

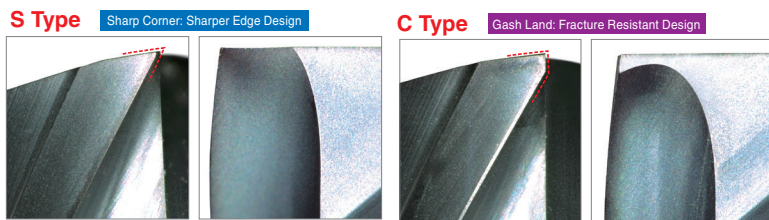


■ Features & Benefits

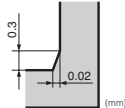
- Wide variation of three flute types and four flute lengths enable use in a wide variety of applications.
- Fine carbide substrate provides high traverse rupture strength and excellent thermal shock resistance improving reliability in wet cutting applications.
- **GSX Coating** provides improved reliability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

■ Product Range		Inch GSX Endmills					
Application	Flutes	Flute Length					
		1.5D	2D		3D	4D	
General Purpose	2	C Type	S Type	C Type	S Type	C Type	C Type
	$\phi 1/16"$ to $\phi 1"$	$\phi 1/16"$ to $\phi 1"$	$\phi 1/16"$ to $\phi 1"$	$\phi 1/16"$ to $\phi 1"$	$\phi 1/16"$ to $\phi 1"$	$\phi 1/16"$ to $\phi 1"$	
	4						
$\phi 1/16"$ to $\phi 1"$	$\phi 1/16"$ to $\phi 1"$	$\phi 1/16"$ to $\phi 1"$	$\phi 1/16"$ to $\phi 1"$	$\phi 1/16"$ to $\phi 1"$	$\phi 1/16"$ to $\phi 1"$		

■ Product Range		Metric GSX Endmills					
Application	Flutes	Flute Length					
		1.5D	2D		3D	4D	
General Purpose	2	C Type	S Type	C Type	S Type	C Type	C Type
	$\phi 1.0$ to $\phi 20.0$ mm	$\phi 0.5$ to $\phi 20.0$ mm	$\phi 0.5$ to $\phi 25.0$ mm	$\phi 0.5$ to $\phi 20.0$ mm	$\phi 1.0$ to $\phi 20.0$ mm	$\phi 1.0$ to $\phi 20.0$ mm	
	3						
$\phi 1.0$ to $\phi 20.0$ mm		$\phi 1.0$ to $\phi 20.0$ mm					
4							
$\phi 1.0$ to $\phi 20.0$ mm	$\phi 1.0$ to $\phi 20.0$ mm	$\phi 1.0$ to $\phi 25.0$ mm	$\phi 1.0$ to $\phi 20.0$ mm	$\phi 1.0$ to $\phi 20.0$ mm	$\phi 1.0$ to $\phi 20.0$ mm		



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



■ Recommended Milling Examples

Application	Surface Milling		Groove Milling		Groove Finishing	
	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing
<b>S Type</b>	⊙	⊙	⊙	⊙ <sup>*2</sup>	⊙	⊙
<b>C Type</b>	⊙	○	⊙	⊙	⊙	○

**S Type** is best for removing inside corners    <sup>\*2</sup>: Use with small depth of cut.

■ Application Range

⊙ : Best    ○ : Good    Blank : Not recommended

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

■ Multi-Purpose

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

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



# SOLID CARBIDE ENDMILLS

## Recommended Cutting Conditions - 1.5D, 2D, 3D & 4D

Speeds and Feeds reflect roughing and finishing applications

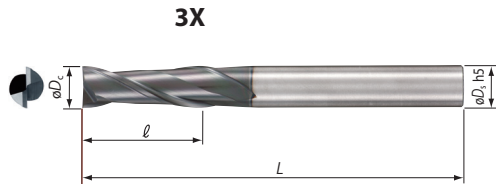
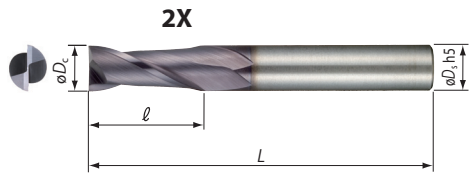
ISO	GSX 1.5D & 2D Endmills			Cutting Diameter										
	Material	Hardness (Bhn)	SFM	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	1
				Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth
P	Low and Medium Carbon Steels	<250	150-400	.0005-.0024	.0007-.0025	.0008-.0035	.0008-.0037	.001-.0045	.0012-.0055	.0014-.0066	.0016-.0075	.002-.0095	.002-.010	.002-.0105
	Medium Carbon Alloy Steels	<250	140-375	.0005-.0024	.0007-.0025	.0008-.0035	.0008-.0037	.001-.0045	.0012-.0055	.0014-.0066	.0016-.0075	.002-.0095	.002-.010	.002-.0105
	Medium-High Carbon Steels	>250	175-300	.0005-.0015	.0007-.002	.0008-.003	.0008-.0033	.001-.0039	.0012-.0045	.0014-.0056	.0016-.0062	.002-.0075	.002-.008	.002-.009
	Free Machining Steels and Alloys	<250	175-350	.0005-.002	.0008-.0025	.0008-.0035	.0008-.004	.001-.0045	.0012-.0055	.0014-.0058	.0016-.0072	.002-.0075	.002-.0085	.002-.009
	Tool Steels	<250	150-300	.0005-.0017	.0005-.0024	.0008-.003	.0008-.0035	.001-.0045	.001-.0055	.0012-.0066	.0016-.0075	.002-.0075	.002-.0085	.002-.009
250 - 350		100-225	.0005-.0015	.0005-.0019	.0008-.0025	.0008-.003	.001-.0036	.001-.0044	.0012-.0055	.0013-.0065	.0015-.0075	.002-.0085	.002-.0088	
>350		75-150	.0005-.001	.0005-.0012	.0006-.0014	.0008-.0017	.0008-.0022	.0008-.0028	.001-.0034	.001-.0041	.001-.0046	.0015-.0051	.002-.0055	
M	Martensitic and Ferritic	<250	150-350	.0005-.0013	.0008-.0013	.0008-.0016	.0008-.0019	.001-.0025	.001-.0031	.001-.0037	.001-.0044	.001-.005	.001-.0055	.001-.0062
		<250	150-350	.0005-.0013	.0005-.0013	.0005-.0016	.0008-.0019	.0008-.0025	.001-.0031	.001-.0037	.001-.0044	.001-.005	.001-.0055	.001-.0062
	Austenitic	<250	150-325	.0005-.0013	.0005-.0018	.0008-.003	.001-.0033	.001-.0035	.0011-.0039	.0012-.0043	.0012-.0047	.0014-.0055	.0015-.006	.002-.007
	Precipitation Hardening	<280	90-300	.0005-.0012	.0005-.0013	.0008-.0015	.001-.0019	.001-.0025	.001-.003	.001-.0035	.001-.0041	.001-.0048	.001-.0055	.001-.0065
K	Grey Cast Iron		250-400	.0008-.0024	.001-.0028	.001-.0031	.001-.0033	.001-.004	.001-.0045	.001-.006	.001-.0067	.001-.0075	.001-.0085	.001-.010
	Ductile Iron		160-350	.0005-.0024	.0005-.0028	.0008-.0031	.001-.0033	.001-.004	.001-.0045	.001-.0059	.001-.0067	.001-.0075	.001-.0085	.001-.010
S	Exotic Alloys: Inconel, Hastalloy, Waspalloy, etc.		75-125	.0005-.0015	.0008-.0018	.0008-.0021	.0008-.0024	.001-.0028	.001-.0033	.001-.0036	.001-.004	.001-.0045	.001-.005	.001-.006
N	Non-Ferrous Material		600-1500	.001-.0024	.001-.003	.001-.0035	.001-.004	.001-.0045	.001-.005	.001-.006	.001-.008	.001-.0095	.001-.011	.001-.012

ISO	GSX 3D Endmills			Cutting Diameter										
	Material	Hardness (Bhn)	SFM	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	1
				Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth
P	Low and Medium Carbon Steels	<250	125-280	.0005-.0021	.0007-.0022	.0008-.0031	.0008-.0034	.001-.0041	.0012-.005	.0014-.006	.0016-.0072	.002-.008	.002-.009	.002-.010
	Medium Carbon Alloy Steels	<250	100-255	.0005-.0021	.0007-.0022	.0008-.0031	.0008-.0034	.001-.0041	.0012-.005	.0014-.006	.0016-.0072	.002-.008	.002-.009	.002-.010
	Medium-High Carbon Steels	>250	90-200	.0005-.0014	.0007-.0018	.0008-.0027	.0008-.003	.001-.0036	.0012-.0041	.0014-.005	.0016-.0059	.002-.0069	.002-.008	.002-.009
	Free Machining Steels and Alloys	<250	110-230	.0005-.0018	.0008-.0022	.0008-.0031	.0008-.0036	.001-.0041	.0012-.0049	.0014-.006	.0016-.0071	.002-.0081	.002-.0092	.002-.0103
	Tool Steels	<250	100-200	.0005-.0015	.0005-.0019	.0008-.0027	.0008-.0031	.001-.0041	.001-.005	.0012-.0059	.0016-.0069	.002-.008	.002-.0091	.002-.0102
250 - 350		85-165	.0005-.0013	.0005-.0017	.0008-.0022	.0008-.0029	.001-.0033	.001-.004	.0012-.0048	.0013-.0059	.0015-.007	.002-.0081	.002-.0092	
>350		75-145	.0005-.001	.0005-.0011	.0006-.0013	.0008-.0017	.001-.0023	.0008-.0026	.001-.003	.001-.0037	.001-.0042	.0015-.0047	.002-.0054	
M	Martensitic and Ferritic	<250	90-230	.0005-.0013	.0008-.0011	.0008-.0015	.0008-.002	.001-.0025	.001-.0029	.001-.0033	.001-.004	.001-.0046	.001-.0051	.001-.0058
		<250	90-230	.0005-.0013	.0005-.0011	.0005-.0015	.0008-.002	.0008-.0025	.001-.0029	.001-.0033	.001-.004	.001-.0046	.001-.0051	.001-.0058
	Austenitic	<250	110-205	.0005-.0011	.0005-.0016	.0008-.002	.0008-.0024	.001-.0027	.0011-.0035	.0012-.0038	.0012-.0042	.0014-.0046	.0015-.005	.002-.006
	Precipitation Hardening	<280	90-180	.0005-.0011	.0005-.0012	.0008-.0015	.0008-.0035	.001-.0022	.001-.0027	.001-.0032	.001-.0037	.001-.0043	.001-.005	.001-.006
K	Grey Cast Iron		250-280	.0008-.002	.001-.0025	.001-.0028	.0008-.0031	.001-.0035	.001-.0039	.001-.0046	.001-.005	.001-.0054	.001-.006	.001-.007
	Ductile Iron		160-225	.0005-.002	.001-.0025	.001-.0028	.0015-.0031	.001-.0035	.001-.0039	.001-.0046	.001-.005	.001-.0054	.001-.006	.001-.007
S	Exotic Alloys: Inconel, Hastalloy, Waspalloy, etc.		75-115	.0005-.0012	.0008-.0015	.0008-.0018	.0008-.0021	.001-.0025	.001-.0029	.001-.0033	.001-.0038	.001-.0044	.001-.0051	.001-.0057
N	Non-Ferrous Material		550-1100	.001-.0021	.001-.0027	.001-.0031	.0008-.0036	.001-.0042	.001-.0053	.001-.0064	.001-.0075	.001-.0085	.001-.0095	.001-.0105

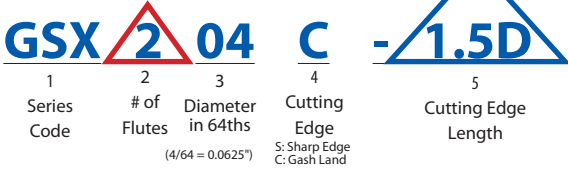
ISO	GSX 4D Endmills			Cutting Diameter										
	Material	Hardness (Bhn)	SFM	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	1
				Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth
P	Low and Medium Carbon Steels	<250	115-260	.0005-.0018	.0007-.0019	.0008-.0028	.0008-.0031	.001-.0036	.0012-.0045	.0014-.0054	.0016-.0065	.002-.007	.002-.0075	.002-.009
	Medium Carbon Alloy Steels	<250	90-235	.0005-.0018	.0007-.0019	.0008-.0028	.0008-.0031	.001-.0036	.0012-.0045	.0014-.0054	.0016-.0065	.002-.007	.002-.0075	.002-.009
	Medium-High Carbon Steels	>250	80-180	.0005-.0013	.0007-.0016	.0008-.0024	.0008-.0027	.001-.0032	.0012-.0037	.0014-.0045	.0016-.0053	.002-.006	.002-.007	.002-.0081
	Free Machining Steels and Alloys	<250	100-210	.0005-.0016	.0008-.002	.0008-.0027	.0008-.0032	.001-.0036	.0012-.004	.0014-.005	.0016-.006	.002-.007	.002-.008	.002-.009
	Tool Steels	<250	90-160	.0005-.0013	.0005-.0017	.0008-.0024	.0008-.0027	.001-.0033	.001-.004	.0012-.005	.0016-.006	.002-.007	.002-.008	.002-.009
250 - 350		85-145	.0005-.0011	.0005-.0015	.0008-.002	.0008-.0025	.001-.003	.001-.0035	.0012-.0043	.0013-.0052	.0015-.0062	.002-.0073	.002-.0084	
>350		75-125	.0005-.001	.0005-.0011	.0006-.0012	.0008-.0013	.0008-.0018	.0008-.0023	.001-.0027	.001-.0031	.001-.004	.0015-.0045	.002-.005	
M	Martensitic and Ferritic	<250	85-210	.0005-.0011	.0008-.0011	.0008-.0012	.0008-.0015	.001-.002	.001-.0029	.001-.0033	.001-.004	.001-.0046	.001-.0051	.001-.0058
		<250	85-210	.0005-.0011	.0005-.0011	.0005-.0012	.0008-.0015	.0008-.002	.001-.0029	.001-.0033	.001-.004	.001-.0046	.001-.0051	.001-.0058
	Austenitic	<250	100-185	.0005-.0011	.0005-.0012	.0008-.0016	.001-.002	.001-.0024	.0011-.0028	.0012-.0032	.0012-.0036	.0014-.004	.0015-.0045	.002-.0052
	Precipitation Hardening	<280	90-160	.0005-.0011	.0005-.0011	.0008-.0013	.001-.0015	.001-.0018	.001-.0024	.001-.0029	.001-.0033	.001-.0037	.001-.0041	.001-.0046
K	Grey Cast Iron		240-250	.0008-.002	.001-.0025	.001-.0027	.001-.0029	.001-.0033	.001-.0037	.001-.004	.001-.0044	.001-.0049	.001-.0055	.001-.0065
	Ductile Iron		160-200	.0008-.002	.001-.0025	.001-.0027	.001-.0029	.001-.0033	.001-.0037	.001-.004	.001-.0044	.001-.0049	.001-.0055	.001-.0065
S	Exotic Alloys: Inconel, Hastalloy, Waspalloy, etc.		75-90	.0005-.001	.0008-.0012	.0008-.0015	.0008-.0018	.001-.0023	.001-.0026	.001-.003	.001-.0035	.001-.004	.001-.0046	.001-.0051
N	Non-Ferrous Material		500-1000	.001-.0017	.001-.0022	.001-.0027	.001-.0032	.001-.0038	.001-.0045	.001-.0042	.001-.005	.001-.0059	.001-.007	.001-.01



**GSX Endmills - Sharp Edge (S) INCH Lineup**



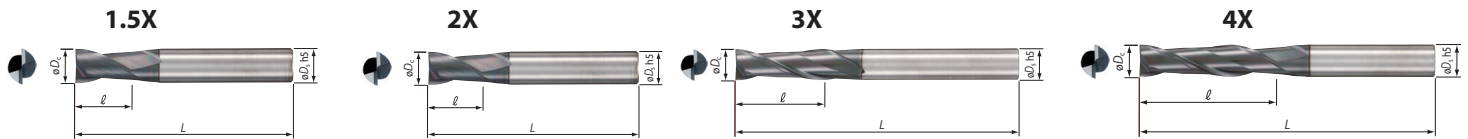
■ Endmill Identification  
(GSX MILL Series Only)



Sharp Edge (S)	Diameter $\phi D_c$		Shank Diameter $\phi D_s$ (Inch)	2			3				
	Fraction	Inch		Flute		Flute Length $\ell$ (Inch)	Flute		Flute Length $\ell$ (Inch)		
				2	4		2	4			
<b>GSXΔ04S-AD</b>	1/16	0.0625	0.1250	●	●	1.500	0.1250	●	●	1.500	0.1875
<b>GSXΔ06S-AD</b>	3/32	0.0938	0.1250	●	●	1.500	0.1875	●	●	1.500	0.2813
<b>GSXΔ08S-AD</b>	1/8	0.1250	0.1250	●	●	2.000	0.2500	●	●	2.000	0.3750
<b>GSXΔ10S-AD</b>	5/32	0.1563	0.1875	●	●	2.000	0.3125	●	●	2.000	0.4688
<b>GSXΔ12S-AD</b>	3/16	0.1875	0.1875	●	●	2.000	0.3750	●	●	2.000	0.5625
<b>GSXΔ14S-AD</b>	7/32	0.2188	0.2500	●	●	2.000	0.4376	●	●	2.000	0.6564
<b>GSXΔ16S-AD</b>	1/4	0.2500	0.2500	●	●	2.000	0.5000	●	●	2.000	0.7500
<b>GSXΔ18S-AD</b>	9/32	0.2813	0.3125	●	●	2.500	0.5626	●	●	3.000	0.8439
<b>GSXΔ20S-AD</b>	5/16	0.3125	0.3125	●	●	2.500	0.6250	●	●	3.000	0.9375
<b>GSXΔ24S-AD</b>	3/8	0.3750	0.3750	●	●	3.000	0.7500	●	●	3.500	1.1250
<b>GSXΔ28S-AD</b>	7/16	0.4375	0.4375	●	●	3.000	0.8750	●	●	3.500	1.3125
<b>GSXΔ32S-AD</b>	1/2	0.5000	0.5000	●	●	3.000	1.0000	●	●	3.500	1.5000
<b>GSXΔ36S-AD</b>	9/16	0.5625	0.5625	●	●	3.500	1.1250	●	●	4.500	1.6875
<b>GSXΔ40S-AD</b>	5/8	0.6250	0.6250	●	●	3.500	1.2500	●	●	4.500	1.8750
<b>GSXΔ44S-AD</b>	11/16	0.6875	0.6875	●	●	4.000	1.3750	●	●	4.500	2.0625
<b>GSXΔ48S-AD</b>	3/4	0.7500	0.7500	●	●	4.000	1.5000	●	●	5.000	2.2500
<b>GSXΔ56S-AD</b>	7/8	0.8750	0.8750	●	●	4.000	1.7500	●	●	5.000	2.6250
<b>GSXΔ64S-AD</b>	1	1.0000	1.0000	●	●	4.000	2.0000	●	●	5.500	3.0000

●: USA stock standard

**GSX Endmills - Gash Land (C) INCH Lineup**



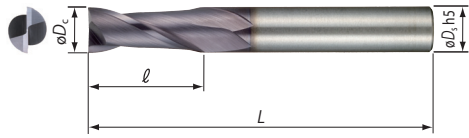
Gash Land (C)	Diameter $\phi D_c$		Shank Diameter $\phi D_s$ (Inch)	1.5			2			3			4						
	Fraction	Inch		Flute		Flute Length $\ell$ (Inch)	Flute		Flute Length $\ell$ (Inch)	Flute		Flute Length $\ell$ (Inch)	Flute		Flute Length $\ell$ (Inch)				
				2	4		2	4		2	4		2	4					
<b>GSXΔ04C-AD</b>	1/16	0.0625	0.1250	●	●	1.500	0.0938	●	●	1.500	0.1250	●	●	1.500	0.1875	●	●	1.500	0.2500
<b>GSXΔ06C-AD</b>	3/32	0.0938	0.1250	●	●	1.500	0.1406	●	●	1.500	0.1875	●	●	1.500	0.2813	●	●	1.500	0.3750
<b>GSXΔ08C-AD</b>	1/8	0.1250	0.1250	●	●	2.000	0.1875	●	●	2.000	0.2500	●	●	2.000	0.3750	●	●	2.000	0.5000
<b>GSXΔ10C-AD</b>	5/32	0.1563	0.1875	●	●	2.000	0.2344	●	●	2.000	0.3125	●	●	2.000	0.4688	●	●	2.000	0.6250
<b>GSXΔ12C-AD</b>	3/16	0.1875	0.1875	●	●	2.000	0.2813	●	●	2.000	0.3750	●	●	2.000	0.5625	●	●	2.500	0.7500
<b>GSXΔ14C-AD</b>	7/32	0.2188	0.2500	●	●	2.000	0.3282	●	●	2.000	0.4376	●	●	2.000	0.6564	●	●	2.500	0.8752
<b>GSXΔ16C-AD</b>	1/4	0.2500	0.2500	●	●	2.000	0.3750	●	●	2.000	0.5000	●	●	2.000	0.7500	●	●	2.500	1.0000
<b>GSXΔ18C-AD</b>	9/32	0.2813	0.3125	●	●	2.500	0.4219	●	●	2.500	0.5626	●	●	3.000	0.8439	●	●	3.000	1.1252
<b>GSXΔ20C-AD</b>	5/16	0.3125	0.3125	●	●	2.500	0.4688	●	●	2.500	0.6250	●	●	3.000	0.9375	●	●	3.000	1.2500
<b>GSXΔ24C-AD</b>	3/8	0.3750	0.3750	●	●	3.000	0.5625	●	●	3.000	0.7500	●	●	3.500	1.1250	●	●	3.500	1.5000
<b>GSXΔ28C-AD</b>	7/16	0.4375	0.4375	●	●	3.000	0.6563	●	●	3.000	0.8750	●	●	3.500	1.3125	●	●	4.000	1.7500
<b>GSXΔ32C-AD</b>	1/2	0.5000	0.5000	●	●	3.000	0.7500	●	●	3.000	1.0000	●	●	3.500	1.5000	●	●	4.000	2.0000
<b>GSXΔ36C-AD</b>	9/16	0.5625	0.5625	●	●	3.500	0.8438	●	●	3.500	1.1250	●	●	4.500	1.6875	●	●	5.000	2.2500
<b>GSXΔ40C-AD</b>	5/8	0.6250	0.6250	●	●	3.500	0.9375	●	●	3.500	1.2500	●	●	4.500	1.8750	●	●	5.000	2.5000
<b>GSXΔ44C-AD</b>	11/16	0.6875	0.6875	●	●	4.000	1.0313	●	●	4.000	1.3750	●	●	4.500	2.0625	●	●	5.000	2.7500
<b>GSXΔ48C-AD</b>	3/4	0.7500	0.7500	●	●	4.000	1.1250	●	●	4.000	1.5000	●	●	5.000	2.2500	●	●	5.500	3.0000
<b>GSXΔ56C-AD</b>	7/8	0.8750	0.8750	●	●	4.000	1.3125	●	●	4.000	1.7500	●	●	5.000	2.6250	●	●	5.500	3.5000
<b>GSXΔ64C-AD</b>	1	1.0000	1.0000	●	●	4.000	1.5000	●	●	4.000	2.0000	●	●	5.500	3.0000	●	●	6.000	4.0000

●: USA stock standard

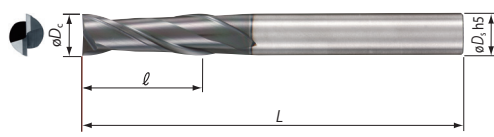


**GSX Endmills - Sharp Edge (S) METRIC Lineup**

2X

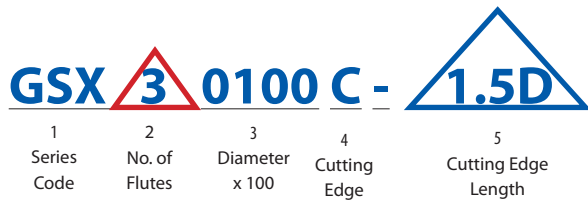


3X



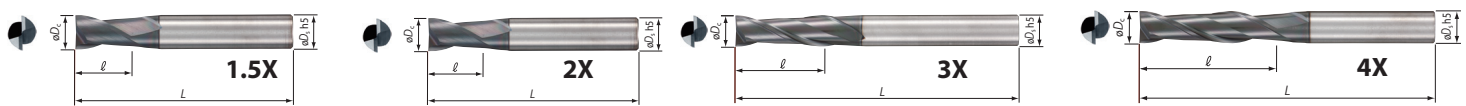
Sharp Edge (S)	Diameter φD <sub>c</sub> (mm)	Shank Diameter φD <sub>s</sub> (mm)	2			3				
			Flute		OAL L (mm)	Flute		OAL L (mm)	Flute Length ℓ (mm)	
			2	4		2	4			
GSXΔ0050S-ΔD	0.5	4.0	★		40.0	1.3	★		40.0	1.5
GSXΔ0100S-ΔD	1.0	4.0	★	★	40.0	2.5	★	★	40.0	3.0
GSXΔ0150S-ΔD	1.5	3.0	★	★	40.0	3.8	★		40.0	4.5
GSXΔ0150S-ΔD-S3	1.5	4.0	★	★	38.0	3.8				
GSXΔ0200S-ΔD	2.0	4.0	★	★	40.0	5.0	★	★	40.0	6.0
GSXΔ0200S-ΔD-S3	2.0	3.0	★	★	38.0	5.0				
GSXΔ0250S-ΔD	2.5	4.0	★	★	40.0	6.3	★		40.0	7.5
GSXΔ0300S-ΔD	3.0	6.0	★	★	45.0	7.5	★	★	50.0	9.0
GSXΔ0300S-ΔD-S3	3.0	3.0	★	★	38.0	7.5				
GSXΔ0350S-ΔD	3.5	6.0	★	★	45.0	8.8				
GSXΔ0400S-ΔD	4.0	6.0	★	★	45.0	11.0	★	★	50.0	12.0
GSXΔ0400S-ΔD-S3	4.0	4.0	★	★	45.0	11.0				
GSXΔ0450S-ΔD	4.5	6.0	★	★	50.0	11.3				
GSXΔ0500S-ΔD	5.0	6.0	★	★	50.0	13.0	★	★	50.0	15.0
GSXΔ0550S-ΔD	5.5	6.0	★	★	50.0	13.0				
GSXΔ0600S-ΔD	6.0	6.0	★	★	50.0	13.0	★	★	50.0	18.0
GSXΔ0700S-ΔD	7.0	8.0	★	★	60.0	16.0		★	70.0	21.0
GSXΔ0800S-ΔD	8.0	8.0	★	★	60.0	19.0	★	★	70.0	24.0
GSXΔ0900S-ΔD	9.0	10.0	★	★	70.0	19.0				
GSXΔ1000S-ΔD	10.0	10.0	★	★	70.0	22.0	★	★	90.0	30.0
GSXΔ1200S-ΔD	12.0	12.0	★	★	75.0	26.0	★	★	90.0	36.0
GSXΔ1600S-ΔD	16.0	16.0	★	★	90.0	32.0	★	★	110.0	48.0
GSXΔ2000S-ΔD	20.0	20.0	★	★	100.0	40.0				

■ Endmill Identification (GSXMILL Series Only)



★ - World Wide Warehouse Item

**GSX Endmills - Gash Land (C) METRIC Lineup**





Gash Land (C)	Diameter φD <sub>c</sub> (mm)	Shank Diameter φD <sub>s</sub> (mm)	1.5			2			3			4			Flute OAL L (mm)	1.5		2				
			Flute		OAL L (mm)	Flute Length ℓ (mm)	Flute		OAL L (mm)	Flute Length ℓ (mm)	Flute		OAL L (mm)	Flute Length ℓ (mm)		Flute Length ℓ (mm)	Flute Length ℓ (mm)					
			2	4			2	4			2	4						2	4			
GSXΔ0050C-ΔD	0.5	4.0				★		40.0	1.0													
GSXΔ0100C-ΔD	1.0	4.0	★	★	40.0	1.5	★	★	40.0	2.0	★	★	40.0	3.0	★	★	40.0	4.0	★	40.0	1.5	2.5
GSXΔ0150C-ΔD	1.5	4.0	★	★	40.0	2.3	★	★	40.0	3.0	★	★	40.0	4.5	★	★	40.0	6.0	★	40.0	2.3	3.8
GSXΔ0200C-ΔD	2.0	4.0	★	★	40.0	3.0	★	★	40.0	4.0	★	★	40.0	6.0	★	★	40.0	8.0	★	40.0	3.0	5.0
GSXΔ0250C-ΔD	2.5	4.0	★	★	40.0	3.8	★	★	40.0	5.0	★	★	40.0	7.5	★	★	50.0	10.0	★	40.0	3.8	6.3
GSXΔ0300C-ΔD	3.0	6.0	★	★	45.0	4.5	★	★	45.0	6.0	★	★	50.0	9.0	★	★	50.0	16.0	★	45.0	4.5	7.5
GSXΔ0350C-ΔD	3.5	6.0	★	★	45.0	5.3	★	★	45.0	7.0												
GSXΔ0400C-ΔD	4.0	6.0	★	★	45.0	6.0	★	★	45.0	8.0	★	★	50.0	12.0	★	★	50.0	20.0	★	45.0	6.0	11.0
GSXΔ0450C-ΔD	4.5	6.0	★	★	50.0	6.8	★	★	50.0	9.0												
GSXΔ0500C-ΔD	5.0	6.0	★	★	50.0	7.5	★	★	50.0	10.0	★	★	50.0	15.0	★	★	60.0	24.0	★	50.0	7.5	11.0
GSXΔ0550C-ΔD	5.5	6.0	★	★	50.0	9.3	★	★	50.0	11.0												
GSXΔ0600C-ΔD	6.0	6.0	★	★	50.0	9.0	★	★	50.0	12.0	★	★	50.0	18.0	★	★	60.0	24.0	★	50.0	9.0	13.0
GSXΔ0700C-ΔD	7.0	8.0	★	★	60.0	11.0	★	★	60.0	14.0									★	60.0	11.0	13.0
GSXΔ0800C-ΔD	8.0	8.0	★	★	60.0	12.0	★	★	60.0	16.0	★	★	70.0	24.0	★	★	80.0	32.0	★	60.0	12.0	19.0
GSXΔ0900C-ΔD	9.0	10.0	★	★	70.0	14.0	★	★	70.0	18.0									★	70.0	14.0	19.0
GSXΔ1000C-ΔD	10.0	10.0	★	★	70.0	15.0	★	★	70.0	20.0	★	★	90.0	30.0	★	★	90.0	40.0	★	70.0	15.0	22.0
GSXΔ1200C-ΔD	12.0	12.0	★	★	75.0	18.0	★	★	75.0	24.0	★	★	90.0	36.0	★	★	100.0	48.0	★	75.0	18.0	26.0
GSXΔ1600C-ΔD	16.0	16.0					★	★	90.0	32.0	★	★	110.0	48.0		★	120.0	64.0				
GSXΔ2000C-ΔD	20.0	20.0					★	★	100.0	40.0												
GSXΔ2500C-ΔD	25.0	25.0					★	★	120.0	50.0												

★ - World Wide Warehouse Item



**Product Range - GSXB Ballnose Endmills**

GSXB Endmills	
Application	Inch
General Purpose	GSXB200
	
	$\phi 1/16'' - \phi 1''$
	Metric
	GSXB2000
	
	$\phi 0.4\text{mm} - \phi 20\text{mm}$



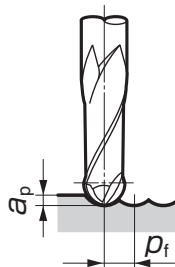
Endmill Series

**Recommended Cutting Conditions - GSXB**

Speeds and Feeds reflect roughing and finishing applications

■ Recommended Cutting Conditions

1. If cutting noise and vibration are present, please change the cutting conditions accordingly.
2. If the machine is not designed to achieve the recommended spindle speed, please use the max. spindle speed available.



■ Radius Milling

Work Material	Carbon Steel, Alloy Steel (Below 25HRC)		Carbon Steel, Alloy Steel (Below 50HRC)		Cast Iron Special Cast Iron		Stainless Steel Titanium Alloy					
	Spindle Speed (SFM)	Feed Rate (in/min)	Spindle Speed (SFM)	Feed Rate (in/min)	Spindle Speed (SFM)	Feed Rate (in/min)	Spindle Speed (SFM)	Feed Rate (in/min)				
0.0313	200 - 450	98	100 - 400	53	210 - 550	98	120 - 400	82				
0.0469		118		62		118		98				
0.0625		118		65		126		98				
0.0781		118		67		153		98				
0.0938		118		67		153		98				
0.1094		118		67		153		98				
0.1250		149		82		161		106				
0.1407		169		86		181		98				
0.1563		185		98		208		98				
0.1875		165		82		177		86				
0.2188		137		75		157		75				
0.2500		110		59		130		59				
0.2813		94		49		110		49				
0.3125		82		43		94		43				
0.3438		70		37		82		37				
0.3750		63		33		74		34				
0.4375		57		29		67		29				
0.5000		45		24		53		24				
Standard Depth-of-cut		$a_p$		$0.02 \times D_c$		$0.02 \times D_c$		$0.02 \times D_c$	$0.02 \times D_c$	$0.02 \times D_c$	$0.02 \times D_c$	$0.02 \times D_c$
		$p_f$		$0.05 \times D_c$		$0.05 \times D_c$		$0.05 \times D_c$	$0.05 \times D_c$	$0.05 \times D_c$	$0.05 \times D_c$	$0.05 \times D_c$



# SOLID CARBIDE ENDMILLS

## GSXB Ballnose Endmills



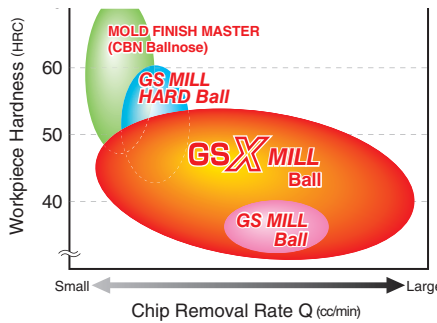
### Recommended Milling Examples

Application	Radius Milling		Copy Milling		Pocket Milling	
	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing
Ballnose Type	⊙	⊙	⊙	⊙	⊙	⊙

### Diameter

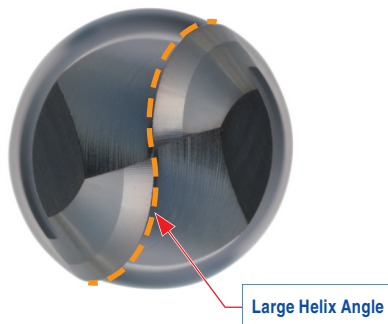


### Application Range



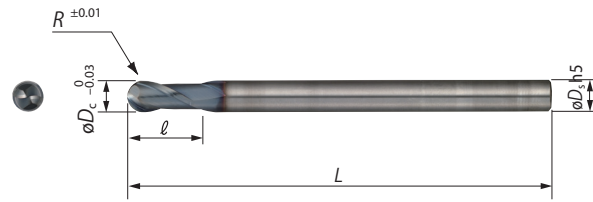
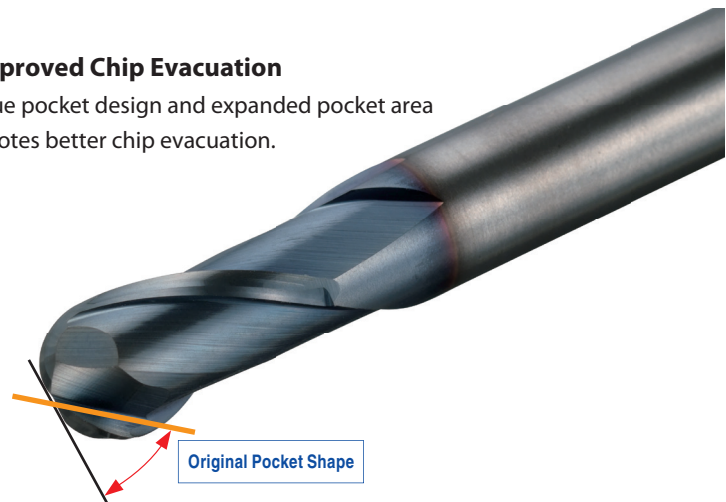
### Reduced Cutting Resistance

Large helix angle on cutting edge reduces cutting resistance.



### Improved Chip Evacuation

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



Ballnose (B)	Stock	φD <sub>C</sub> Inch	φD <sub>C</sub> mm	φD <sub>S</sub> Inch & mm	L Inch & mm	ℓ Inch & mm	R Inch & mm
GSXB204	●	0.063	1.588	0.1250	2.000	0.0938	0.0313
GSXB206	●	0.094	2.381	0.1250	2.500	0.1406	0.0469
GSXB208	●	0.125	3.175	0.1250	2.500	0.1875	0.0625
GSXB210	●	0.156	3.969	0.1875	3.000	0.2344	0.0781
GSXB212	●	0.188	4.763	0.1875	3.000	0.2813	0.0938
GSXB214	●	0.219	5.558	0.2500	3.000	0.3282	0.1094
GSXB216	●	0.250	6.350	0.2500	3.000	0.3750	0.1250
GSXB218	●	0.281	7.144	0.3125	3.500	0.4220	0.1407
GSXB220	●	0.313	7.938	0.3125	3.500	0.4688	0.1563
GSXB224	●	0.375	9.525	0.3750	4.000	0.5652	0.1875
GSXB228	●	0.438	11.113	0.4375	4.000	0.6563	0.2188
GSXB232	●	0.500	12.700	0.5000	4.500	0.7500	0.2500
GSXB236	●	0.563	14.288	0.5625	4.500	0.8438	0.2813
GSXB240	●	0.625	15.875	0.6250	5.500	0.9375	0.3125
GSXB244	●	0.688	17.463	0.6875	5.500	1.0313	0.3438
GSXB248	●	0.750	19.050	0.7500	6.000	1.1250	0.3750
GSXB256	●	0.875	22.225	0.8750	6.500	1.3125	0.4375
GSXB264	●	1.000	25.400	1.0000	7.000	1.5000	0.5000
GSXB20020	★	.0158	0.4	4	50	0.6	0.20
GSXB20030	★	.0237	0.6	4	50	0.9	0.30
GSXB20050	★	.0394	1.0	4	50	1.5	0.50
GSXB20075	★	.0591	1.5	4	50	2.3	0.75
GSXB20100	★	.0788	2.0	6	60	3.0	1.00
GSXB20125	★	.0985	2.5	6	60	4.0	1.25
GSXB20150	★	.1182	3.0	6	60	4.5	1.50
GSXB20200	★	.1575	4.0	6	70	6.0	2.00
GSXB20250	★	.1969	5.0	6	80	7.5	2.50
GSXB20300	★	.2363	6.0	6	80	9.0	3.00
GSXB20350	★	.2756	7.0	8	90	11.0	3.50
GSXB20400	★	.3150	8.0	8	90	12.0	4.00
GSXB20500	★	.3937	10.0	10	100	15.0	5.00
GSXB20600	★	.4725	12.0	12	110	18.0	6.00
GSXB20700	★	.5512	14.0	16	110	21.0	7.00
GSXB20800	★	.6300	16.0	16	140	24.0	8.00
GSXB20900	★	.7087	18.0	20	140	27.0	9.00
GSXB21000	★	.7874	20.0	20	160	30.0	10.00



★ - World Wide Warehouse Item ●: USA stock standard



## GSXVL Endmills - METRIC Anti-vibration Type

## SOLID CARBIDE ENDMILLS

### Product Range - GSXVL Anti-vibration Type

GSXVL Endmills	
Application	Radius Type
General Purpose	GSXVL4000-R02-2.5D  φ3mm - φ 25mm
	Square Type
	 φ2mm - φ 25mm



Endmill Series

### Recommended Cutting Conditions - GSXVL

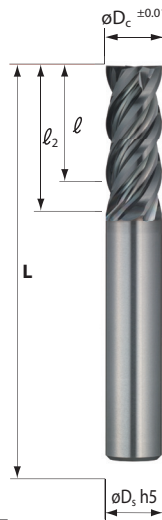
Speeds and Feeds reflect roughing and finishing applications

ISO	GSXVL Endmills			Cutting Diameter										
	Material	Hardness (Bhn)	SFM	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	1
				Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth	Feed/Tooth
P	Low and Medium Carbon Steels	<250	200-450	.0005-.003	.0007-.0033	.0008-.0036	.0008-.0039	.001-.0042	.0012-.0055	.0014-.0066	.0016-.0085	.002-.0105	.002-.0118	.002-.0125
	Medium Carbon Alloy Steels	<250	200-425	.0005-.003	.0007-.0033	.0008-.0035	.0008-.0038	.001-.0042	.0012-.0055	.0014-.0066	.0016-.0085	.002-.0105	.002-.0118	.002-.0125
	Medium-High Carbon Steels	>250	175-350	.0005-.0027	.0007-.003	.0008-.0033	.0008-.0036	.001-.0042	.0012-.0045	.0014-.0066	.0016-.007	.002-.0079	.002-.0089	.002-.011
	Free Machining Steels and Alloys	<250	200-375	.0005-.003	.0008-.0033	.0008-.0035	.0008-.0039	.001-.0042	.0012-.0055	.0014-.0066	.0016-.008	.002-.0088	.002-.0099	.002-.011
	Tool Steels	<250	150-350	.0005-.003	.0005-.0033	.0008-.0035	.0008-.0039	.001-.0042	.001-.0055	.0012-.0066	.0016-.008	.002-.0088	.002-.0099	.002-.011
250 - 350		100-275	.0005-.0025	.0005-.0028	.0008-.0031	.0008-.0034	.001-.0036	.001-.0044	.0012-.0055	.0013-.0067	.0015-.0077	.002-.0081	.002-.0095	
>350		75-175	.0005-.002	.0005-.0023	.0006-.0026	.0008-.0029	.0008-.0031	.0008-.0033	.001-.0036	.001-.0042	.001-.0047	.0015-.0055	.002-.0065	
M Stainless Steel	Martensitic and Ferritic	<250	150-375	.0005-.0025	.0008-.0028	.0008-.003	.0008-.0033	.001-.0036	.001-.0035	.001-.004	.001-.0046	.001-.0055	.001-.0065	.001-.0075
		<250	150-375	.0005-.0025	.0005-.0028	.0005-.0031	.0008-.0033	.0008-.0036	.001-.0035	.001-.004	.001-.0046	.001-.0055	.001-.0065	.001-.0075
	Precipitation Hardening	<280	90-325	.0005-.0022	.0005-.0025	.0008-.0028	.001-.0031	.001-.0033	.001-.0035	.001-.0038	.001-.0041	.001-.0048	.001-.0055	.001-.0065
K	Grey Cast Iron		250-550	.0008-.003	.001-.0033	.001-.0035	.001-.0037	.001-.004	.001-.0053	.001-.0062	.001-.007	.001-.0076	.001-.0089	.001-.0105
	Ductile Iron		175-350	.0005-.003	.0005-.0033	.0008-.0035	.001-.0037	.001-.004	.001-.0053	.001-.0062	.001-.007	.001-.0076	.001-.0089	.001-.0105
S	Exotic Alloys: Inconel, Hastalloy, Waspalloy, etc.		75-125	.0005-.002	.0008-.0023	.0008-.0026	.0008-.0029	.001-.0032	.001-.0036	.001-.004	.001-.0046	.001-.0052	.001-.006	.001-.0071
N	Non-Ferrous Material		600-1500	.001-.003	.001-.0033	.001-.0033	.001-.0038	.001-.0045	.001-.0055	.001-.007	.001-.008	.001-.010	.001-.0115	.001-.0125



# SOLID CARBIDE ENDMILLS

## GSXVL Endmills - METRIC Anti-vibration Type



Catalog No. R- Radius S- Square	Stock	Type	$\phi D_c$ mm	$\phi D_c$ mm	$\ell$ mm	$\ell_2$ mm	L mm	Corner Radius
GSXVL4030-R02-2.5D	★	R	3.0	6	8.0	9.5	50	0.2
GSXVL4030-R05-2.5D	★	R	3.0	6	8.0	9.5	50	0.5
GSXVL4040-R02-2.5D	★	R	4.0	6	10.0	11.5	50	0.2
GSXVL4040-R05-2.5D	★	R	4.0	6	10.0	11.5	50	0.5
GSXVL4040-R10-2.5D	★	R	4.0	6	10.0	11.5	50	1.0
GSXVL4050-R02-2.5D	★	R	5.0	6	13.0	14.5	60	0.2
GSXVL4050-R05-2.5D	★	R	5.0	6	13.0	14.5	60	0.5
GSXVL4050-R10-2.5D	★	R	5.0	6	13.0	14.5	60	1.0
GSXVL4060-R03-2.5D	★	R	6.0	6	15.0	-	60	0.3
GSXVL4060-R05-2.5D	★	R	6.0	6	15.0	-	60	0.5
GSXVL4060-R10-2.5D	★	R	6.0	6	15.0	-	60	1.0
GSXVL4060-R15-2.5D	★	R	6.0	6	15.0	-	60	1.5
GSXVL4080-R03-2.5D	★	R	8.0	8	20.0	-	80	0.3
GSXVL4080-R05-2.5D	★	R	8.0	8	20.0	-	80	0.5
GSXVL4080-R10-2.5D	★	R	8.0	8	20.0	-	80	1.0
GSXVL4080-R15-2.5D	★	R	8.0	8	20.0	-	80	1.5
GSXVL4080-R20-2.5D	★	R	8.0	8	20.0	-	80	2.0
GSXVL4100-R03-2.5D	★	R	10.0	10	25.0	-	90	0.3
GSXVL4100-R05-2.5D	★	R	10.0	10	25.0	-	90	0.5
GSXVL4100-R10-2.5D	★	R	10.0	10	25.0	-	90	1.0
GSXVL4100-R15-2.5D	★	R	10.0	10	25.0	-	90	1.5
GSXVL4100-R20-2.5D	★	R	10.0	10	25.0	-	90	2.0
GSXVL4120-R05-2.5D	★	R	12.0	12	30.0	-	90	0.5
GSXVL4120-R10-2.5D	★	R	12.0	12	30.0	-	90	1.0
GSXVL4120-R15-2.5D	★	R	12.0	12	30.0	-	90	1.5
GSXVL4120-R20-2.5D	★	R	12.0	12	30.0	-	90	2.0
GSXVL4120-R30-2.5D	★	R	12.0	12	30.0	-	90	3.0
GSXVL4160-R10-2.5D	★	R	16.0	16	40.0	-	115	1.0
GSXVL4160-R15-2.5D	★	R	16.0	16	40.0	-	115	1.5
GSXVL4160-R20-2.5D	★	R	16.0	16	40.0	-	115	2.0
GSXVL4160-R30-2.5D	★	R	16.0	16	40.0	-	115	3.0
GSXVL4200-R10-2.5D	★	R	20.0	20	50.0	-	125	1.0
GSXVL4200-R15-2.5D	★	R	20.0	20	50.0	-	125	1.5
GSXVL4200-R20-2.5D	★	R	20.0	20	50.0	-	125	2.0
GSXVL4200-R30-2.5D	★	R	20.0	20	50.0	-	125	3.0
GSXVL4250-R10-2.5D	★	R	25.0	25	63.0	-	140	1.0
GSXVL4250-R15-2.5D	★	R	25.0	25	63.0	-	140	1.5
GSXVL4250-R20-2.5D	★	R	25.0	25	63.0	-	140	2.0
GSXVL4250-R30-2.5D	★	R	25.0	25	63.0	-	140	3.0
GSXVL4020-2.5D	★	S	2.0	4	5.0	6.5	50	-
GSXVL4030-2.5D	★	S	3.0	6	8.0	9.5	50	-
GSXVL4040-2.5D	★	S	4.0	6	10.0	11.5	50	-
GSXVL4050-2.5D	★	S	5.0	6	13.0	14.5	60	-
GSXVL4060-2.5D	★	S	6.0	6	15.0	-	60	-
GSXVL4070-2.5D	★	S	7.0	8	18.0	20.0	70	-
GSXVL4080-2.5D	★	S	8.0	8	20.0	-	80	-
GSXVL4090-2.5D	★	S	9.0	10	23.0	25.0	90	-
GSXVL4100-2.5D	★	S	10.0	10	25.0	-	90	-
GSXVL4110-2.5D	★	S	11.0	12	28.0	30.5	90	-
GSXVL4120-2.5D	★	S	12.0	12	30.0	-	90	-
GSXVL4140-2.5D	★	S	14.0	16	35.0	37.5	110	-
GSXVL4150-2.5D	★	S	15.0	16	38.0	41.0	110	-
GSXVL4160-2.5D	★	S	16.0	16	40.0	-	115	-
GSXVL4180-2.5D	★	S	18.0	20	45.0	48.0	120	-
GSXVL4200-2.5D	★	S	20.0	20	50.0	-	125	-
GSXVL4250-2.5D	★	S	25.0	25	63.0	-	140	-

★ - World Wide Warehouse Item

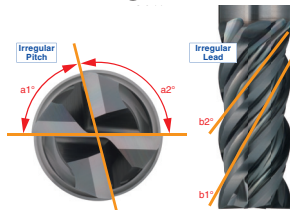
### Recommended Milling Examples

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

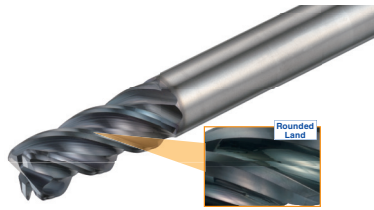
### Diameter



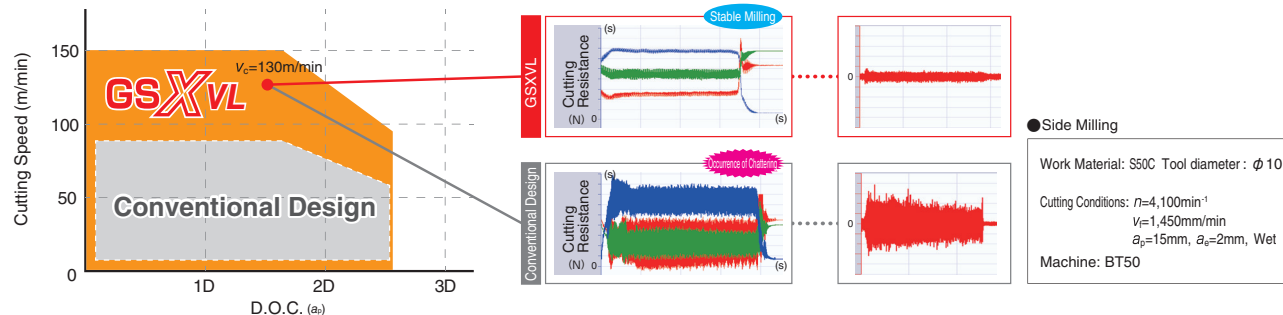
### Irregular Pitch and Irregular Lead



### Drastically Improved Surface Quality



### Performance Data



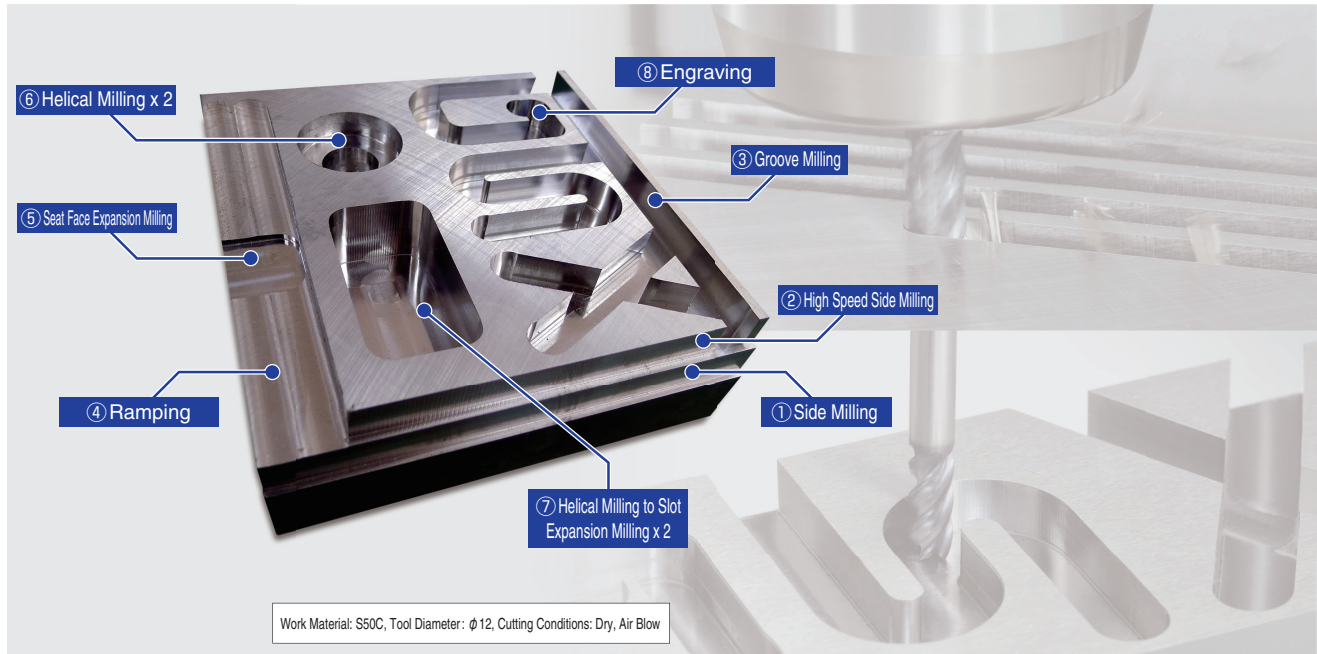


# GSX Series Solid Carbide Endmills

## Application Examples

# SOLID CARBIDE

# ENDMILLS



Work Material: S50C, Tool Diameter:  $\phi 12$ , Cutting Conditions: Dry, Air Blow

<p><b>① Side Milling</b></p> <p>Cutting Conditions: <math>v_c=102\text{m/min}</math> (<math>n=4,100\text{min}^{-1}</math>)  <math>v_f=1,080\text{mm/min}</math> (<math>0.1\text{mm/t}</math>)  <math>a_p=24\text{mm}</math>, <math>a_e=2.0\text{mm}</math></p>	<p><b>② High Speed Side Milling</b></p> <p>Cutting Conditions: <math>v_c=151\text{m/min}</math> (<math>n=4,000\text{min}^{-1}</math>)  <math>v_f=4,800\text{mm/min}</math> (<math>0.3\text{mm/t}</math>)  <math>a_p=12\text{mm}</math>, <math>a_e=2.0\text{mm}</math></p>	<p><b>③ Groove Milling</b></p> <p>Cutting Conditions: <math>v_c=90\text{m/min}</math> (<math>n=2,400\text{min}^{-1}</math>)  <math>v_f=960\text{mm/min}</math> (<math>0.1\text{mm/t}</math>)  <math>a_p=12\text{mm}</math></p>
<p><b>④ Ramping</b></p> <p>Cutting Conditions: <math>v_c=90\text{m/min}</math> (<math>n=2,400\text{min}^{-1}</math>)  <math>v_f=480\text{mm/min}</math> (<math>0.05\text{mm/t}</math>)  Ramp Angle <math>5^\circ</math></p>	<p><b>⑤ Seat Face Expansion Milling</b></p> <p>Cutting Conditions: <math>v_c=90\text{m/min}</math> (<math>n=2,400\text{min}^{-1}</math>)  <math>v_f=960\text{mm/min}</math> (<math>0.1\text{mm/t}</math>)</p>	<p><b>⑥ Helical Milling x 2</b></p> <p>Cutting Conditions: <math>v_c=90\text{m/min}</math> (<math>n=2,400\text{min}^{-1}</math>)  <math>v_f=480\text{mm/min}</math> (<math>0.05\text{mm/t}</math>)  Ramp Angle <math>3^\circ</math></p>
<p><b>⑦ Helical Milling to Slot Expansion Milling x 2</b></p> <p>Cutting Conditions: <math>v_c=90\text{m/min}</math> (<math>n=2,400\text{min}^{-1}</math>)  [Helical] <math>v_f=480\text{mm/min}</math> (<math>0.05\text{mm/t}</math>) [Slot Expansion] <math>v_f=672\text{mm/min}</math> (<math>0.07\text{mm/t}</math>) [Finishing] <math>v_f=1,920\text{mm/min}</math> (<math>0.2\text{mm/t}</math>)  Ramp Angle <math>3^\circ</math>  <math>a_p=24\text{mm}</math>, <math>a_e=0.1\text{mm}</math></p>		<p><b>⑧ Engraving</b></p> <p>Cutting Conditions: <math>v_c=79\text{m/min}</math> (<math>n=2,100\text{min}^{-1}</math>)  <math>v_f=588\text{mm/min}</math> (<math>0.07\text{mm/t}</math>)  <math>a_p=12\text{mm}</math></p>

