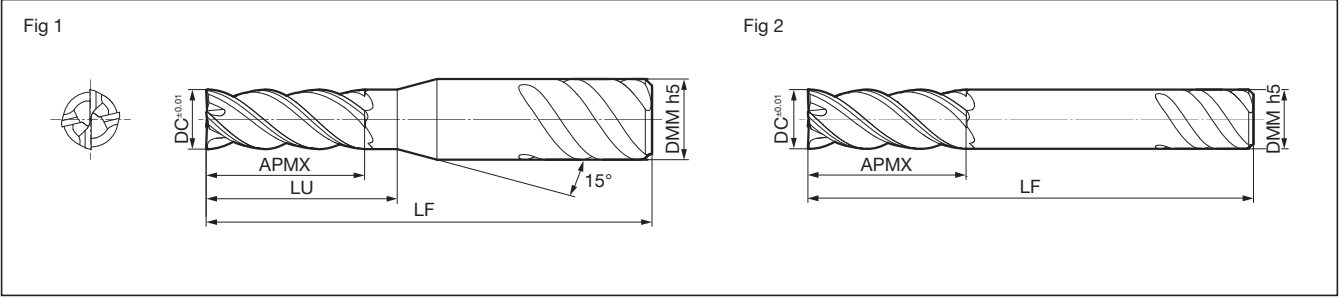
CFRP

Coated

Uncoated

GSX MILL 4 Flute Endmills Anti-vibration Type
GSXVL 4000S-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



Body (**SAFE-LOCK®** Product)

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSXVL4120S-2.5D	★	12.0	30	-	90	12	2
GSXVL4140S-2.5D	★	14.0	35	37.5	110	16	1
GSXVL4150S-2.5D	★	15.0	38	41.0	110	16	1
GSXVL4160S-2.5D	★	16.0	40	-	115	16	2
GSXVL4180S-2.5D	★	18.0	45	48.0	120	20	1
GSXVL4200S-2.5D	★	20.0	50	-	125	20	2
GSXVL4250S-2.5D	★	25.0	63	-	140	25	2

Grade: ACF20

Endmill Identification (GSXMILL Series Only)

GSXVL 4 120 S - 2.5D

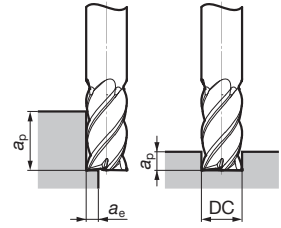
Series Code	Number of Teeth	Dia.	Safelock	Cutting Edge Length
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GSX MILL 4 Flute Endmills Anti-vibration Type

GSXVL 4000S-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	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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)										
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	1.5DC									
Depth of Cut	0.2DC		0.05DC		0.1DC		0.05DC			

Groove Milling

Work Material	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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)										
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	1.0DC									
Depth of Cut	1.0DC		0.2DC		0.5DC		0.2DC			

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

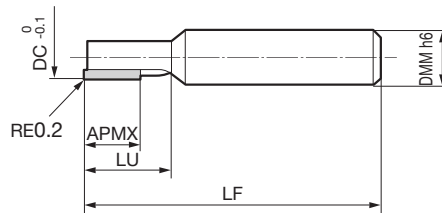
Uncoated

SUMIBORON Helical Master BNES Type

Pre-hardened Steel	Hardened Steel 45 to 55HRC	Hardened Steel 55 to 60HRC	Hardened Steel 60 to 65HRC
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Fig 1



Body

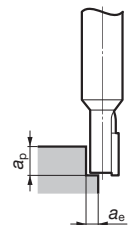
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
BNES1060	★	6.0	7.0	11.0	60	10	1
BNES1080	★	8.0	10.0	14.0	70	10	1
BNES1100	★	10.0	12.0	17.0	75	12	1
BNES1120	★	12.0	14.0	20.0	80	12	1
BNES1140	★	14.0	16.0	21.5	80	16	1
BNES1160	★	16.0	18.0	24.0	80	16	1

Grade: BN350

Recommended Cutting Conditions

1. Use dry cutting (air blow) conditions.
2. Down cut is recommended.
3. Make overhang as short as possible and use a rigid machine.

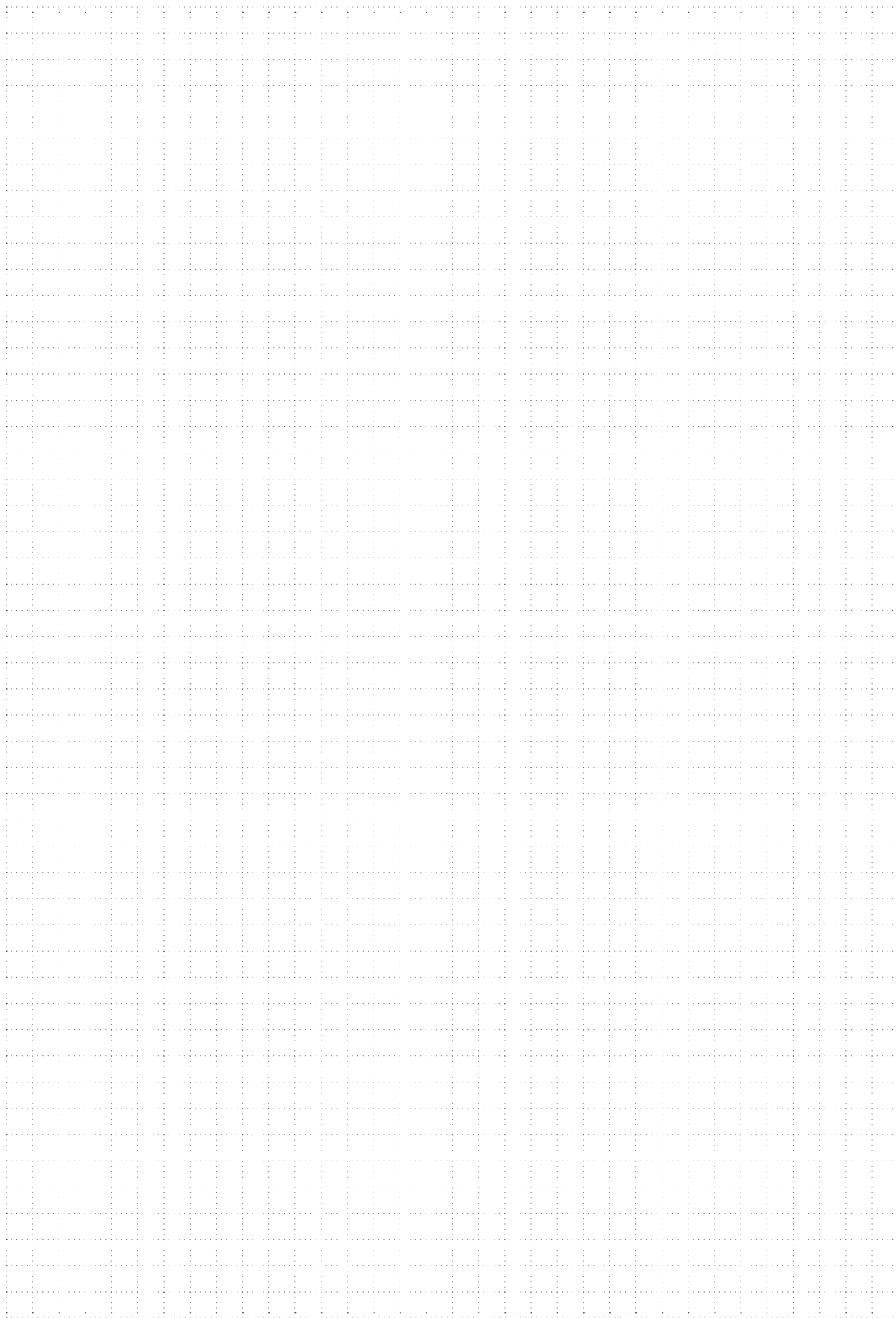


Side Milling

Work Material (Hardness)	High-Hardness Hardened Steel (50 to 57HRC)		
Cutting Conditions	Cutting Speed V_c 100 to 170m/min		
DC (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Depth of Cut a_e (mm)
ø6 to 8	4,000 to 9,000	240 to 540	up to 0.1
ø10 to 12	2,700 to 5,400	180 to 360	up to 0.15
ø14 to 16	2,000 to 3,800	140 to 260	up to 0.2

Work Material (Hardness)	High-Hardness Hardened Steel (58 to 65HRC)		
Cutting Conditions	Cutting Speed V_c 80 to 150m/min		
DC (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	Depth of Cut a_e (mm)
ø6 to 8	3,200 to 8,000	150 to 370	up to 0.08
ø10 to 12	2,100 to 4,800	120 to 370	up to 0.12
ø14 to 16	1,600 to 3,400	110 to 230	up to 0.15

MEMO



AURORA Coat Square Endmills ASM 2000DL Type

Aluminum Alloy
Copper Alloy



Fig 1

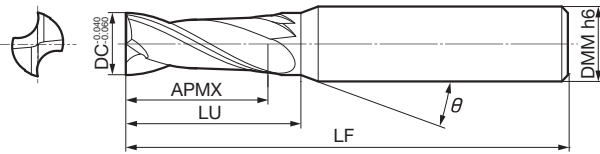
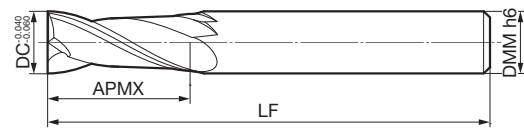


Fig 2



DC	θ
$< \phi 3$	10°
$\geq \phi 3$	15°

Body

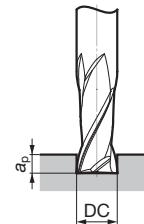
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
ASM2020DL	★	2.0	6.0	6.8	40	4	1
ASM2030DL	★	3.0	10.0	12.9	45	6	1
ASM2040DL	★	4.0	12.0	14.7	45	6	1
ASM2050DL	★	5.0	15.0	18.6	50	6	1
ASM2060DL	★	6.0	15.0	-	50	6	2
ASM2080DL	★	8.0	18.0	-	60	8	2
ASM2100DL	★	10.0	22.0	-	71	10	2
ASM2120DL	★	12.0	25.0	-	75	12	2
ASM2160DL	★	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	
		Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)					
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	a_p	1.0DC		0.5DC	
Depth of Cut	a_e	1.0DC		1.0DC	

AURORA Coat Square Endmills ASM 4000DL Type

Aluminum Alloy
Copper Alloy



Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

Fig 1

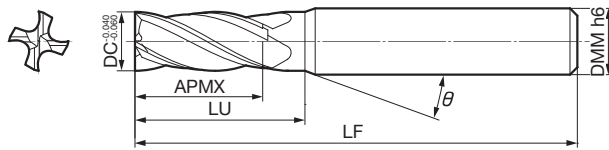


Fig 2



DC	θ
< ø3	10°
≥ ø3	15°

Body

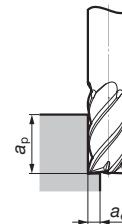
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
ASM4020DL	★	2.0	6.0	6.8	40	4	1
ASM4030DL	★	3.0	10.0	12.9	45	6	1
ASM4040DL	★	4.0	12.0	14.7	45	6	1
ASM4050DL	★	5.0	15.0	18.6	50	6	1
ASM4060DL	★	6.0	15.0	-	50	6	2
ASM4080DL	★	8.0	18.0	-	60	8	2
ASM4100DL	★	10.0	22.0	-	71	10	2
ASM4120DL	★	12.0	25.0	-	75	12	2
ASM4160DL	★	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	Aluminum Alloy			
	Wet		Dry	
	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)				
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	a_p	1.5DC	a_p	1.5DC
Depth of Cut	a_e	0.2DC	a_e	0.2DC



Fig 1

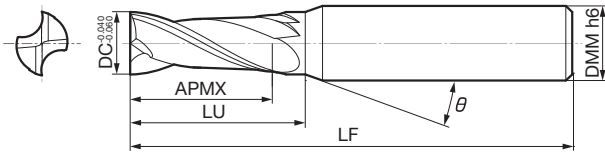
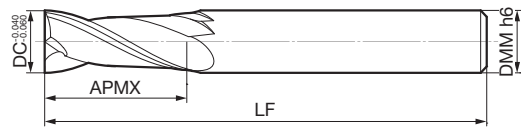


Fig 2



DC	θ
< $\phi 3$	10°
$\approx \phi 3 < \phi 6$	15°
> $\phi 6$	20°

Body

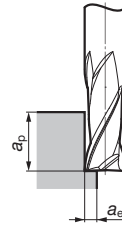
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
ASM2020	★	2.0	6	6.8	40	4	1
ASM2030	★	3.0	10	12.9	45	6	1
ASM2040	★	4.0	12	14.7	45	6	1
ASM2050	★	5.0	15	18.6	50	6	1
ASM2060	★	6.0	15	-	50	6	2
ASM2080	★	8.0	18	-	60	8	2
ASM2100	★	10.0	22	-	71	10	2
ASM2120	★	12.0	25	-	75	12	2
ASM2140	★	14.0	32	44.2	90	16	1
ASM2150	★	15.0	32	44.1	90	16	1
ASM2160	★	16.0	32	-	90	16	2

Grade: H1

Recommended Cutting Conditions

1. If the machine cannot achieve the standard 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	Aluminum Alloy		Cast Iron	
	Cutting Conditions		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	a_p	1.5DC	1.5DC	
Depth of Cut	a_e	0.1DC	0.1DC	

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

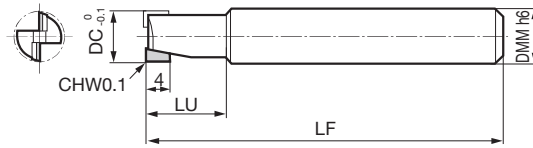
CFRP

Coated

Uncoated



Fig 1



Body

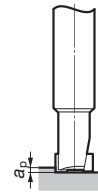
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
DFE2040S	★	4.0	15	50	6	1
DFE2050S	★	5.0	15	50	6	1
DFE2080S	★	8.0	15	60	10	1
DFE2090S	★	9.0	15	70	10	1
DFE2100S	★	10.0	15	70	10	1

Grade: DA2200

Recommended Cutting Conditions

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



Face Milling (2 Flutes)

Work Material		Aluminum Alloy Copper Alloy	
Cutting Conditions			
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	a_p	0.4DC	

SUMIDIA Endmills

DFE Type

Aluminum Alloy

Copper Alloy

Graphite



Fig 1

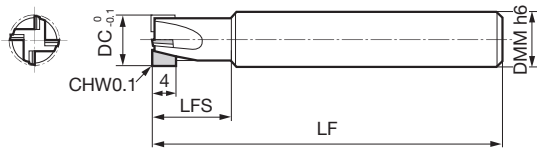
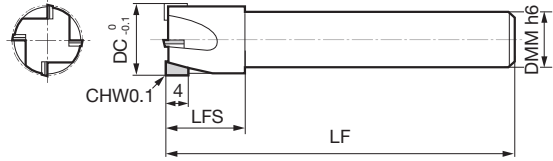


Fig 2



Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Neck Length LFS	Overall Length LF	Shank Dia. DMM	Fig
DFE4090S	★	9.0	15	70	10	1
DFE4100S	★	10.0	15	70	10	1
DFE4130GS	★	13.0	15	70	10	2

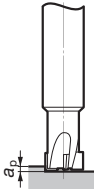
Grade: DA2200

Recommended Cutting Conditions

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

Face Milling (4 Flutes)

Work Material	Aluminum Alloy	
	Copper Alloy	
Cutting Conditions	Spindle Speed (RPM)	Feed Rate (IPM)
DC (mm)		
9.0	17,800	5.512
10.0	16,000	4.961
13.0	12,300	3.819
Standard Depth of Cut: a_p	0.4DC	



Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

SUMIDIA Endmills DAE Type

Aluminum Alloy
Copper Alloy
Graphite

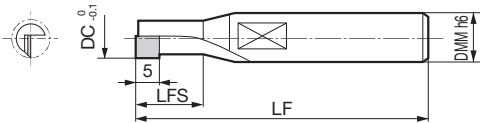
1
Flute

PCD



Side Milling Face Milling

Fig 1



Body

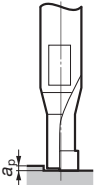
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Neck Length LFS	Overall Length LF	Shank Dia. DMM	Fig
DAE1040	★	4.0	10	45	6	1
DAE1050	★	5.0	12	50	6	1

Grade: DA200

Recommended Cutting Conditions

1. If the machine cannot achieve the standard 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	Aluminum Alloy Copper Alloy	
Cutting Conditions	Spindle Speed (RPM)	Feed Rate (IPM)
DC (mm)		
4.0	6,000	8.268
5.0	5,000	6.890
Standard Depth of Cut a_p	0.4DC	

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

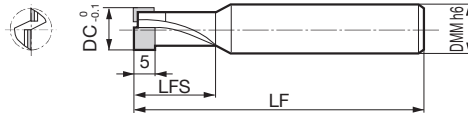
SUMIDIA Endmills

DAE Type

Aluminum Alloy
Copper Alloy
Graphite



Fig 1



Body (2 Flutes)

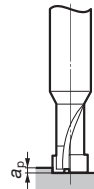
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Neck Length LFS	Overall Length LF	Shank Dia. DMM	Fig
DAE2060	★	6.0	20	50	6	1
DAE2070	★	7.0	20	60	8	1
DAE2080	★	8.0	20	60	8	1
DAE2090	★	9.0	25	71	10	1
DAE2100	★	10.0	25	71	10	1
DAE2110	★	11.0	25	75	12	1
DAE2120	★	12.0	25	75	12	1

Grade: DA200

Recommended Cutting Conditions

1. If the machine cannot achieve the standard 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	Aluminum Alloy Copper Alloy	
	Spindle Speed (RPM)	Feed Rate (IPM)
DC (mm)		
6.0	6,400	22.83
7.0	5,500	19.69
8.0	5,400	19.69
9.0	5,300	18.90
10.0	4,800	17.32
11.0	4,400	15.75
12.0	4,000	14.17
Standard Depth of Cut	0.4DC	

SUMIDIA Coated Endmills for CFRP SSDC 4000(RL) Type

Graphite CFRP GFRP

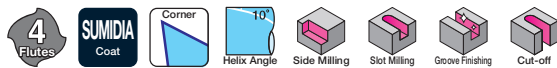
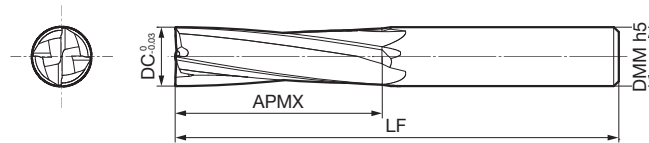


Fig 1



Body Right-hand Helix Type

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Overall Length LF	Shank Dia. DMM	Fig
SSDC4060	★	6.0	20	70	6	1
SSDC4080	★	8.0	30	80	8	1
SSDC4100	★	10.0	30	90	10	1
SSDC4120	★	12.0	30	100	12	1

Grade: DCX20

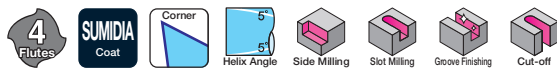
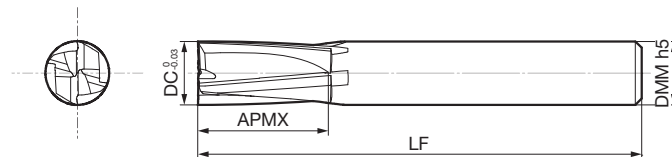


Fig 2



Body Right/Left-hand Helix Type

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Cutting Edge Length APMX	Overall Length LF	Shank Dia. DMM	Fig
SSDC4060RL	★	6.0	20	70	6	2
SSDC4080RL	★	8.0	30	80	8	2
SSDC4100RL	★	10.0	30	90	10	2
SSDC4120RL	★	12.0	30	100	12	2

Grade: DCX20

Identification Code

SSDC 4 060 RL

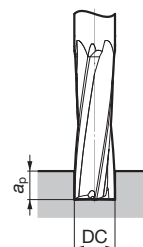
Series Code Number of Teeth Dia. Helix Shape (RL: Right/Left-hand Helix)

Recommended Cutting Conditions

- 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.
- Take sufficient dust control measures.
- When radial depth of cut is 0.7D or more in groove milling and trimming, reduce feed rate accordingly.

Groove Milling (Common)

Work Material	CFRP			
Cutting Conditions	Dry			
DC (mm)	Spindle Speed (SFM)	Spindle Speed (RPM)	Feed Rate (IPM)	Feed Rate (IPR)
6.0	649.0	10,500	37.01	0.0035
8.0	659.5	8,000	31.50	0.0039
10.0	669.7	6,500	28.34	0.0044
12.0	679.8	5,500	26.38	0.0048



Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL 4 Flute Radius Endmills 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



Fig 1

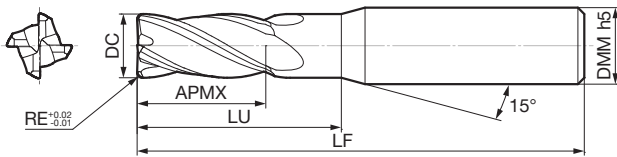
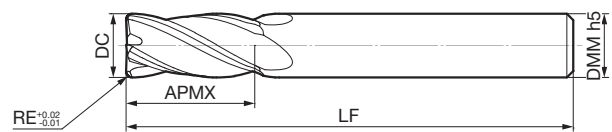


Fig 2



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

Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Radius RE	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSX40300-R02-2D	★	3.0	0.2	8.0	9.5	45	6	1
GSX40300-R05-2D	★	3.0	0.5	8.0	9.5	45	6	1
GSX40400-R02-2D	★	4.0	0.2	11.0	14.0	45	6	1
GSX40400-R05-2D	★	4.0	0.5	11.0	14.0	45	6	1
GSX40400-R10-2D	★	4.0	1.0	11.0	14.0	45	6	1
GSX40500-R02-2D	★	5.0	0.2	13.0	19.6	50	6	1
GSX40500-R05-2D	★	5.0	0.5	13.0	19.6	50	6	1
GSX40500-R10-2D	★	5.0	1.0	13.0	19.6	50	6	1
GSX40600-R02-2D	★	6.0	0.2	13.0	-	50	6	2
GSX40600-R05-2D	★	6.0	0.5	13.0	-	50	6	2
GSX40600-R10-2D	★	6.0	1.0	13.0	-	50	6	2
GSX40600-R15-2D	★	6.0	1.5	13.0	-	50	6	2
GSX40800-R02-2D	★	8.0	0.2	19.0	-	60	8	2
GSX40800-R05-2D	★	8.0	0.5	19.0	-	60	8	2
GSX40800-R10-2D	★	8.0	1.0	19.0	-	60	8	2
GSX40800-R15-2D	★	8.0	1.5	19.0	-	60	8	2
GSX41000-R02-2D	★	10.0	0.2	22.0	-	70	10	2
GSX41000-R05-2D	★	10.0	0.5	22.0	-	70	10	2
GSX41000-R10-2D	★	10.0	1.0	22.0	-	70	10	2
GSX41000-R15-2D	★	10.0	1.5	22.0	-	70	10	2
GSX41000-R20-2D	★	10.0	2.0	22.0	-	70	10	2
GSX41200-R02-2D	★	12.0	0.2	26.0	-	70	12	2
GSX41200-R05-2D	★	12.0	0.5	26.0	-	70	12	2
GSX41200-R10-2D	★	12.0	1.0	26.0	-	70	12	2
GSX41200-R15-2D	★	12.0	1.5	26.0	-	70	12	2
GSX41200-R20-2D	★	12.0	2.0	26.0	-	70	12	2

Grade: ACF20

Identification Code

GSX 4 0300 - R 02 - 2D

Series Code Number of Teeth Dia. Corner Radius Cutting Edge Length
Cutting Edge R: Radius

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

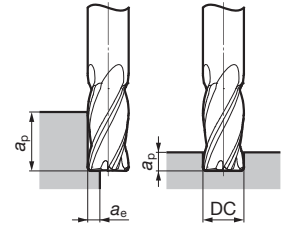
Uncoated

GSX MILL 4 Flute Radius Endmills

GSX 40000-R-2D Type

Recommended Cutting Conditions

1. If the machine cannot achieve the standard 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	Steel for Structure, 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)												
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	a _p	1.5DC	1.5DC		1.5DC		1.0DC		1.5DC		1.0DC	
	a _e	0.1DC	0.1DC		0.05DC		0.02DC		0.1DC		0.05DC	

Groove Milling

Work Material	Steel for Structure, 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)												
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	a _p	0.5DC	0.5DC		0.2DC		0.05DC		0.3DC		0.1DC	

Side Milling (High Speed Machining Centre)

Work Material	Steel for Structure, 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)										
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	a _p	1.5DC	1.5DC		1.5DC		1.0DC		1.5DC	
	a _e	0.05DC	0.05DC		0.05DC		0.02DC		0.05DC	

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL 4 Flute Radius Endmills Anti-vibration Type

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



Fig 1

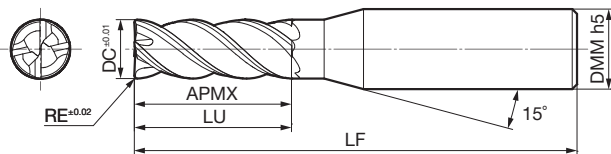
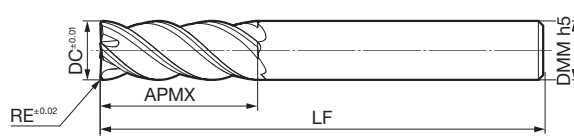


Fig 2



Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Radius RE	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSV4030-R02-2.5D	★	3.0	0.2	8.0	9.5	50	6	1
GSV4030-R05-2.5D	★	3.0	0.5	8.0	9.5	50	6	1
GSV4040-R02-2.5D	★	4.0	0.2	10.0	11.5	50	6	1
GSV4040-R05-2.5D	★	4.0	0.5	10.0	11.5	50	6	1
GSV4040-R10-2.5D	★	4.0	1.0	10.0	11.5	50	6	1
GSV4050-R02-2.5D	★	5.0	0.2	13.0	14.5	60	6	1
GSV4050-R05-2.5D	★	5.0	0.5	13.0	14.5	60	6	1
GSV4050-R10-2.5D	★	5.0	1.0	13.0	14.5	60	6	1
GSV4060-R03-2.5D	★	6.0	0.3	15.0	-	60	6	2
GSV4060-R05-2.5D	★	6.0	0.5	15.0	-	60	6	2
GSV4060-R10-2.5D	★	6.0	1.0	15.0	-	60	6	2
GSV4060-R15-2.5D	★	6.0	1.5	15.0	-	60	6	2
GSV4080-R03-2.5D	★	8.0	0.3	20.0	-	80	8	2
GSV4080-R05-2.5D	★	8.0	0.5	20.0	-	80	8	2
GSV4080-R10-2.5D	★	8.0	1.0	20.0	-	80	8	2
GSV4080-R15-2.5D	★	8.0	1.5	20.0	-	80	8	2
GSV4080-R20-2.5D	★	8.0	2.0	20.0	-	80	8	2
GSV4100-R03-2.5D	★	10.0	0.3	25.0	-	90	10	2
GSV4100-R05-2.5D	★	10.0	0.5	25.0	-	90	10	2
GSV4100-R10-2.5D	★	10.0	1.0	25.0	-	90	10	2
GSV4100-R15-2.5D	★	10.0	1.5	25.0	-	90	10	2
GSV4100-R20-2.5D	★	10.0	2.0	25.0	-	90	10	2
GSV4120-R05-2.5D	★	12.0	0.5	30.0	-	90	12	2
GSV4120-R10-2.5D	★	12.0	1.0	30.0	-	90	12	2
GSV4120-R15-2.5D	★	12.0	1.5	30.0	-	90	12	2
GSV4120-R20-2.5D	★	12.0	2.0	30.0	-	90	12	2
GSV4120-R30-2.5D	★	12.0	3.0	30.0	-	90	12	2
GSV4160-R10-2.5D	★	16.0	1.0	40.0	-	115	16	2
GSV4160-R15-2.5D	★	16.0	1.5	40.0	-	115	16	2
GSV4160-R20-2.5D	★	16.0	2.0	40.0	-	115	16	2
GSV4160-R30-2.5D	★	16.0	3.0	40.0	-	115	16	2
GSV4200-R10-2.5D	★	20.0	1.0	50.0	-	125	20	2
GSV4200-R15-2.5D	★	20.0	1.5	50.0	-	125	20	2
GSV4200-R20-2.5D	★	20.0	2.0	50.0	-	125	20	2
GSV4200-R30-2.5D	★	20.0	3.0	50.0	-	125	20	2
GSV4250-R10-2.5D	★	25.0	1.0	63.0	-	140	25	2
GSV4250-R15-2.5D	★	25.0	1.5	63.0	-	140	25	2
GSV4250-R20-2.5D	★	25.0	2.0	63.0	-	140	25	2
GSV4250-R30-2.5D	★	25.0	3.0	63.0	-	140	25	2

Grade: ACF20

Identification Code

GSV 4 030 - R 02 - 2.5D

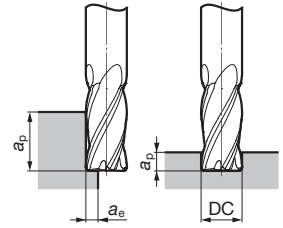
Series Code Number of Teeth Dia. Nose Radius Cutting Edge Length
Cutting Edge R: Radius

GSX MILL 4 Flute Radius Endmills Anti-vibration Type

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	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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)										
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	1.5DC									
	0.2DC				0.05DC		0.1DC		0.05DC	

Groove Milling

Work Material	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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)										
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	0.8DC				0.16DC		0.4DC		0.16DC	

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL 4 Flute Radius Endmills Anti-vibration Type 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



Fig 1

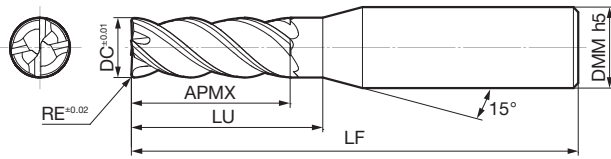
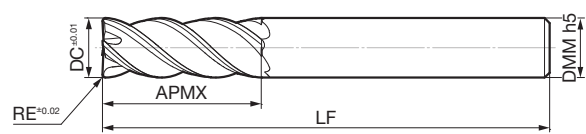


Fig 2



Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Radius RE	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSXVL4030-R02-2.5D	★	3.0	0.2	8.0	9.5	50	6	1
GSXVL4030-R05-2.5D	★	3.0	0.5	8.0	9.5	50	6	1
GSXVL4040-R02-2.5D	★	4.0	0.2	10.0	11.5	50	6	1
GSXVL4040-R05-2.5D	★	4.0	0.5	10.0	11.5	50	6	1
GSXVL4040-R10-2.5D	★	4.0	1.0	10.0	11.5	50	6	1
GSXVL4050-R02-2.5D	★	5.0	0.2	13.0	14.5	60	6	1
GSXVL4050-R05-2.5D	★	5.0	0.5	13.0	14.5	60	6	1
GSXVL4050-R10-2.5D	★	5.0	1.0	13.0	14.5	60	6	1
GSXVL4060-R03-2.5D	★	6.0	0.3	15.0	-	60	6	2
GSXVL4060-R05-2.5D	★	6.0	0.5	15.0	-	60	6	2
GSXVL4060-R10-2.5D	★	6.0	1.0	15.0	-	60	6	2
GSXVL4060-R15-2.5D	★	6.0	1.5	15.0	-	60	6	2
GSXVL4080-R03-2.5D	★	8.0	0.3	20.0	-	80	8	2
GSXVL4080-R05-2.5D	★	8.0	0.5	20.0	-	80	8	2
GSXVL4080-R10-2.5D	★	8.0	1.0	20.0	-	80	8	2
GSXVL4080-R15-2.5D	★	8.0	1.5	20.0	-	80	8	2
GSXVL4080-R20-2.5D	★	8.0	2.0	20.0	-	80	8	2
GSXVL4100-R03-2.5D	★	10.0	0.3	25.0	-	90	10	2
GSXVL4100-R05-2.5D	★	10.0	0.5	25.0	-	90	10	2
GSXVL4100-R10-2.5D	★	10.0	1.0	25.0	-	90	10	2
GSXVL4100-R15-2.5D	★	10.0	1.5	25.0	-	90	10	2
GSXVL4100-R20-2.5D	★	10.0	2.0	25.0	-	90	10	2
GSXVL4120-R05-2.5D	★	12.0	0.5	30.0	-	90	12	2
GSXVL4120-R10-2.5D	★	12.0	1.0	30.0	-	90	12	2
GSXVL4120-R15-2.5D	★	12.0	1.5	30.0	-	90	12	2
GSXVL4120-R20-2.5D	★	12.0	2.0	30.0	-	90	12	2
GSXVL4120-R30-2.5D	★	12.0	3.0	30.0	-	90	12	2
GSXVL4160-R10-2.5D	★	16.0	1.0	40.0	-	115	16	2
GSXVL4160-R15-2.5D	★	16.0	1.5	40.0	-	115	16	2
GSXVL4160-R20-2.5D	★	16.0	2.0	40.0	-	115	16	2
GSXVL4160-R30-2.5D	★	16.0	3.0	40.0	-	115	16	2
GSXVL4200-R10-2.5D	★	20.0	1.0	50.0	-	125	20	2
GSXVL4200-R15-2.5D	★	20.0	1.5	50.0	-	125	20	2
GSXVL4200-R20-2.5D	★	20.0	2.0	50.0	-	125	20	2
GSXVL4200-R30-2.5D	★	20.0	3.0	50.0	-	125	20	2
GSXVL4250-R10-2.5D	★	25.0	1.0	63.0	-	140	25	2
GSXVL4250-R15-2.5D	★	25.0	1.5	63.0	-	140	25	2
GSXVL4250-R20-2.5D	★	25.0	2.0	63.0	-	140	25	2
GSXVL4250-R30-2.5D	★	25.0	3.0	63.0	-	140	25	2

Grade: ACF20

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

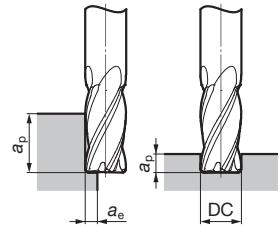
Uncoated

GSX MILL 4 Flute Radius Endmills Anti-vibration Type

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	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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)										
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	1.5DC									
a_p	0.2DC		0.05DC		0.1DC		0.05DC			

Groove Milling

Work Material	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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)										
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	1.0DC									
a_p	1.0DC		0.2DC		0.5DC		0.2DC			

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

SSEHVL 4000W-R TypeStainless
SteelTi Alloy /
Heat Resistant
Alloy4
FlutesGS
HARD
CoatRadius
P42°
45°
Helix Angle

Side Milling

Slot Milling

Groove Finishing

Face Milling

Profiling

Fig 1

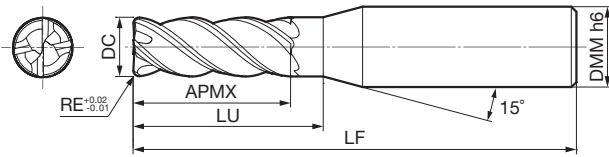
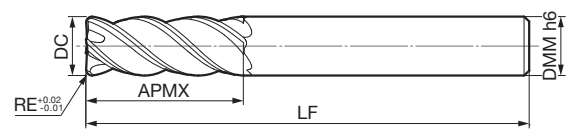


Fig 2



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	Radius RE	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
SSEHVL4045W-R05	★	4.5	0.5	12.0	14.5	50	6	1
SSEHVL4045W-R10	★	4.5	1.0	12.0	14.5	50	6	1
SSEHVL4050W-R05	★	5.0	0.5	13.0	15.5	60	6	1
SSEHVL4050W-R10	★	5.0	1.0	13.0	15.5	60	6	1
SSEHVL4060W-R10	★	6.0	1.0	13.0	-	60	6	2
SSEHVL4080W-R10	★	8.0	1.0	19.0	-	80	8	2
SSEHVL4100W-R10	★	10.0	1.0	22.0	-	90	10	2
SSEHVL4100W-R30	★	10.0	3.0	22.0	-	90	10	2
SSEHVL4120W-R10	★	12.0	1.0	26.0	-	90	12	2
SSEHVL4120W-R30	★	12.0	3.0	26.0	-	90	12	2
SSEHVL4160W-R10	★	16.0	1.0	32.0	-	115	16	2
SSEHVL4160W-R30	★	16.0	3.0	32.0	-	115	16	2
SSEHVL4200W-R10	★	20.0	1.0	40.0	-	125	20	2
SSEHVL4200W-R30	★	20.0	3.0	40.0	-	125	20	2
SSEHVL4250W-R10	★	25.0	1.0	50.0	-	140	25	2
SSEHVL4250W-R30	★	25.0	3.0	50.0	-	140	25	2

Grade: ACW52

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

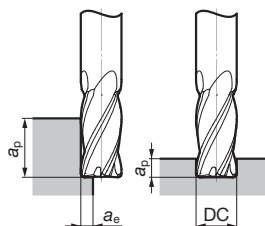
Coated

Uncoated

Radius Endmills for Exotic Alloys, Anti-vibration Type 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	Stainless Steel SUS304,SUS316		Titanium Alloy		Heat-Resistant Alloy	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)						
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	a_p	1.5DC	a_p	1.5DC	a_p	1.5DC
	a_e	0.1DC		0.05DC		0.05DC

Groove Milling

Work Material	Stainless Steel SUS304,SUS316		Titanium Alloy		Heat-Resistant Alloy	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)						
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	a_p	0.3DC	a_p	0.2DC	a_p	0.15DC

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

Radius Endmill for Exotic Alloys SSEH 4000W-R Type

Stainless Steel
Ti Alloy / Heat Resistant Alloy

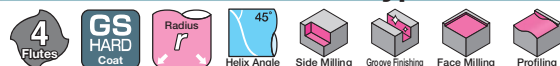


Fig 1

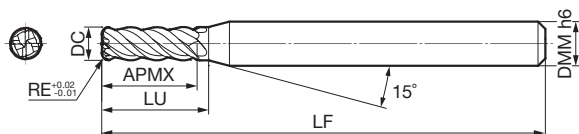


Fig 2



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	Radius RE	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
SSEH4045W-R05	★	4.5	0.5	12.0	14.5	50	6	1
SSEH4050W-R05	★	5.0	0.5	13.0	15.5	60	6	1
SSEH4060W-R10	★	6.0	1.0	13.0	-	60	6	2
SSEH4080W-R10	★	8.0	1.0	19.0	-	80	8	2
SSEH4100W-R10	★	10.0	1.0	22.0	-	90	10	2
SSEH4100W-R30	★	10.0	3.0	22.0	-	90	10	2
SSEH4120W-R10	★	12.0	1.0	26.0	-	90	12	2
SSEH4120W-R30	★	12.0	3.0	26.0	-	90	12	2
SSEH4160W-R10	★	16.0	1.0	32.0	-	115	16	2
SSEH4160W-R30	★	16.0	3.0	32.0	-	115	16	2
SSEH4200W-R10	★	20.0	1.0	40.0	-	125	20	2
SSEH4200W-R30	★	20.0	3.0	40.0	-	125	20	2
SSEH4250W-R10	★	25.0	1.0	50.0	-	140	25	2
SSEH4250W-R30	★	25.0	3.0	50.0	-	140	25	2

Grade: ACW52

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

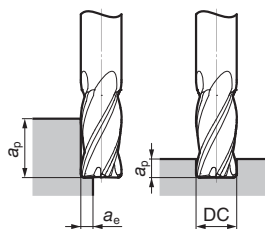
Uncoated

Radius Endmill for Exotic Alloys

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	Stainless Steel SUS304,SUS316		Titanium Alloy		Heat-Resistant Alloy	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)						
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	a_p	1.5DC	a_p	1.5DC	a_p	1.5DC
	a_e	0.1DC	a_e	0.05DC	a_e	0.05DC

Groove Milling

Work Material	Stainless Steel SUS304,SUS316		Titanium Alloy		Heat-Resistant Alloy	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)						
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	a_p	0.3DC	a_p	0.2DC	a_p	0.15DC

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

SSEHVL 4000-R Type



Fig 1

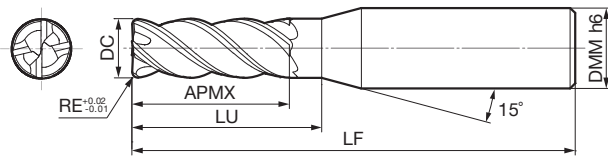
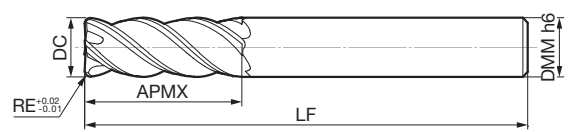


Fig 2



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

Body

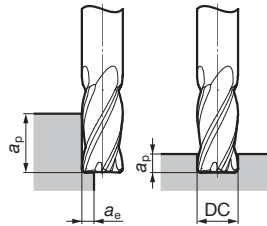
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Radius RE	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
SSEHVL4045-R05	★	4.5	0.5	12.0	14.5	50	6	1
SSEHVL4045-R10	★	4.5	1.0	12.0	14.5	50	6	1
SSEHVL4050-R05	★	5.0	0.5	13.0	15.5	60	6	1
SSEHVL4050-R10	★	5.0	1.0	13.0	15.5	60	6	1
SSEHVL4060-R10	★	6.0	1.0	13.0	-	60	6	2
SSEHVL4080-R10	★	8.0	1.0	19.0	-	80	8	2
SSEHVL4100-R10	★	10.0	1.0	22.0	-	90	10	2
SSEHVL4100-R30	★	10.0	3.0	22.0	-	90	10	2
SSEHVL4120-R10	★	12.0	1.0	26.0	-	90	12	2
SSEHVL4120-R30	★	12.0	3.0	26.0	-	90	12	2
SSEHVL4160-R10	★	16.0	1.0	32.0	-	115	16	2
SSEHVL4160-R30	★	16.0	3.0	32.0	-	115	16	2

Grade: EH520

Recommended Cutting Conditions

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



Side Milling

Work Material	Stainless Steel SUS304, SUS316		Titanium Alloy		Heat-Resistant Alloy	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)						
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	a _p	1.5DC	1.5DC	1.5DC	1.5DC	1.5DC
	p _t	0.1DC	0.05DC	0.05DC	0.05DC	0.05DC

Groove Milling

Work Material	Stainless Steel SUS304, SUS316		Titanium Alloy		Heat-Resistant Alloy	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)						
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	a _p	0.3DC	0.2DC	0.15DC	0.15DC	0.15DC

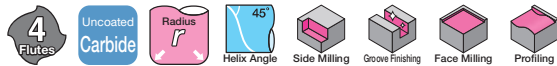


Fig 1

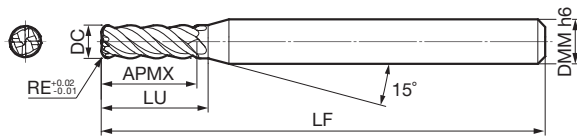
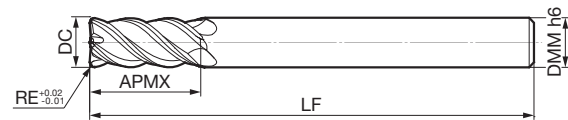


Fig 2



DC	Tolerance
$D \leq 6.0$	-0.028 to -0.043
$6.0 < D$	-0.033 to -0.052

Body

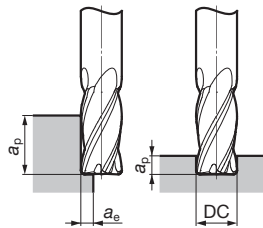
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Radius RE	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
SSEH4045-R05	★	4.5	0.5	12.0	14.5	50	6	1
SSEH4050-R05	★	5.0	0.5	13.0	15.5	60	6	1
SSEH4060-R10	★	6.0	1.0	13.0	-	60	6	2
SSEH4080-R10	★	8.0	1.0	19.0	-	80	8	2
SSEH4100-R10	★	10.0	1.0	22.0	-	90	10	2
SSEH4100-R30	★	10.0	3.0	22.0	-	90	10	2
SSEH4120-R10	★	12.0	1.0	26.0	-	90	12	2
SSEH4120-R30	★	12.0	3.0	26.0	-	90	12	2
SSEH4160-R10	★	16.0	1.0	32.0	-	115	16	2
SSEH4160-R30	★	16.0	3.0	32.0	-	115	16	2

Grade: EH520

Recommended Cutting Conditions

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

**Side Milling**

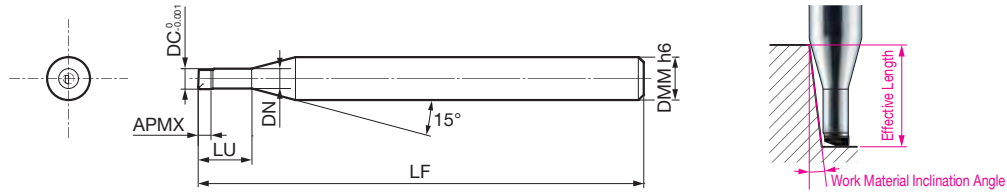
Work Material	Stainless Steel SUS304, SUS316		Titanium Alloy		Heat-Resistant Alloy	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)						
4.5	1,800	90	3,500	280	1,400	110
5.0	1,600	100	3,200	320	1,300	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	a_p	1.5DC	1.5DC	1.5DC	1.5DC	1.5DC
Depth of Cut	a_e	0.1DC	0.05DC	0.05DC	0.05DC	0.05DC

Groove Milling

Work Material	Stainless Steel SUS304, SUS316		Titanium Alloy		Heat-Resistant Alloy	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)						
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	a_p	0.3DC	0.2DC	0.15DC	0.15DC	0.15DC
Depth of Cut						



Fig 1



Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Radius RE	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Head Dia. DN	Shank Dia. DMM	Effective Length for Work Material Inclination Angle					Wiper Edge	Fig
									0.5°	1°	1.5°	2°	3°		
NPDRS1020R002-006	★	0.2	0.02	0.1	0.6	40	0.175	4	0.63	0.65	0.67	0.70	0.75	No	1
NPDRS1020R005-006	★	0.2	0.05	0.1	0.6	40	0.175	4	0.63	0.65	0.67	0.69	0.74	No	1
NPDRS1030R002-010	★	0.3	0.02	0.15	1.0	40	0.27	4	1.04	1.08	1.11	1.15	1.24	No	1
NPDRS1030R005-010	★	0.3	0.05	0.15	1.0	40	0.27	4	1.04	1.08	1.11	1.15	1.23	No	1
NPDRS1050R005-015	★	0.5	0.05	0.25	1.5	40	0.47	4	1.56	1.61	1.66	1.72	1.84	No	1
NPDRS1050R010-015	★	0.5	0.10	0.25	1.5	40	0.47	4	1.56	1.60	1.65	1.71	1.83	No	1
NPDRS1100R005-030	★	1.0	0.05	0.55	3.0	40	0.95	4	3.14	3.24	3.35	3.46	3.72	No	1
NPDRS1100R010-030	★	1.0	0.10	0.55	3.0	40	0.95	4	3.14	3.24	3.34	3.46	3.71	No	1
NPDRS1100R020-030	★	1.0	0.20	0.55	3.0	40	0.95	4	3.14	3.23	3.33	3.44	3.69	No	1
NPDRS1200R005-040	★	2.0	0.05	0.55	4.0	40	1.95	4	4.17	4.31	4.45	4.60	4.94	No	1
NPDRS1200R010-040	★	2.0	0.10	0.55	4.0	40	1.95	4	4.17	4.30	4.44	4.60	4.93	No	1
NPDRS1200R020-040	★	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

Type

For Standard Finishing

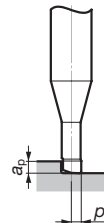
Dia.

Nose Radius

Neck Length

Recommended Cutting Conditions

1. Use a precision machine for stable cutting.
2. Non-water soluble cutting oil is recommended. Supply as a mist or external coolant. Take fire prevention precautions to avoid fire hazards caused by sparks igniting during machining or tool breakage.
3. Shorten overhang as much as possible.
4. Adjust cutting conditions as necessary as equipment performance and other conditions may vary.
5. Values shown in the table of conditions are guidelines. Adjust the actual cutting conditions to the desired machined surface quality.



Work Material		Cemented Carbide			
DC (mm)	LU (mm)	Spindle Speed (RPM)	Feed Rate (IPM)	a_p (inch)	p_t (inch)
0.2	0.6	40,000	3.937	0.00004	0.00004
0.3	1.0	40,000	5.906	0.00008	0.00004
0.5	1.5	40,000	7.874	0.00012	0.00004
1.0	3.0	40,000	15.748	0.00020	0.00012
2.0	4.0	40,000	23.622	0.00039	0.00020

MEMO

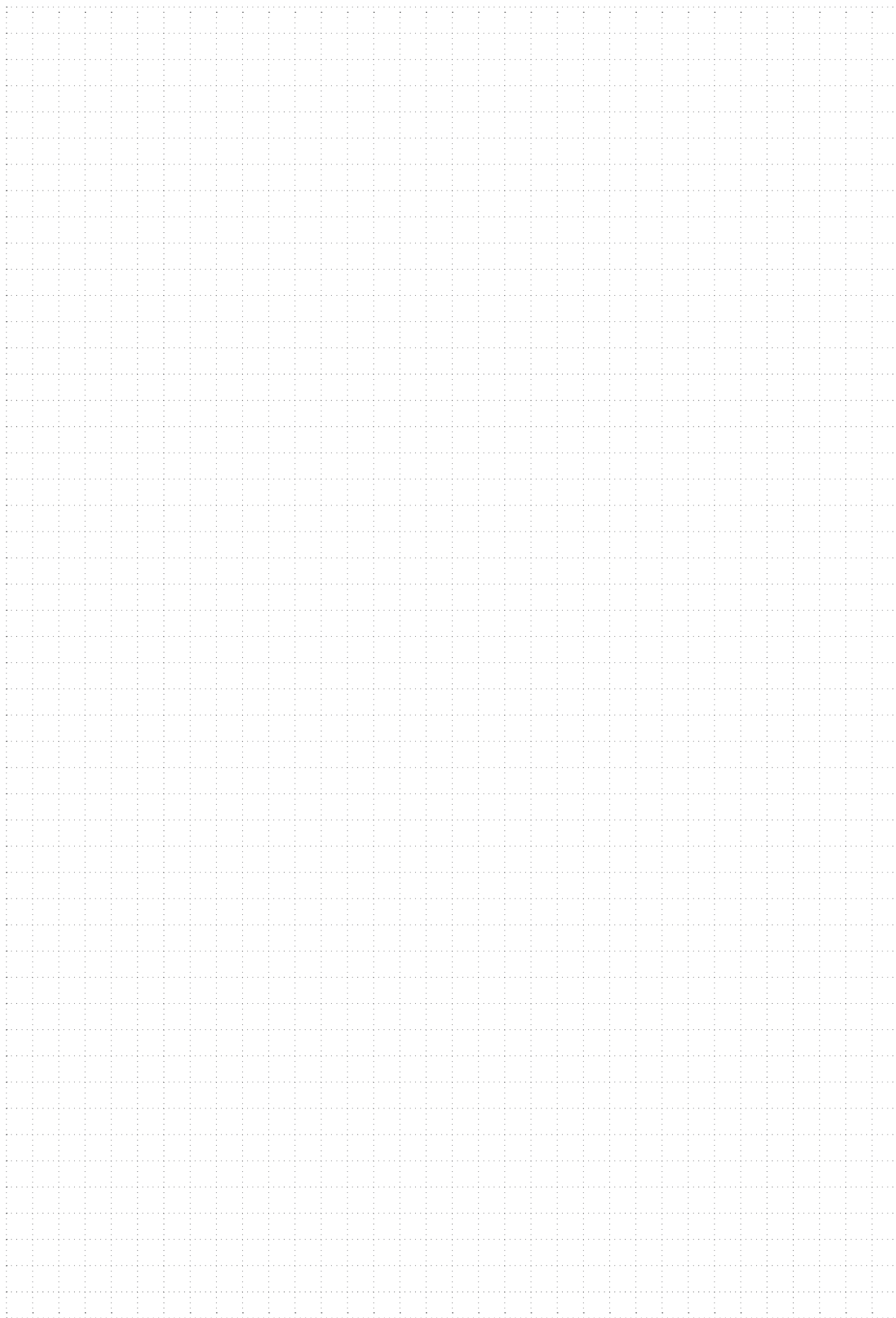
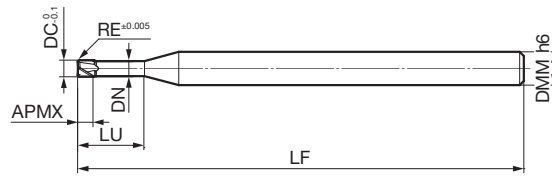




Fig 1



Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Radius RE	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Head Dia. DN	Shank Dia. DMM	Wiper Edge	Fig
BNBR2D020R005-0054	★	0.2	0.05	0.1	0.5	50	0.17	4	No	1
BNBR2D030R005-0054	★	0.3	0.05	0.15	0.5	50	0.27	4	No	1
BNBR2D040R005-0054	★	0.4	0.05	0.2	0.5	50	0.37	4	No	1
BNBR2D050R005-0054	★	0.5	0.05	0.3	0.5	50	0.47	4	No	1
BNBR2D050R005-0154	★	0.5	0.05	0.3	1.5	50	0.47	4	No	1
BNBR2D050R005-0254	★	0.5	0.05	0.3	2.5	50	0.47	4	No	1
BNBR2D050R010-0154	★	0.5	0.10	0.3	1.5	50	0.47	4	No	1
BNBR2D050R010-0254	★	0.5	0.10	0.3	2.5	50	0.47	4	No	1
BNBR2D100R005-0304	★	1.0	0.05	0.7	3.0	50	0.97	4	Yes	1
BNBR2D100R005-0504	★	1.0	0.05	0.7	5.0	50	0.97	4	Yes	1
BNBR2D100R010-0304	★	1.0	0.10	0.7	3.0	50	0.97	4	Yes	1
BNBR2D100R010-0504	★	1.0	0.10	0.7	5.0	50	0.97	4	Yes	1
BNBR2D100R020-0304	★	1.0	0.20	0.7	3.0	50	0.97	4	Yes	1
BNBR2D100R020-0504	★	1.0	0.20	0.7	5.0	50	0.97	4	Yes	1
BNBR2D100R030-0304	★	1.0	0.30	0.7	3.0	50	0.97	4	Yes	1
BNBR2D100R030-0504	★	1.0	0.30	0.7	5.0	50	0.97	4	Yes	1
BNBR2D150R010-0454	★	1.5	0.10	1.2	4.5	50	1.47	4	Yes	1
BNBR2D150R010-0754	★	1.5	0.10	1.2	7.5	50	1.47	4	Yes	1
BNBR2D150R020-0454	★	1.5	0.20	1.2	4.5	50	1.47	4	Yes	1
BNBR2D150R020-0754	★	1.5	0.20	1.2	7.5	50	1.47	4	Yes	1
BNBR2D150R030-0454	★	1.5	0.30	1.2	4.5	50	1.47	4	Yes	1
BNBR2D150R030-0754	★	1.5	0.30	1.2	7.5	50	1.47	4	Yes	1
BNBR2D200R010-0604	★	2.0	0.10	1.5	6.0	50	1.97	4	Yes	1
BNBR2D200R020-0604	★	2.0	0.20	1.5	6.0	50	1.97	4	Yes	1
BNBR2D200R030-0604	★	2.0	0.30	1.5	6.0	50	1.97	4	Yes	1
BNBR2D200R050-0604	★	2.0	0.50	1.5	6.0	50	1.97	4	Yes	1

Grade: BNX20

Identification Code

BNBR 2 D050 R010 - 015 4

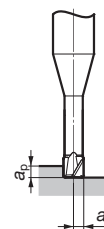
Series Code	Number of Teeth	Dia.	Nose Radius	Neck Length	Shank Dia.
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MOLD FINISH MASTER SUMIBORON Radius Endmills

BNBR Type

Recommended Cutting Conditions

1. Use a machine with high rigidity for stable cutting.
2. Non-water soluble cutting oil is recommended. Supply as a mist or external coolant.
Take fire prevention precautions to avoid fire hazards caused by sparks igniting during machining or tool breakage.
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)	a _p (mm)	a _e (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a _p (mm)	a _e (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a _p (mm)	a _e (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	0.01		0.05	40,000	0.01		0.05	35,000				
	0.05	2.5				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										
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			

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

GSX MILL Ballnose Endmills

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

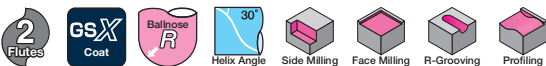


Fig 1

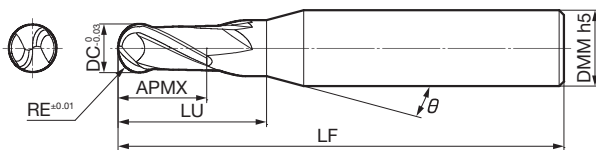
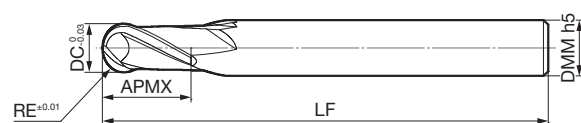


Fig 2



DC	θ
< $\phi 2$	10°
$\phi 2$ or more	15°

Body

Dimensions (mm)

Cat. No.	Stock	Radius RE	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
GSXB20020	★	0.20	0.4	0.6	0.8	50	4	1
GSXB20030	★	0.30	0.6	0.9	1.2	50	4	1
GSXB20050	★	0.50	1.0	1.5	2.0	50	4	1
GSXB20075	★	0.75	1.5	2.5	3.0	50	4	1
GSXB20100	★	1.00	2.0	3.0	4.0	60	6	1
GSXB20125	★	1.25	2.5	4.0	5.0	60	6	1
GSXB20150	★	1.50	3.0	4.5	6.0	60	6	1
GSXB20200	★	2.00	4.0	6.0	8.0	70	6	1
GSXB20250	★	2.50	5.0	7.5	10.0	80	6	1
GSXB20300	★	3.00	6.0	9.0	-	80	6	2
GSXB20350	★	3.50	7.0	11.0	20.0	90	8	1
GSXB20400	★	4.00	8.0	12.0	-	90	8	2
GSXB20500	★	5.00	10.0	15.0	-	100	10	2
GSXB20600	★	6.00	12.0	18.0	-	110	12	2
GSXB20700	★	7.00	14.0	21.0	38.0	110	16	1
GSXB20800	★	8.00	16.0	24.0	-	140	16	2
GSXB20900	★	9.00	18.0	27.0	50.0	140	20	1
GSXB21000	★	10.00	20.0	30.0	-	160	20	2

Grade: ACB20

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

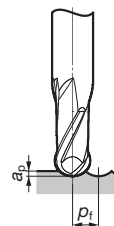
CFRP

Coated

Uncoated

GSX MILL Ballnose Endmills

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	a_p	0.02DC		0.02DC		0.02DC		0.02DC	
	p_t	0.05DC		0.05DC		0.05DC		0.05DC	

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

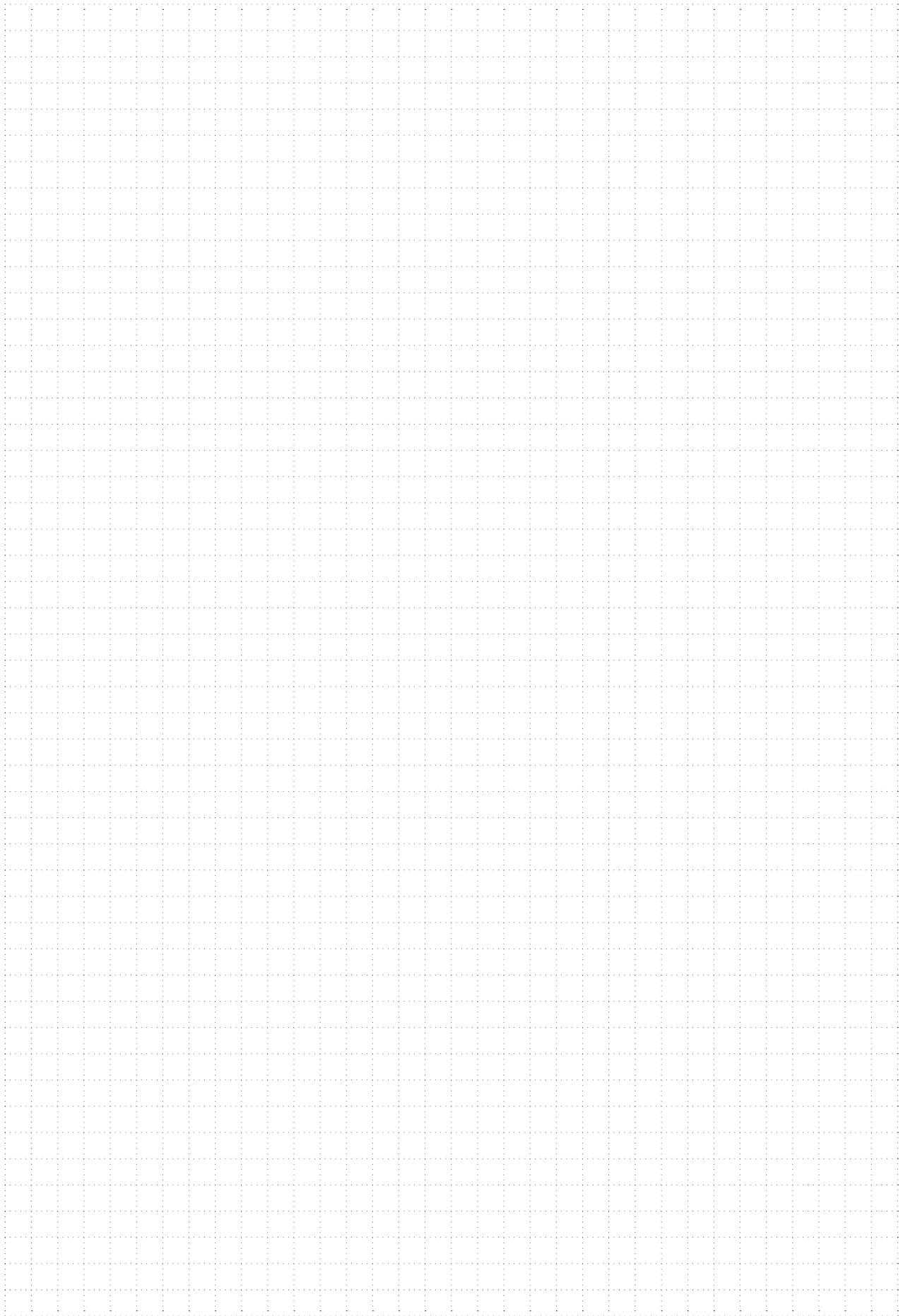
Non-ferrous Metal

CFRP

Coated

Uncoated

MEMO



AURORA Coat Ballnose Endmills

SNB 2000DL Type

Aluminum Alloy
Copper Alloy



Fig 1

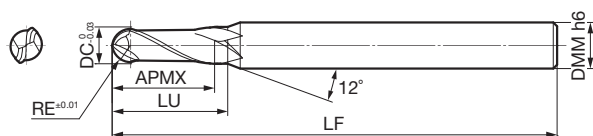


Fig 2



Body

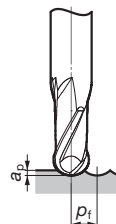
Dimensions (mm)

Cat. No.	Stock	Radius RE	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
SNB2020DL	★	1.0	2.0	3.0	5	60	6	1
SNB2030DL	★	1.5	3.0	4.5	8	80	6	1
SNB2040DL	★	2.0	4.0	6.0	12	80	6	1
SNB2050DL	★	2.5	5.0	7.5	14	90	6	1
SNB2060DL	★	3.0	6.0	9.0	-	100	6	2
SNB2080DL	★	4.0	8.0	12.0	-	100	8	2
SNB2100DL	★	5.0	10.0	15.0	-	120	10	2
SNB2120DL	★	6.0	12.0	18.0	-	120	12	2
SNB2160DL	★	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 (RPM)	Feed Rate (mm/min)	Spindle Speed (RPM)	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	a_p	0.1DC		0.1DC	
Depth of Cut	p_t	0.2DC		0.2DC	

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

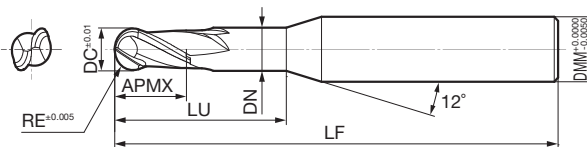
CFRP

Coated

Uncoated



Fig 1



Body

Dimensions (mm)

Cat. No.	Stock	Radius RE	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Head Dia. DN	Shank Dia. DMM	Fig
SNB200050034DL	★	0.05	0.1	0.1	0.3	45	0.09	4	1
SNB200050064DL	★	0.05	0.1	0.1	0.6	45	0.09	4	1
SNB200100054DL	★	0.10	0.2	0.2	0.5	45	0.18	4	1
SNB200100104DL	★	0.10	0.2	0.2	1.0	45	0.18	4	1
SNB200100204DL	★	0.10	0.2	0.2	2.0	45	0.18	4	1
SNB200150054DL	★	0.15	0.3	0.3	0.5	45	0.27	4	1
SNB200150104DL	★	0.15	0.3	0.3	1.0	45	0.27	4	1
SNB200150204DL	★	0.15	0.3	0.3	2.0	45	0.27	4	1
SNB200150304DL	★	0.15	0.3	0.3	3.0	45	0.27	4	1
SNB200200104DL	★	0.20	0.4	0.4	1.0	45	0.36	4	1
SNB200200204DL	★	0.20	0.4	0.4	2.0	45	0.36	4	1
SNB200200304DL	★	0.20	0.4	0.4	3.0	45	0.36	4	1
SNB200200404DL	★	0.20	0.4	0.4	4.0	45	0.36	4	1
SNB200250104DL	★	0.25	0.5	0.45	1.0	45	0.45	4	1
SNB200250204DL	★	0.25	0.5	0.45	2.0	45	0.45	4	1
SNB200250304DL	★	0.25	0.5	0.45	3.0	45	0.45	4	1
SNB200250404DL	★	0.25	0.5	0.45	4.0	45	0.45	4	1
SNB200300204DL	★	0.30	0.6	0.6	2.0	45	0.54	4	1
SNB200300304DL	★	0.30	0.6	0.6	3.0	45	0.54	4	1
SNB200300404DL	★	0.30	0.6	0.6	4.0	45	0.54	4	1
SNB200300504DL	★	0.30	0.6	0.6	5.0	45	0.54	4	1
SNB200300604DL	★	0.30	0.6	0.6	6.0	45	0.54	4	1
SNB200500304DL	★	0.50	1.0	1.5	3.0	45	0.90	4	1
SNB200500404DL	★	0.50	1.0	1.5	4.0	45	0.90	4	1
SNB200500604DL	★	0.50	1.0	1.5	6.0	45	0.90	4	1
SNB200500804DL	★	0.50	1.0	1.5	8.0	50	0.90	4	1
SNB200501004DL	★	0.50	1.0	1.5	10.0	50	0.90	4	1
SNB200750304DL	★	0.75	1.5	2.3	3.0	45	1.35	4	1
SNB200750604DL	★	0.75	1.5	2.3	6.0	45	1.35	4	1
SNB200751004DL	★	0.75	1.5	2.3	10.0	50	1.35	4	1
SNB201000304DL	★	1.00	2.0	3.0	3.0	50	1.80	4	1
SNB201000604DL	★	1.00	2.0	3.0	6.0	50	1.80	4	1
SNB201001004DL	★	1.00	2.0	3.0	10.0	50	1.80	4	1
SNB201001504DL	★	1.00	2.0	3.0	15.0	60	1.80	4	1
SNB201002004DL	★	1.00	2.0	3.0	20.0	60	1.80	4	1
SNB202001606DL	★	2.00	4.0	6.0	16.0	80	3.60	6	1
SNB202002006DL	★	2.00	4.0	6.0	20.0	80	3.60	6	1
SNB202003006DL	★	2.00	4.0	6.0	30.0	80	3.60	6	1

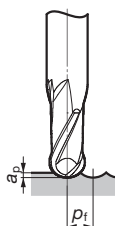
Grade: DL1200

AURORA Coat Long Neck Ballnose

SNB2 Type

Recommended Cutting Conditions

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



Side Milling

Work Material		Copper Alloy		
Cutting Conditions		Spindle Speed	Feed Rate	Standard depth of cut (mm)
Cat. No.		(min ⁻¹)	(mm/min)	a _p a _e
SNB200050034DL		20,000	90	0.005 0.005
SNB200050064DL		-50,000	80	0.005 0.005
SNB200100054DL			350	0.01 0.02
SNB200100104DL		20,000	350	0.007 0.015
SNB200100204DL		-50,000	200	0.005 0.005
SNB200150054DL			400	0.015 0.025
SNB200150104DL		20,000	400	0.01 0.02
SNB300150204DL		-50,000	300	0.007 0.01
SNB200150304DL			250	0.005 0.008
SNB200200104DL			800	0.025 0.05
SNB200200204DL		20,000	700	0.02 0.03
SNB200200304DL		-30,000	600	0.015 0.02
SNB200200404DL			400	0.007 0.015
SNB200250104DL			1,000	0.04 0.07
SNB200250204DL		20,000	800	0.03 0.06
SNB200250304DL		-30,000	700	0.02 0.05
SNB200250404DL			600	0.015 0.04
SNB200300204DL			1,400	0.05 0.15
SNB200300304DL			1,200	0.04 0.1
SNB200300404DL		20,000	1,000	0.03 0.07
SNB200300504DL		-30,000	700	0.03 0.06
SNB200300604DL			600	0.015 0.03
SNB200500304DL			3,500	0.2 0.4
SNB200500404DL		20,000	3,000	0.15 0.4
SNB200500604DL		-30,000	2,500	0.13 0.3
SNB200500804DL			2,000	0.07 0.15
SNB200501004DL			1,200	0.04 0.07
SNB200750304DL		20,000	4,000	0.25 0.4
SNB200750604DL		20,000	3,200	0.15 0.4
SNB200751004DL		20,000	2,000	0.1 0.3
SNB201000304DL		16,000	4,500	0.4 0.6
SNB201000604DL		16,000	3,500	0.35 0.6
SNB201001004DL		16,000	3,000	0.25 0.4
SNB201001504DL		12,000	2,000	0.15 0.3
SNB201002004DL		10,000	1,500	0.1 0.2
SNB202001606DL		16,000	4,000	0.4 0.8
SNB202002006DL		16,000	3,500	0.4 0.8
SNB202003006DL		12,000	3,000	0.2 0.4

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

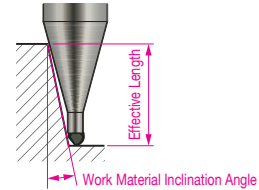
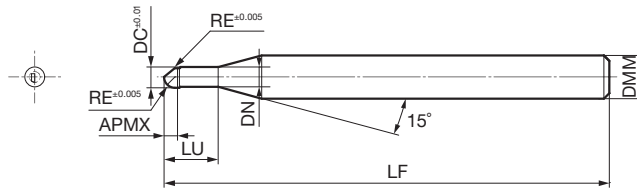
Coated

Uncoated

NPDBS Type



Fig 1



Body (for Standard Finishing)

Dimensions (mm)

Cat. No.	Stock	Radius RE	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Head Dia. DN	Shank Dia. DMM	Effective Length for Work Material Inclination Angle					Fig
									0.5°	1°	1.5°	2°	3°	
NPDBS1010-004	★	0.1	0.2	0.1	0.4	40	0.18	4	0.42	0.43	0.44	0.46	0.48	1
NPDBS1020-008	★	0.2	0.4	0.2	0.8	40	0.38	4	0.83	0.85	0.87	0.90	0.95	1
NPDBS1030-010	★	0.3	0.6	0.3	1.0	40	0.58	4	1.03	1.06	1.08	1.11	1.17	1
NPDBS1050-020	★	0.5	1.0	0.5	2.0	40	0.95	4	2.10	2.15	2.20	2.26	2.39	1
NPDBS1100-030	★	1.0	2.0	1.0	3.0	40	1.95	4	3.18	3.18	3.25	3.33	3.51	1

Grade: NPD10

Identification Code

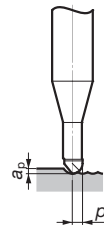
NPDB (S) 1 030 - 010

Type

For Standard
FinishingNumber
of TeethBallnose
RadiusNeck
Length

Recommended Cutting Conditions

1. Use a precision machine for stable cutting.
2. Non-water soluble cutting oil is recommended. Supply as a mist or external coolant.
Take fire prevention precautions to avoid fire hazards caused by sparks igniting during machining or tool breakage.
3. Shorten overhang as much as possible.
4. Adjust cutting conditions as necessary as equipment performance and other conditions may vary.
5. Values shown in the table of conditions are guidelines. Adjust the actual cutting conditions to the desired machined surface quality.



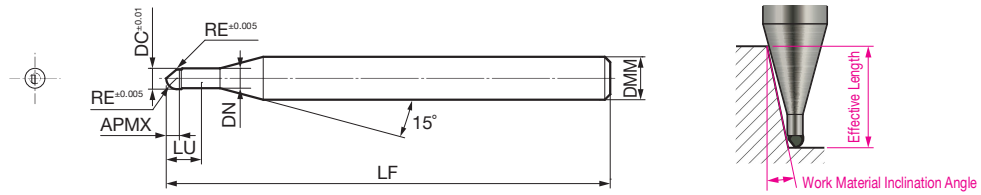
Flat Surface Finishing

Work Material		Cemented Carbide			
RE (mm)	LU (mm)	Spindle Speed (RPM)	Feed Rate (IPM)	a _p (in)	p _f (in)
0.1	0.4	40,000	3.937	0.00004	0.00004
0.2	0.8	40,000	5.906	0.00008	0.00004
0.3	1.0	40,000	7.874	0.00012	0.00004
0.5	2.0	40,000	15.748	0.00020	0.00012
1.0	3.0	40,000	23.622	0.00040	0.00020

*Radius accuracy inspection test results are included in the case. *Also applicable for long neck types, depending on the size. For details, please contact us.



Fig 1



Body (for Precision Finishing)

Dimensions (mm)

Cat. No.	Stock	Radius RE	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Head Dia. DN	Shank Dia. DMM	Effective Length for Work Material Inclination Angle					Fig
									0.5°	1°	1.5°	2°	3°	
NPDB1010-004	★	0.1	0.2	0.1	0.4	40	0.18	4	0.42	0.43	0.44	0.46	0.48	1
NPDB1020-008	★	0.2	0.4	0.2	0.8	40	0.38	4	0.83	0.85	0.87	0.90	0.95	1
NPDB1030-010	★	0.3	0.6	0.3	1.0	40	0.58	4	1.03	1.06	1.08	1.11	1.17	1
NPDB1050-020	★	0.5	1.0	0.5	2.0	40	0.95	4	2.10	2.15	2.20	2.26	2.39	1
NPDB1100-030	★	1.0	2.0	1.0	3.0	40	1.95	4	3.11	3.18	3.25	3.33	3.51	1

Grade: NPDB10

Identification Code

NPDB 1 030 - 010

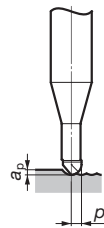
Type

Number
of TeethBallnose
Radius

Neck Length

Recommended Cutting Conditions

1. Use a precision machine for stable cutting.
2. Non-water soluble cutting oil is recommended. Supply as a mist or external coolant.
Take fire prevention precautions to avoid fire hazards caused by sparks igniting during machining or tool breakage.
3. Shorten overhang as much as possible.
4. Adjust cutting conditions as necessary as equipment performance and other conditions may vary.
5. Values shown in the table of conditions are guidelines. Adjust the actual cutting conditions to the desired machined surface quality.



Flat Surface Finishing

Work Material		Cemented Carbide			
RE (mm)	LU (mm)	Spindle Speed (RPM)	Feed Rate (IPM)	a_p (in)	p_t (in)
0.1	0.4	40,000	3.937	0.00004	0.00004
0.2	0.8	40,000	5.906	0.00008	0.00004
0.3	1.0	40,000	7.874	0.00012	0.00004
0.5	2.0	40,000	15.748	0.00020	0.00012
1.0	3.0	40,000	23.622	0.00040	0.00020

*Radius accuracy inspection test results are included in the case. *Also applicable for long neck types, depending on the size. For details, please contact us.

SDCB Type

2
FlutesSUMIDIA
CoatBallnose
R

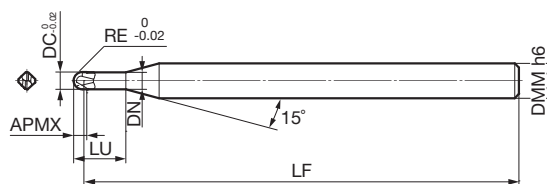
Side Milling

Face Milling

R-Grooving

Profiling

Fig 1



Body

Dimensions (mm)

Cat. No.	Stock	Radius RE	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Head Dia. DN	Shank Dia. DMM	Fig
SDCB2R050-015	★	0.5	1.0	0.6	1.5	50	0.94	4	1
SDCB2R050-020	★	0.5	1.0	0.6	2.0	50	0.94	4	1
SDCB2R050-030	★	0.5	1.0	0.6	3.0	50	0.94	4	1
SDCB2R050-050	★	0.5	1.0	0.6	5.0	50	0.94	4	1
SDCB2R100-025	★	1.0	2.0	1.4	2.5	50	1.92	4	1
SDCB2R100-040	★	1.0	2.0	1.4	4.0	50	1.92	4	1
SDCB2R100-060	★	1.0	2.0	1.4	6.0	50	1.92	4	1
SDCB2R100-100	★	1.0	2.0	1.4	10.0	50	1.92	4	1

Grade: DCM20

Identification Code

SDCB 2 R050 - 015

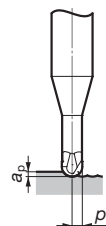
Type

Number
of TeethBallnose
Radius

Neck Length

Recommended Cutting Conditions

1. Use a precision machine for stable cutting.
2. Air blow is recommended, but oil mist or external coolant supply can also be used.
Take fire prevention precautions to avoid fire hazards caused by sparks igniting during machining or tool breakage.
3. Shorten overhang as much as possible.
4. Adjust cutting conditions as necessary as equipment performance and other conditions may vary.
5. Values shown in the table of conditions are guidelines. Adjust the actual cutting conditions to the desired machined surface quality.



Work Material		Cemented Carbide			
RE (mm)	LU (mm)	Spindle Speed (RPM)	Feed Rate (IPM)	a _p (inch)	a _e (inch)
0.5	1.5	30,000	11.811	0.00197	0.00984
1.0	2.5	30,000	11.811	0.00394	0.01181

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Uncoated

MEMO

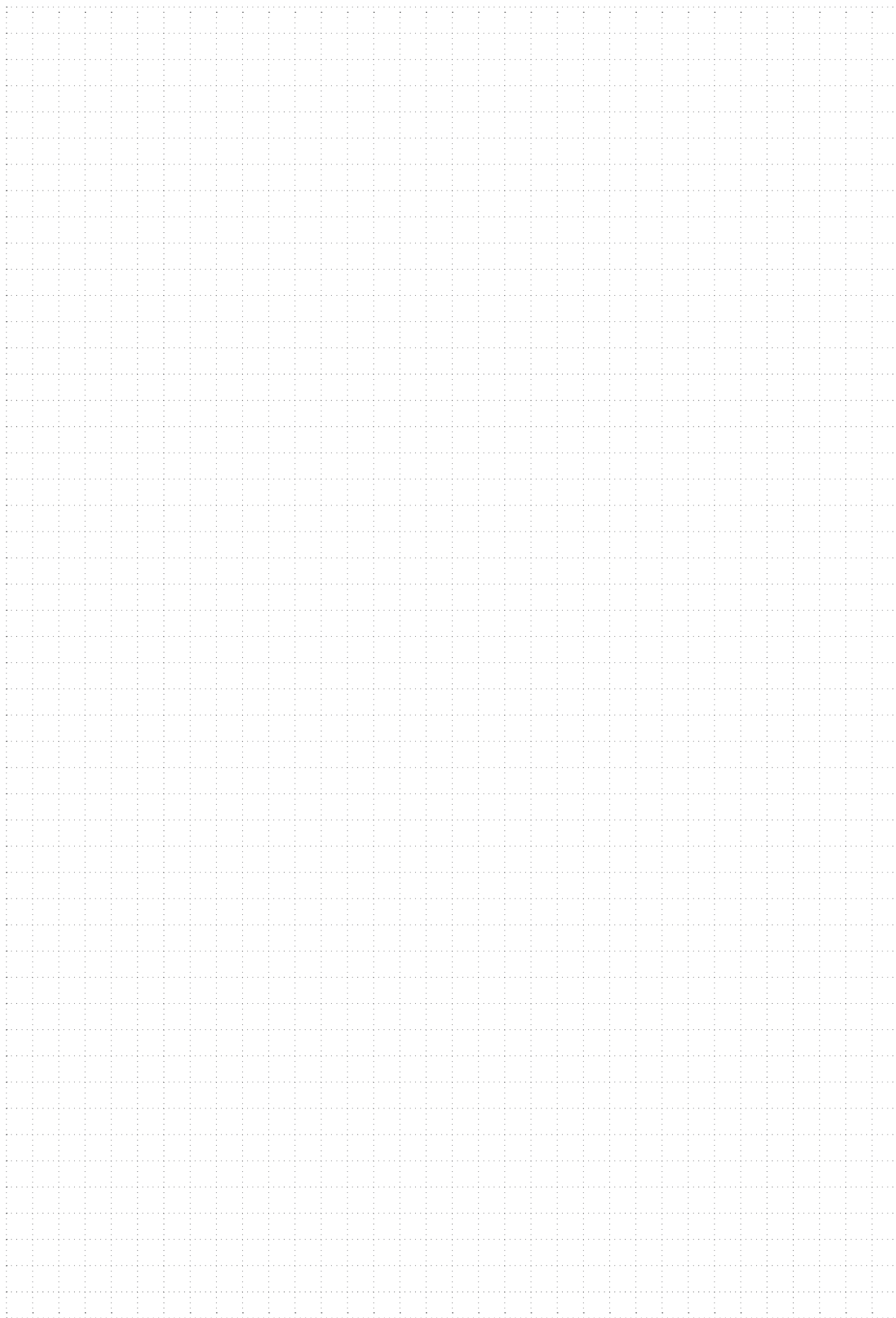
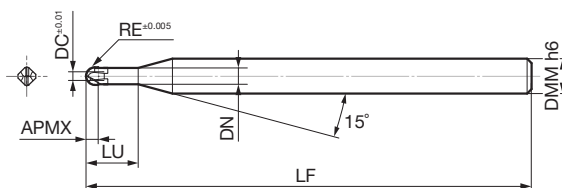




Fig 1



Body

Dimensions (mm)

Cat. No.	Stock	Radius RE	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Head Dia. DN	Shank Dia. DMM	Fig
BNBP2R020-0124	★	0.20	0.4	0.3	1.2	50	0.37	4	1
BNBP2R020-0126	★	0.20	0.4	0.3	1.2	50	0.37	6	1
BNBP2R020-0204	★	0.20	0.4	0.3	2.0	50	0.37	4	1
BNBP2R020-0304	★	0.20	0.4	0.3	3.0	50	0.37	4	1
BNBP2R020-0404	★	0.20	0.4	0.3	4.0	50	0.37	4	1
BNBP2R030-0154	★	0.30	0.6	0.4	1.5	50	0.57	4	1
BNBP2R030-0156	★	0.30	0.6	0.4	1.5	50	0.57	6	1
BNBP2R030-0304	★	0.30	0.6	0.4	3.0	50	0.57	4	1
BNBP2R030-0404	★	0.30	0.6	0.4	4.0	50	0.57	4	1
BNBP2R030-0504	★	0.30	0.6	0.4	5.0	50	0.57	4	1
BNBP2R030-0604	★	0.30	0.6	0.4	6.0	50	0.57	4	1
BNBP2R050-0254	★	0.50	1.0	0.6	2.5	50	0.97	4	1
BNBP2R050-0256	★	0.50	1.0	0.6	2.5	50	0.97	6	1
BNBP2R050-0304	★	0.50	1.0	0.6	3.0	50	0.97	4	1
BNBP2R050-0404	★	0.50	1.0	0.6	4.0	50	0.97	4	1
BNBP2R050-0604	★	0.50	1.0	0.6	6.0	50	0.97	4	1
BNBP2R050-0804	★	0.50	1.0	0.6	8.0	50	0.97	4	1
BNBP2R075-0404	★	0.75	1.5	0.9	4.0	50	1.47	4	1
BNBP2R075-0406	★	0.75	1.5	0.9	4.0	50	1.47	6	1
BNBP2R100-0554	★	1.00	2.0	1.4	5.5	50	1.97	4	1
BNBP2R100-0556	★	1.00	2.0	1.4	5.5	50	1.97	6	1
BNBP2R100-0804	★	1.00	2.0	1.4	8.0	50	1.97	4	1

Grade: BN350

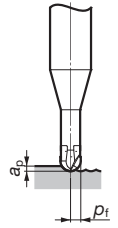
Identification Code

BNBP 2 R030 - 015 4

Series Code	Number of Teeth	Ballnose Radius	Neck Length	Shank Dia.
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MOLD FINISH MASTER SUMIBORON Ballnose Endmills

BNBP Type



Recommended Cutting Conditions

1. Use a machine with high rigidity for stable cutting.
2. Non-water soluble cutting oil is recommended. Supply as a mist or external coolant.
Take fire prevention precautions to avoid fire hazards caused by sparks igniting during machining or tool breakage.
3. Shorten overhang as much as possible.
4. Adjust cutting conditions according to actual conditions 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)	a _p (mm)	p _t (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a _p (mm)	p _t (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a _p (mm)	p _t (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
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
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
	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
1.0	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
	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

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

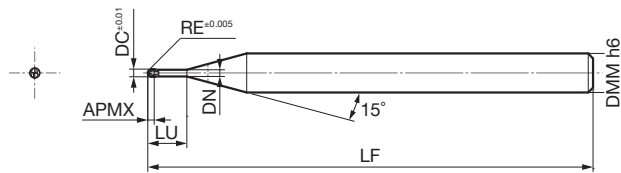
Uncoated

MOLD FINISH MASTER SUMIBORON Ballnose Endmills for Copper Electrode Machining BNBC

Copper Alloy



Fig 1



Body

Dimensions (mm)

Cat. No.	Stock	Radius RE	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Head Dia. DN	Shank Dia. DMM	Fig
BNBC2R010-0034	★	0.1	0.2	0.2	0.3	50	0.17	4	1
BNBC2R010-0104	★	0.1	0.2	0.2	1.0	50	0.17	4	1
BNBC2R020-0054	★	0.2	0.4	0.3	0.5	50	0.37	4	1
BNBC2R020-0204	★	0.2	0.4	0.3	2.0	50	0.37	4	1
BNBC2R030-0104	★	0.3	0.6	0.4	1.0	50	0.57	4	1
BNBC2R030-0304	★	0.3	0.6	0.4	3.0	50	0.57	4	1
BNBC2R050-0304	★	0.5	1.0	0.6	3.0	50	0.97	4	1

Grade: BN700

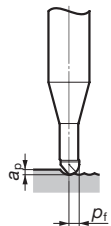
Identification Code

BNBC 2 R030 - 010 4

Series Code Number of Teeth 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. Supply as a mist or external coolant.
Take fire prevention precautions to avoid fire hazards caused by sparks igniting during machining or tool breakage.
3. Shorten overhang as much as possible.
4. Adjust cutting conditions according to actual conditions 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.



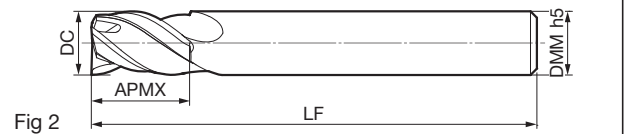
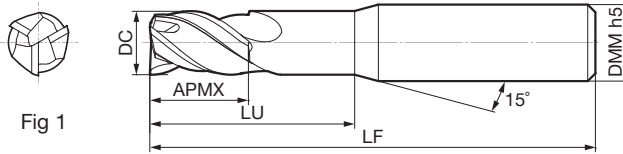
Side Milling

Work Material	Copper Alloy			
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Standard depth of cut (mm)	
Cat. No.			a _p	p _f
BNBC2R010-0034	20,000	350	0.01	0.02
BNBC2R010-0104	-50,000	350	0.007	0.015
BNBC2R020-0054	20,000	800	0.025	0.05
BNBC2R020-0204	-50,000	700	0.02	0.03
BNBC2R030-0104	20,000	1,400	0.05	0.15
BNBC2R030-0304	-50,000	1,200	0.04	0.1
BNBC2R050-0304	20,000 -50,000	2,200	0.15	0.35

GSX MILL Slot Endmills (3 Flutes)

GSXSLT 30000C-1.5D

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



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
GSXSLT30100C-1.5D	★	1.0	1.5	2.5	40	4	1
GSXSLT30150C-1.5D	★	1.5	2.3	3.3	40	4	1
GSXSLT30200C-1.5D	★	2.0	3.0	4.0	40	4	1
GSXSLT30250C-1.5D	★	2.5	3.8	4.8	40	4	1
GSXSLT30300C-1.5D	★	3.0	4.5	6.0	45	6	1
GSXSLT30400C-1.5D	★	4.0	6.0	7.5	45	6	1
GSXSLT30500C-1.5D	★	5.0	7.5	9.5	50	6	1
GSXSLT30600C-1.5D	★	6.0	9.0	-	50	6	2
GSXSLT30700C-1.5D	★	7.0	11.0	13.0	60	8	1
GSXSLT30800C-1.5D	★	8.0	12.0	-	60	8	2
GSXSLT30900C-1.5D	★	9.0	14.0	16.0	70	10	1
GSXSLT31000C-1.5D	★	10.0	15.0	-	70	10	2
GSXSLT31200C-1.5D	★	12.0	18.0	-	75	12	2

Grade: ACF20

Recommended Cutting Conditions

- For stable machining performance use rigid, high-precision machines and holders.
- Use air blow when dry machining.
- Use wet machining for stainless steel, heat-resistant alloy, and titanium alloy applications.
- Use step machining of 0.1 DC when drilling stainless steel, heat-resistant alloy, and titanium alloy.
- If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.

Side Milling

Work Material	Steel for Structure 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		
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	
DC (mm)																	
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	a _p	1.5DC										1.0DC					
	a _e	0.05DC										0.02DC					

Groove Milling

Work Material		Steel for Structure 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	
Cutting Conditions	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
	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	a _p	0.2DC				0.5DC				0.2DC		0.05DC				0.2DC	

Slot Milling

Work Material	Steel for Structure 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	
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC (mm)																
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

Endmills

I

Square

Radius

Ballnose

Multi-Purpose

General-purpose

High Efficiency

Hardened Steel

Roughing

Non-ferrous Metal

CFRP

Coated

Unc coated