Endmills

J

J1 ~ J62

Square Endmill Selection Guide

Sharp : Sharp edge
Honed : Edge with honing

◎ : Optimum ○ : Applicable ✕:Inappropriate Blank: Not recommended

Grade	Application · Feature	No. of teeth	Length: Short Flute / Standard / Long Series / Extra-Long Series / Long Neck / Relief Shank	Product Type · Series	Diameter Range	Coating: Cutting Edge Corner	Appearance	Work: P: General Structure Rolled Steel	P: Carbon Steel	P: Alloy Steel	P: Pre-hardened Steel	P: Tempered Steel · Die Steel 30~45HRC	H: Hardened Steel 45-55HRC	H: Hardened Steel 55-60HRC	H: Hardened Steel 60- HRC	M: Stainless Steel	S: Ti Alloy / Heat-Resistive Alloy	K: Cast Iron	N: Aluminum Alloy	N: Copper Alloy	N: Graphite	Reference Page
COATED CARBIDE	General	2		GSMILL 2 Flutes GLM2000SF	ø0.5~12	GS Sharp		◎	◎	◎	◎	◎	◎	○		◎	○	◎				J10
				SSM Type Short 2 Flutes S-SSM2000ZX	ø0.3~6	ZX Sharp		○	◎		○	◎						◎				J22
				SSM Type 2 Flutes SSM2000ZX	ø1~32	ZX Sharp		○	◎		◎	◎	◎			○		◎				J21
				Quasi-JIS Type 2 Flutes JSM2000ZX	ø3~15	ZX Sharp		○	◎		◎	◎	◎			○		◎				J24
				US Mill 2 Flutes USM2000ZX	ø3~25	ZX Honed		○	◎		◎	◎	◎			○		◎				J26
				LSM Type Long Series 2 Flutes LSM2000ZX	ø1~25	ZX Sharp		○	◎		◎	◎	◎			○		◎				J25
		4		GSMILL Flutes GLM4000SF	ø1~12	GS Sharp		◎	◎	◎	◎	◎	◎	○		◎	○	◎				J11
				SSM Type 4 Flutes SSM4000ZX	ø1.5~32	ZX Sharp		○	◎		◎	◎	◎					◎				J22
				Quasi-JIS Type 4 Flutes JSM4000ZX	ø3~15	ZX Sharp		○	◎		◎	◎	◎			○		◎				J24
				US Mill 4 Flutes USM4000ZX	ø3~25	ZX Honed		○	◎		◎	◎	◎			○		◎				J26
				LSM Type Long Series 4 Flutes LSM4000ZX	ø3~25	ZX Sharp		○	◎		◎	◎	◎			○		◎				J25
	High Efficiency	4		UPMILL SSUP4000ZX	ø2~20	ZX Honed		◎	◎	◎	◎	◎	◎	○		◎	○	○				J16
			★	UPMILL Deep Shoulder SSUPR4000ZX	ø3~20	ZX Honed		◎	◎	◎	◎	◎	◎	○		◎	○	○				J17
	Roughing	4		GSMILL Roughing GSRE4000SF NEW	ø6~20	GS Honed		◎	◎	◎	◎	◎	◎			◎	○	◎				J13
				Roughing Endmill RSM4000ZX	ø6~25	ZX Honed		◎	◎	◎	◎	◎	◎					◎				J29
	Kovar	2		ITMILL Short Flute 2 Flutes S-SIT2000ZX	ø0.5~3	ZX Honed		◎								◎	◎					J19
				ITMILL 2 Flutes SIT2000ZX	ø0.5~3	ZX Honed		◎								◎	◎					J19
		4		ITMILL Short Flute 4 Flutes S-SIT4000ZX	ø1~3	ZX Honed		◎								◎	◎					J19
				ITMILL 4 Flutes SIT4000ZX	ø1~3	ZX Honed		◎								◎	◎					J19
	Aluminum and Non-Ferrous Metal	2		AURORA Coat 2 Flutes ASM2000DL	ø2~16	DLC Sharp													◎	○		J20
		4		AURORA Coat 4 Flutes ASM4000DL	ø2~16	DLC Sharp													◎	○		J20

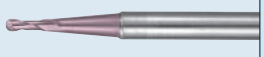
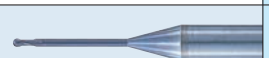
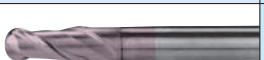
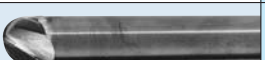
Sharp : Sharp edge
Honed : Edge with honing

◎ : Optimum ○ : Applicable ×:Inappropriate Blank: Not recommended

Grade	Application · Feature	No. of teeth	Length: Short Flute / Standard / Long Series / Extra-Long Series / Long Neck / Relief Shank	Product Type · Series	Diameter Range	Coating · Cutting Edge Corner	Appearance	Work: P: General Structure Rolled Steel	P: Carbon Steel	P: Alloy Steel	P: Pre-hardened Steel	P: Tempered Steel · Die Steel	H: Hardened Steel 45~55HRC	H: Hardened Steel 55~60HRC	H: Hardened Steel 60~ HRC	M: Stainless Steel	S: Ti Alloy / Heat-Resistive Alloy	K: Cast Iron	N: Aluminum Alloy	N: Copper Alloy	N: Graphite	Reference Page
COATED CARBIDE	Stainless Steel and Heat-Resistive Alloy	2~4		High Helix HSM2/3/4000ZX	ø2~25	ZX Honed		○	○							◎	◎					J23
	Compound Endmilling	3		UPMILL Slot SSUP3000ZX	ø2~16	ZX Honed		◎	◎	◎	◎	◎	◎	○		◎	○	○				J18
	Hardened Steel	4~8		GSMILL HARD GSH4/6/8000SF	ø1~20	GS Honed			◎	◎	◎	◎	◎	◎	◎							J14
				HARD HHM4/6/8000ZX	ø3~32	ZX Honed			○	○	○	◎	◎	◎	◎							J27
				HARD Long LHHM4/6/8000ZX	ø3~32	ZX Honed			○	○	○	◎	◎	◎	○							J27
				HARD Extra-Long EHHM4/6/8000ZX	ø3~32	ZX Honed			○	○	○	◎	◎	◎	○							J28
		2	★	GSMILL Long Neck (New) GSN2	ø0.2~6	GS Sharp		◎	◎	◎	◎	◎	◎									J42
		4	★	GSMILL Long Neck (New) GSN4	ø1~10	GS Sharp		◎	◎	◎	◎	◎	◎									J43
		4~8	★	Hard with Relief Shank HHMR4/6/8000ZX	ø4~32	ZX Honed			○	○	○	◎	◎	◎	◎							J29
CARBIDE	General	2		Solid Carbide Spiral 2 Flutes SSM2000	ø0.2~30	Sharp		○	◎									○	○			J50
				Extra-Long Solid Carbide Spiral 2 Flutes ELSM2000	ø3~25	Sharp		○	◎									○	○			J55
		4		Solid Carbide Spiral 4 Flutes SSM4000	ø1.5~25	Sharp		○	◎									○	○			J51
				Extra-Long Solid Carbide Spiral 4 Flutes ELSM4000	ø3~25	Sharp		○	◎									○	○			J55
	Roughing	2		Roughing Solid Spiral RSM4000	ø6~30	Honed		◎	◎	◎	◎							◎				J58
	Stainless Steel and Heat-Resistive Alloy	2~4		High Helix Solid Carbide HSM2/3/4000	ø2~32	Honed		◎	◎	○	○					○	○					J53
	Aluminum and Non-Ferrous Metal	2		Solid Carbide Endmills for Non-ferrous cutting ASM2000	ø2~16	Sharp													◎	○		J58
CBN	Hardened Steel	1		SUMIBORON Helical Master BNES type BNES	ø6~16						○		○	◎	◎				×	×		J61 L63
PCD	Aluminum and Non-Ferrous Metal	1,2		SUMIDIA Endmill DAE type DAE	ø4~12			×	×	×	×	×	×	×	×	×	×	×	◎	◎	○	J62 M25
		2,4		SUMIDIA Endmill DFE type DFE-S	ø4~13			×	×	×	×	×	×	×	×	×	×	×	◎	◎	○	J62 M25

Ballnose Endmill Selection Guide

◎ : Optimum ○ : Applicable ×:Inappropriate Blank: Not recommended

Grade	Application · Feature	No. of teeth	Length: Short Flute / Standard / Long Series / Extra-Long Series / Long Neck / Relief Shank	Product Type · Series	Radius Range · Tolerance (mm)	Coating	Appearance	Work: P: General Structure Rolled Steel	P: Carbon Steel	P: Alloy Steel	P: Pre-hardened Steel	P: Tempered Steel · Die Steel 30~45HRC	H: Hardened Steel 45~55HRC	H: Hardened Steel 55~60HRC	H: Hardened Steel 60~ HRC	M: Stainless Steel	S: Ti Alloy / Heat-Resistive Alloy	K: Cast Iron	N: Aluminum Alloy	N: Copper Alloy	N: Graphite	Reference Page
COATED CARBIDE	General	2	Standard	GSMILL Ballnose GLB2000SF	R0.5~6 ±0.01	GS		◎	◎	◎	◎	◎	◎	○		◎	○	◎		◎		J30
			Short Flute	Short Flute Ballnose S-SSB2000ZX	R1.5~4 ±0.02	ZX		○	◎		◎	◎	◎					◎				J36
			Short Flute	Small Diameter, Precision Ballnose SSBS2000ZX	R0.2~3 ±0.02	ZX		○	◎		◎	◎	◎					◎				J36
			Standard	Ballnose SSB2000ZX	R0.5~12.5 ±0.02	ZX		○	◎		◎	◎	◎					◎				J37
			Long Series	Long Ballnose LSSB2000ZX	R1.5~12.5 ±0.02	ZX		○	◎		◎	◎	◎					◎				J37
	High Efficiency	2	Short Flute	NeoBall Short Flute S-SNB2000ZX	R1.5~15 ±0.01	ZX		○	◎	◎	◎	◎	◎	◎		◎	○	◎				J33
			Standard	NeoBall SNB2000ZX	R0.5~15 ±0.01	ZX		◎	◎	◎	◎	◎	◎	◎		◎	○	◎				J33
			Long Series	NeoBall Long LSNB2000ZX	R0.5~15 ±0.01	ZX		◎	◎	◎	◎	◎	◎	◎		◎	○	◎				J34
			Extra-Long Series	NeoBall Extra-Long ESNB2000ZX	R3~15 ±0.01	ZX		○	◎	◎	◎	◎	◎	○				◎				J34
			★	NeoBall Pencil Neck PSNB2000ZX	R0.5~6 ±0.01	ZX		◎	◎	◎	◎	◎	◎	◎		◎	○	◎				J35
			★	NeoBall Pencil Neck Long PLSNB2000ZX	R2~6 ±0.01	ZX		○	◎	◎	◎	◎	◎	○				◎				J35
	Aluminum and Non-Ferrous Metal	2	Standard	AURORA Coat Ballnose SNB2000DL	R1~8 ±0.01	DLC													◎	○		J32
	Hardened Steel	2	Standard	GSMILL HARD Ballnose GSBH20000SF (New)	R0.2~6 +0.003 ~−0.007	GS			◎	◎	◎	○	◎	◎	◎							J31
			★	GSMILL Long Neck Ballnose GSBN2 (New)	R0.1~1 ±0.005	GS					◎	◎	○	○								J40
			Standard	HARD Ballnose SHB2000ZX	R0.5~10 ±0.02	ZX					○	◎	◎	◎	○			○				J38
			Long Series	HARD Ballnose Long LSHB2000ZX	R3~10 ±0.02	ZX					○	◎	◎	◎	○			○				J38
CARBIDE	General	2	Short Flute	Short Solid Spiral Ball S-SSB2000	R0.2~6 ±0.02			○	◎	◎	◎	○										J56
			Standard	Solid Spiral Ball SSB2000	R0.5~15 ±0.02			○	◎	◎	◎	○					○					J56
CBN	High Precision Mold Profiling	2	Short Flute	SUMIBORON MOLD FINISH MASTER BNBP2R (New)	R0.2~1 ±0.005						○		○	◎	◎				×	×		J60 L64
			Standard	SUMIBORON Ballnose Endmill BNBS Type BNBS2000S	R1~10 ±0.02						○		○	◎	◎				×	×		J61 L65

Recommended spindle speed: 20,000min-1 and above

Endmills

◎ : Optimum ○ : Applicable ✕:Inappropriate Blank: Not recommended

Grade	Application · Feature	No. of teeth	Length: Short Flute / Standard / Long Series / Extra-Long Series / Long Neck / Relief Shank	Product Type · Series	Diameter Range	Coating	Appearance	Work: P: General Structure Rolled Steel	P: Carbon Steel	P: Alloy Steel	P: Pre-hardened Steel	P: Tempered Steel · Die Steel 30~45HRC	H: Hardened Steel 45~55HRC	H: Hardened Steel 55~60HRC	H: Hardened Steel 60~ HRC	M: Stainless Steel	S: Ti Alloy / Heat-Resistive Alloy	K: Cast Iron	N: Aluminum Alloy	N: Copper Alloy	N: Graphite	Reference Page
COATED CARBIDE	General Endmilling With Corner Radius	4	Standard	❶ GSMILL Radius GLM4000SF-R New	ø3~12	GS		◎	◎	◎	◎	◎	◎			◎	○	○				J12
		2	Standard	❷ SSM Radius SSM2000ZX-R	ø6~16	ZX		○	◎		◎	◎	◎					◎				J23
	High Efficiency Endmilling With Corner Radius	4	Standard	❸ UPMILL Radius SSUP4000ZX-R	ø3~20	ZX		◎	◎	◎	◎	◎	◎	○		◎	○	◎				J16
			Extra-Long Series / Long Neck / Relief Shank ★	❹ UPMILLDeep Shoulder, Radius SSUPR4000ZX-R	ø3~20	ZX		◎	◎	◎	◎	◎				○		◎				J17
	Hardened Steel Endmilling With Corner Radius	6,8	Standard	❺ GSMILL HARD Radius GSH6/8000SF-R New	ø6~20	GS			◎	◎	◎	◎	◎	◎	◎							J15
		6,8	Standard	❻ HHM HARD Radius HHM6/8000ZX-R	ø6~25	ZX			○	○	○	◎	◎	◎	◎							J28

■ Diameter and corner radius selection range

❶ GSMILL Corner Radius
GLM4000SF-R

Diameter	R0.2	R0.5	R1.0	R1.5	R2.0
ϕ 3	●	●			
ϕ 4	●	●	●		
ϕ 5	●	●	●		
ϕ 6	●	●	●	●	
ϕ 8	●	●	●	●	
ϕ 10	●	●	●		●
ϕ 12	●	●	●	●	●

❷ SSM Corner Radius
SSM2000ZX-R

Diameter	R0.3	R0.5	R1.0
ϕ 6	●	●	
ϕ 8	●	●	●
ϕ 10		●	●
ϕ 12		●	●
ϕ 16		●	●

❸ UPMILL Corner Radius
SSUP4000ZX-R

Diameter	R0.2	R0.3	R0.5	R1.0	R1.5	R2.0	R3.0
ϕ 3	●		●				
ϕ 4	●		●	●			
ϕ 5	●		●	●			
ϕ 6		●	●	●	●		
ϕ 8		●	●	●	●	●	
ϕ 10		●	●	●	●	●	
ϕ 12			●	●	●	●	●
ϕ 16				●	●	●	●
ϕ 20				●	●	●	●

❹ UPMILL Deep Shoulder, Corner-R
SSUPR4000ZX-R

Diameter	R0.2	R0.3	R0.5	R1.0	R1.5	R2.0
ϕ 3	●		●			
ϕ 4	●		●			
ϕ 5	●		●			
ϕ 6		●	●			
ϕ 7		●	●			
ϕ 8			●	●		
ϕ 9			●	●		
ϕ 10			●	●	●	
ϕ 11			●	●	●	
ϕ 12			●	●	●	
ϕ 13			●	●	●	
ϕ 16				●	●	●
ϕ 17				●	●	●
ϕ 20				●	●	●

❺ GSMILL HARD Radius
GSH6/8000SF-R

Diameter	R0.2	R0.5	R1.0	R1.5	R2.0
ϕ 6	●	●	●		
ϕ 8	●	●	●		
ϕ 10		●	●	●	●
ϕ 12		●	●	●	●
ϕ 16			●	●	●
ϕ 20			●	●	●

❻ HHM HARD Radius
HHM6/8000ZX-R

Diameter	R0.3	R0.5	R1.0	R1.5	R2.0
ϕ 6	●	●	●		
ϕ 8	●	●	●		
ϕ 10		●	●	●	●
ϕ 12		●	●	●	●
ϕ 16			●	●	●
ϕ 20			●	●	●
ϕ 25			●	●	●

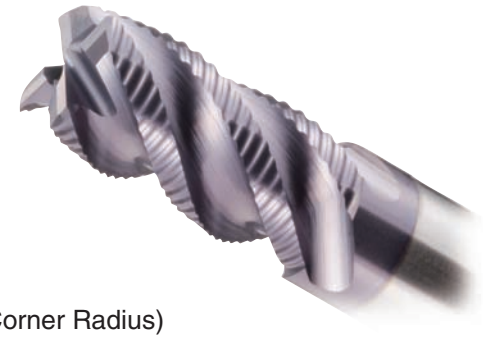
"Global Standard" Solid Endmill

GS MILL Series

■ Characteristics

GS MILL (Square／Ballnose／Radius／Roughing)

- New low cobalt content carbide substrate for better rigidity and wear resistance.
- New smooth TiAℓN coating for improved wear resistance, lower cutting forces as well as better chip removal.
- Square type with sharp edge for general machining with an unique cross-section design for the 4-fluted range.
- Ballnose type with sharp edge and precise radial profile for high precision machining.
- New Radius／Series expansion for corner radius endmilling.
- New Roughing／Unique nicked and waveform design for excellent chip evacuation, low cutting force and high efficiency roughing.



■ Product Range

● GS MILL (Square/Ballnose)

Series	No. of teeth	Shape	Diameter
GLM2000SF	2 flutes	 →J10	ø0.5～ø12
GLM4000SF	4 flutes	 →J11	ø1～ø12
GLB2000SF	2 flutes	 →J30	R0.5～R6 (ø1～ø12)

● GS MILL (Corner Radius)

Series	No. of teeth	Shape	Diameter
New **GLM4000SF-R**	4 flutes	 →J12	ø3～ø12

● GS MILL (Roughing)

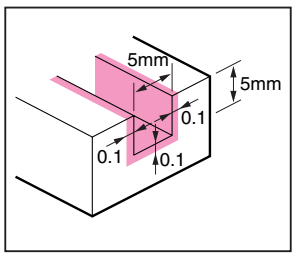
Series	No. of teeth	Shape	Diameter
New **GSRE4000SF**	4 flutes	 →J13	ø6～ø20

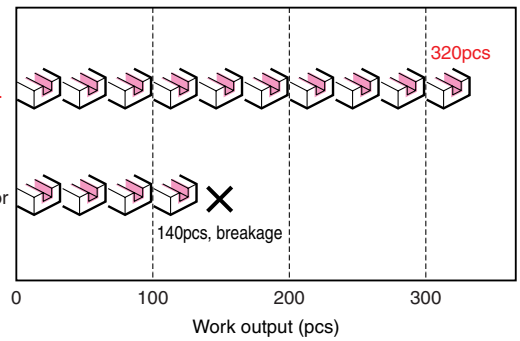
■ GS MILL

● Application Examples (ϕ 3,4flutes-Finish Groove Milling)

- Work Material：S50C (200HB)
- Endmill：GLM4030SF (ϕ 3)
- Water soluble coolant
- Cutting conditions

V =80m/min(N =8,500min^{-1})
f =0.015mm/t (F =500mm/min)
Ad=0.1mm, Rd=0.1mm



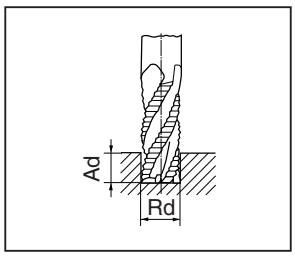


■ GS MILL Roughing

● Application Examples (4 flutes, ϕ 10 groove machining)

- Work Material：SKD11 (210HB)
- Endmill：GSRE4100SF
- Air blown
- Cutting conditions

V =80m/min(N =2550min^{-1})
f =0.10mm～0.20mm/t
(F =1100～2000mm/min)
Ad=10mm, Rd=10mm

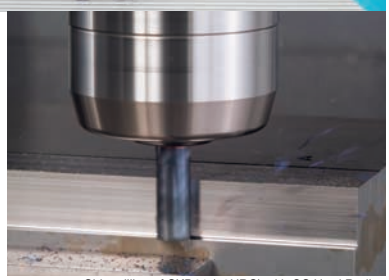


◎:Stable milling △:Chipping found ×:Fracture

	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
GSMILL Roughing	◎	◎	◎	◎	◎	◎	◎	○	○	△
Competitor A	◎	◎	◎	◎	○	△	×			
Competitor B	◎	○	△	×						

Feedrate (mm/min)

GS MILL HARD Series

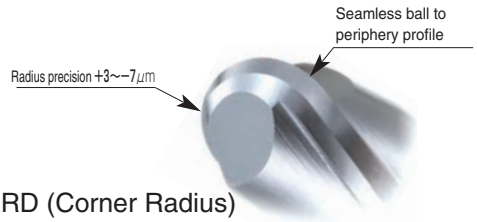


Side milling of SKD61 (53HRC) with GS Hard Radius

■ Characteristics

New GS MILL HARD (Square／Ballnose／Corner Radius)

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



■ Product Range

● GS MILL (Square/Ballnose)

Series	No. of teeth	Shape	Diameter
GSH4000/ 6000/8000SF	4,6, 8 flutes	 →J14	ø1 ～ ø20
New **GSBH 20000SF**	2 flutes	 →J31	R0.2 ～ R6.0 (ø0.4 ～ ø12)

● GS MILL HARD (Corner Radius)

Series	No. of teeth	Shape	Diameter
New **GSH6000/ 8000SF-R**	6,8 flutes	 →J15	ø6 ～ ø20

■GS MILL HARD

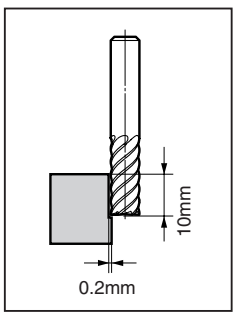
● ø10, 6 flutes-End Milling

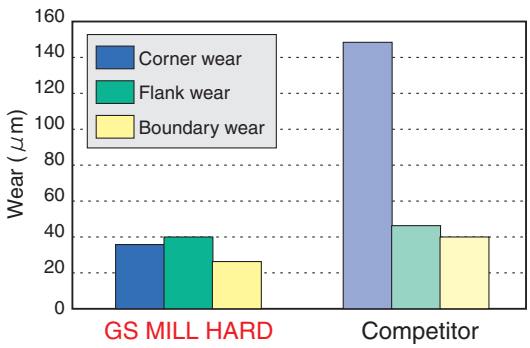
- Work Material : SKD61 (53HRC)
- Endmill : GSH6100SF (φ10)
- Cutting length : 75m
- Cutting conditions

  V = 800m/min (N = 25,460min^{-1})

  f = 0.07mm/t (F = 10,500mm/min)

  Ad = 10mm Rd = 0.2mm
- Air blown, Down-cut





■GS MILL HARD Ball

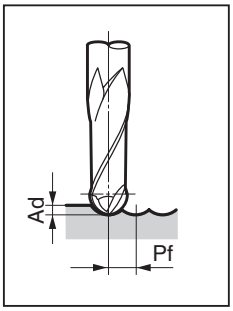
● Application Examples (Automobile parts precision forging type)

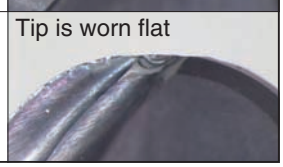
- Work Material : SKH51 (62HRC)
- Endmill : GSBH20300SF (R3)
- Cutting length : about 150m
- Cutting conditions

  N=4,000min^{-1}

  f = 0.075 mm/t (F=600mm/min)

  Ad = 0.16mm Pf=1mm



GS MILL HARD Ball	Very small wear 
Competitor	Tip is worn flat 

SUMIBORON Mold Finish Master / GS MILL Long Neck

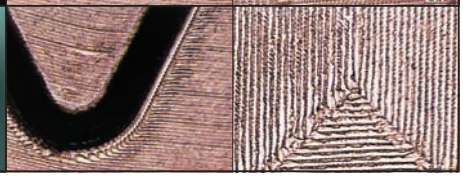
→J60

■ Feature of SUMIBORON Mold Finish Master

- ●Achieves high precision machining with precise ball profile of ±5 μm.
- ●Achieving extremely long tool life, high precision and machined quality with high spindle speeds of 20,000min^{-1} and above.
- ●For high speed finishing of the various types of mold materials from low carbon steel to high-hardened steel up to 60HRC, with longer tool life.
- ●Excellent surface finish drastically reduces the grinding process.
- ●Utilizing the excellent fracture resistant SUMIBORON BN350

■ Cutting Performance

- ・ Work Material ：Mold for cell phone parts
  SKD11（60HRC）
- ・ Endmill ：R0.3
- ・ Cutting conditions
  N＝36,000min^{-1}
  F＝500mm/min
  Ad＝0.03mm, Pf＝0.02mm
  Oil mist

	Close-up of Cutting Edge	Machined Surface
SUMIBORON Mold Finish Master BNBP2R030-0124		
Coated carbide endmill（R0.3）		

→J39

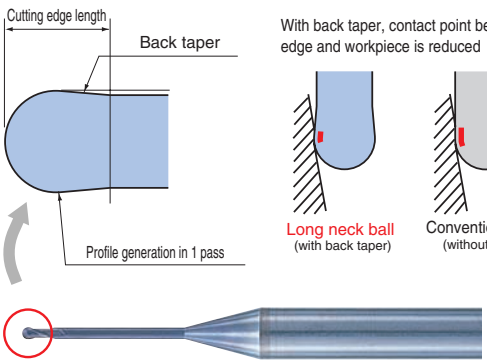
■ Feature of GS MILL Long Neck Series

●**Extremely long tool life**
Long tool life double that of competitors is achieved with a combination of ultra-fine grained, super hard substrate for high resistance and high rigidity, coupled with a multi-layered coating for excellent wear resistance.

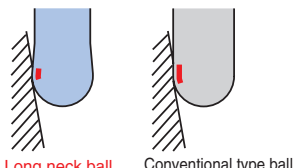
●**Excellent machined face precision**
High precision machining is possible with an unique cutting edge design coupled with the smooth GS Coat,

●**Original ball profile**
Seamless ball to periphery profile tolerance of ±5μm. Back taper is incorporated to reduce cutting force and improve surface finish.

●**Wide selection**
364 series items in stock, catering to all the fine machining needs.

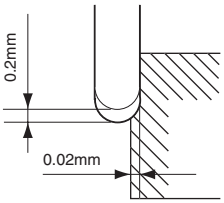


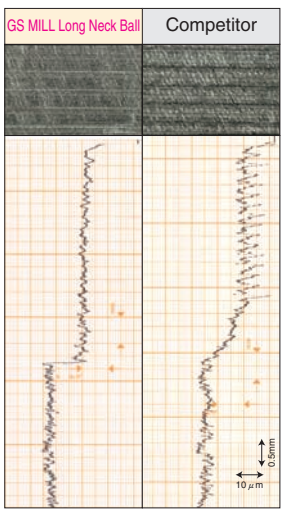
With back taper, contact point between cutting edge and workpiece is reduced



■Surface finish comparison of machined vertical wall

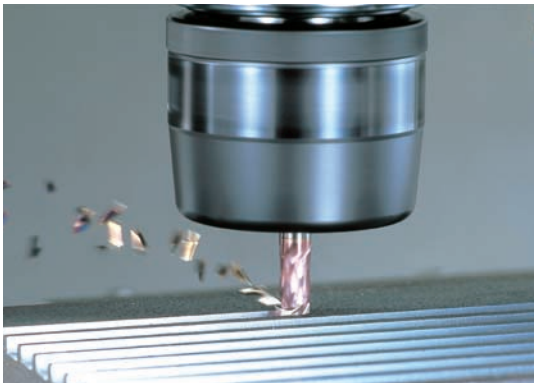
Cutting conditions
Endmill ：GSBN2 R0.5×12mm neck
V ：40m/min（12,700min^{-1}）
f ：150mm/min（0.012mm/tooth）
Work Material ：NAK80（40HRC）
Coolant ：Air blown





High Efficiency Endmill

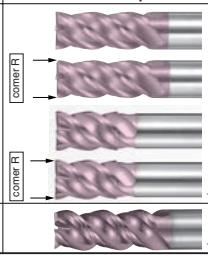
UP MILL Series



■ Characteristics / Application

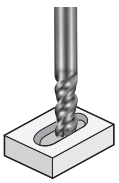
- UP MILL with the latest ZX Coat is designed for heavy groove and side milling
- Unique flute design that creates a consistent chip curl for easy removal and at the same time maintaining a strong core for high efficiency grooving
- UP MILL-Deep Shoulder
  Basic SSUP design with longer overhang for high efficiency side milling
- UP MILL-Slot
  3 flutes providing good cutting balance and chip removal with center cutting design for plunge cutting and high efficiency slotting

■ Product Range

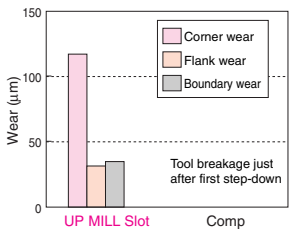
Series	No. of teeth	Shape	Diameter
SSUP4000ZX	4 flutes		ø2～ø20
SSUP4000ZX-R			ø3～ø20
SSUPR4000ZX			ø3～ø20
SSUPR4000ZX-R			ø3～ø20
SSUP3000ZX	3 flutes	→J18	ø2～ø16

■ Efficiency

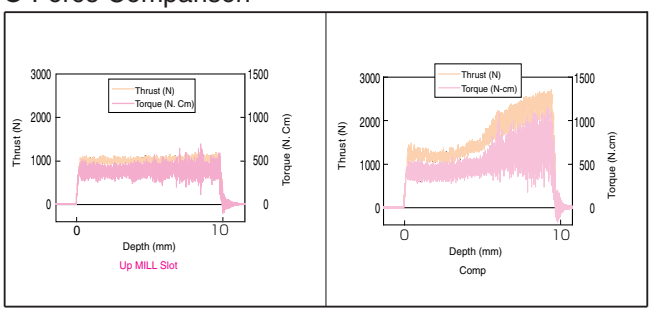
● Slotting Comparison Milling ● Tool Wear Comparison



Endmill : ø10 (3 flutes)
C/Speed : 80m/min
2550min-1
Feed : Plunging
200mm/min
Groove milling
1000mm/min
Depth : 10mm
Length : 50mm
Work : SKD11(180HB)
Output : 300grooves
Coolant : Dry



● Force Comparison



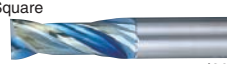
DLC (Diamond Like Carbon) Coating

AURORA COAT Endmill Series

■ Characteristics / Application

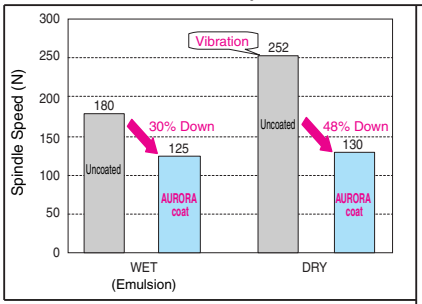
- Very smooth AURORA COAT results in low adhesion as well as good surface finish
- With lower cutting forces and high rigidity, this series is suitable for low rigidity machine
- Available in 2 and 4 flutes square type as well as ballnose type endmills

■ Product Range

Series	No. of teeth	Shape	Diameter
ASM2000DL	2 flutes	Square  →J20	ø2～ø16
ASM4000DL	4 flutes	Square  →J20	ø2～ø16
SNB2000DL	2 flutes	Ballnose  →J32	R1～R8 (ø2～ø16)

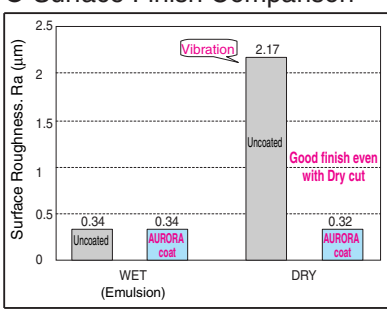
■ Efficiency

● Performance Comparison



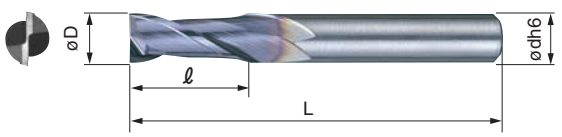
Work :
A5052
Endmill :
ASM4100DL
ø10mm (4 teeth)
Conditions
N = 6,300min-1
V = 200m/min
Ad = 10mm
Rd = 1mm
F = 1300mm/min
f = 0.05mm/t
Down Cut

● Surface Finish Comparison



GLM 2000SF Type

2 teeth



φ D	Tolerance
D<3.0	0 −0.015
D≥3.0	0 −0.03

Helix angle 30°
Corner: Sharp edge

■ Endmills

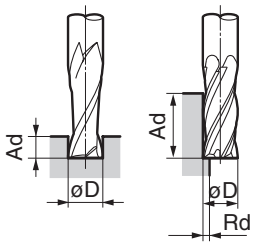
(mm)

Cat. No.	Stock	øD	ℓ	L	ød
GLM 2005SF	●	0.5	1.25	38	3
New GLM 2005SF-S4	●	0.5	1.25	40	4
GLM 2010SF	●	1.0	2.5	38	3
New GLM 2010SF-S4	●	1.0	2.5	40	4
GLM 2015SF	●	1.5	3.75	38	3
New GLM 2015SF-S4	●	1.5	3.75	40	4
GLM 2020SF	●	2.0	5	38	3
New GLM 2020SF-S4	●	2.0	5	40	4
GLM 2025SF	●	2.5	6.25	38	3
New GLM 2025SF-S4	●	2.5	6.25	40	4
GLM 2030SF	●	3.0	7.5	38	3
New GLM 2030SF-S6	●	3.0	7.5	45	6
GLM 2040SF	●	4.0	11	45	4
New GLM 2040SF-S6	●	4.0	11	45	6
GLM 2050SF	●	5.0	13	50	6
GLM 2060SF	●	6.0	13	50	6
New GLM 2070SF	●	7.0	16	60	8
GLM 2080SF	●	8.0	19	60	8
New GLM 2090SF	●	9.0	19	70	10
GLM 2100SF	●	10.0	22	70	10
New GLM 2110SF	●	11.0	22	75	12
GLM 2120SF	●	12.0	26	75	12

Grade : ACZ20W

Recommended Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.
2. If cutting noise and vibration are is present, please reduce the cutting conditions accordingly.
3. For groove milling of Stainless steel, use 60% of recommended spindle speed and 40% of commended federate.(＊)



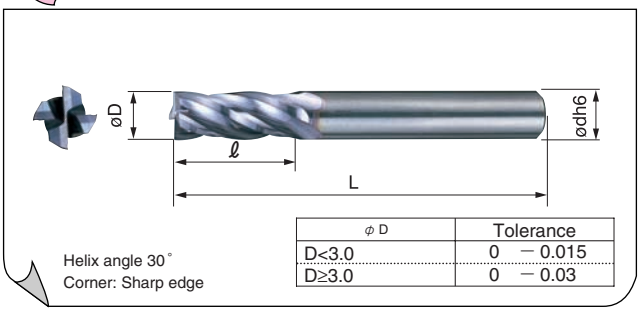
■ Recommended Conditions (General Purpose Machines)

● GS MILL 2 Flutes GLM2000SF Type

Work / Cond.		Structural Steel, Carbon Steel, Cast Iron SS, SC, FC (150～250HB)		Alloy Steel, Pre-hardened Steel SCM, NAK, HPM (25～35HRC)		Tempered Steel, Hardened Steel (35～45HRC)		Hardened Steel (45～55HRC)		Stainless Steel(＊) SUS304, SUS316		Heat Resistive Steel, Ti-alloy	
Dia. (mm)		S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)
2		11,200	340	10,500	240	7,300	130	5,300	80	5,300	90	3,300	50
4		6,400	460	6,000	320	4,200	180	3,000	110	3,000	130	1,900	70
6		4,600	550	4,300	390	3,000	210	2,200	130	2,200	150	1,400	80
8		3,400	550	3,200	390	2,200	210	1,600	130	1,600	150	1,000	80
10		2,800	560	2,600	390	1,800	210	1,300	130	1,300	150	800	80
12		2,300	560	2,200	400	1,500	210	1,100	130	1,100	150	700	80
Side Milling	Ad	1.5D		1.5D		1.5D		1.0D		1.5D		1.0D	
	Rd	0.1D		0.1D		0.05D		0.02D		0.1D		0.05D	
Groove Milling	Ad	0.5D		0.5D		0.2D		0.05D		0.3D		0.05D	

GLM 4000SF Type

4 teeth



φ D	Tolerance
D<3.0	0 −0.015
D≥3.0	0 −0.03

Helix angle 30°
Corner: Sharp edge

■ Endmills

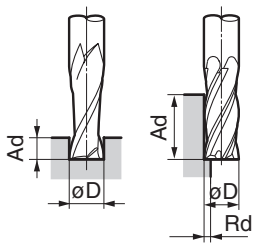
(mm)

Cat. No.	Stock	øD	ℓ	L	ød
GLM 4010SF	●	1.0	2.5	38	3
New **GLM 4010SF-S4**	●	1.0	2.5	40	4
GLM 4020SF	●	2.0	5	38	3
New **GLM 4020SF-S4**	●	2.0	5	40	4
GLM 4030SF	●	3.0	7.5	38	3
New **GLM 4030SF-S6**	●	3.0	7.5	45	6
GLM 4040SF	●	4.0	11	45	4
New **GLM 4040SF-S6**	●	4.0	11	45	6
GLM 4050SF	●	5.0	13	50	6
GLM 4060SF	●	6.0	13	50	6
GLM 4080SF	●	8.0	19	60	8
GLM 4100SF	●	10.0	22	70	10
GLM 4120SF	●	12.0	26	75	12

Grade : ACZ20W

Recommended Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.
2. If cutting noise and vibration are is present, please reduce the cutting conditions accordingly.
3. For groove milling of Stainless steel, use 60% of recommended spindle speed and 40% of commended federate.(＊)



■ Recommended Conditions (General Purpose Machines)

● GS MILL 4 Flutes GLM4000SF Type

Work / Cond. / Dia. (mm)		Structural Steel, Carbon Steel, Cast Iron SS, SC, FC (150～250HB)		Alloy Steel, Pre-hardened Steel SCM, NAK, HPM (25～35HRC)		Tempered Steel, Hardened Steel (35～45HRC)		Hardened Steel (45～55HRC)		Stainless Steel(＊) SUS304, SUS316		Heat Resistive Steel, Ti-alloy	
		S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)
2		12,800	570	12,000	380	8,300	230	6,000	150	6,000	130	3,700	70
4		6,800	730	6,400	490	4,400	300	3,200	200	3,200	170	2,000	90
6		4,600	770	4,300	520	3,000	320	2,200	210	2,200	180	1,400	100
8		3,400	770	3,200	520	2,200	320	1,600	210	1,600	180	1,000	100
10		2,800	780	2,600	520	1,800	320	1,300	210	1,300	180	800	100
12		2,300	780	2,200	530	1,500	320	1,100	210	1,100	180	700	100
Side Milling	Ad	1.5D		1.5D		1.5D		1.0D		1.5D		1.0D	
	Rd	0.1D		0.1D		0.05D		0.02D		0.1D		0.05D	
Groove Milling	Ad	0.5D		0.5D		0.2D		0.05D		0.3D		0.1D	

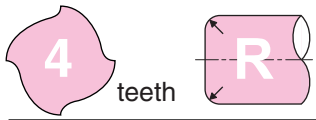
■ Recommended Conditions (High Speed Machining Center)

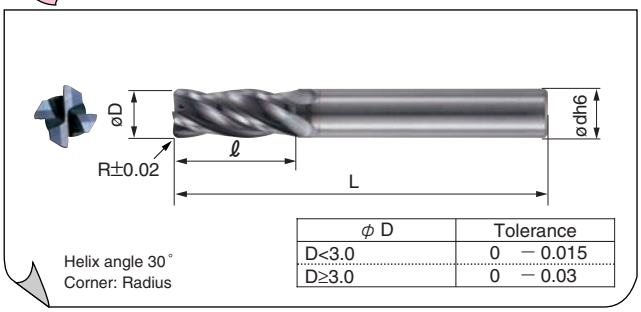
● GS MILL 4 Flutes GLM4000SF Type

Work / Cond. / Dia. (mm)		Structural Steel, Carbon Steel, Cast Iron SS, SC, FC (150～250HB)		Alloy Steel, Pre-hardened Steel SCM, NAK, HPM (25～35HRC)		Tempered Steel, Hardened Steel (35～45HRC)		Hardened Steel (45～55HRC)		Stainless Steel(＊) SUS304, SUS316	
		S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)
2		47,800	2,200	47,800	1,600	39,800	1,200	31,800	900	15,900	400
4		23,900	2,600	23,900	1,900	19,900	1,400	15,900	1,100	8,000	490
6		16,000	2,700	16,000	2,000	13,300	1,500	10,600	1,200	5,300	510
8		12,000	2,700	12,000	2,000	10,000	1,500	8,000	1,200	4,000	520
10		9,600	2,700	9,600	2,000	8,000	1,500	6,400	1,200	3,200	520
12		8,000	2,700	8,000	2,000	6,700	1,500	5,300	1,200	2,700	520
Depth of Cut	Ad	1.5D		1.5D		1.5D		1.0D		1.5D	
	Rd	0.05D		0.05D		0.05D		0.02D		0.05D	

GLM 4000SF-R Type

New





φ D	Tolerance
D<3.0	0 −0.015
D≥3.0	0 −0.03

Helix angle 30°
Corner: Radius

■ Endmills

(mm)

Cat. No.	Stock	øD	R	ℓ	L
GLM 4030SF-R02	●	3.0	0.2	7.5	45
GLM 4030SF-R05	●	3.0	0.5	7.5	45
GLM 4040SF-R02	●	4.0	0.2	11	45
GLM 4040SF-R05	●	4.0	0.5	11	45
GLM 4040SF-R10	●	4.0	1	11	45
GLM 4050SF-R02	●	5.0	0.2	13	50
GLM 4050SF-R05	●	5.0	0.5	13	50
GLM 4050SF-R10	●	5.0	1	13	50
GLM 4060SF-R02	●	6.0	0.2	13	50
GLM 4060SF-R05	●	6.0	0.5	13	50
GLM 4060SF-R10	●	6.0	1	13	50
GLM 4060SF-R15	●	6.0	1.5	13	50
GLM 4080SF-R02	●	8.0	0.2	19	60
GLM 4080SF-R05	●	8.0	0.5	19	60
GLM 4080SF-R10	●	8.0	1	19	60
GLM 4080SF-R15	●	8.0	1.5	19	60
GLM 4100SF-R02	●	10.0	0.2	22	70
GLM 4100SF-R05	●	10.0	0.5	22	70
GLM 4100SF-R10	●	10.0	1	22	70
GLM 4100SF-R20	●	10.0	2	22	70
GLM 4120SF-R02	●	12.0	0.2	26	75
GLM 4120SF-R05	●	12.0	0.5	26	75
GLM 4120SF-R10	●	12.0	1	26	75
GLM 4120SF-R15	●	12.0	1.5	26	75
GLM 4120SF-R20	●	12.0	2	26	75

Grade : ACZ20W

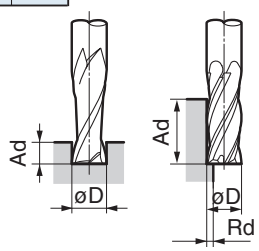
■ Diameter and corner radius selection range

Blade diameter	R0.2	R0.5	R1.0	R1.5	R2.0
φ 3	●	●			
φ 4	●	●	●		
φ 5	●	●	●		
φ 6	●	●	●	●	
φ 8	●	●	●	●	
φ 10	●	●	●		●
φ 12	●	●	●	●	●
φ 16		●	●	●	●

Coated Endmills

Recommended Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.
2. If cutting noise and vibration are is present, please reduce the cutting conditions accordingly.
3. For groove milling of Stainless steel, use 60% of recommended spindle speed and 40% of commended federate.(＊)



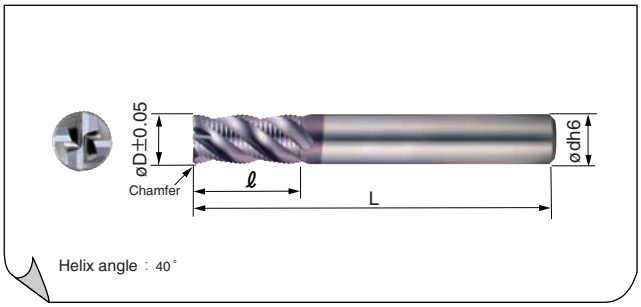
■ Recommended Conditions (General Purpose Machines)

● GS MILL Radius Endmill GLM4000SF-R Type

Work / Cond.		Structural Steel, Carbon Steel, Cast Iron SS, SC, FC (150～250HB)		Alloy Steel, Pre-hardened Steel SCM, NAK, HPM (25～35HRC)		Tempered Steel, Hardened Steel (35～45HRC)		Hardened Steel (45～55HRC)		Stainless Steel(＊) SUS304, SUS316		Heat Resistive Steel, Ti-alloy	
Dia. (mm)		S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)
2		12,800	570	12,000	380	8,300	230	6,000	150	6,000	130	3,700	70
4		6,800	730	6,400	490	4,400	300	3,200	200	3,200	170	2,000	90
6		4,600	770	4,300	520	3,000	320	2,200	210	2,200	180	1,400	100
8		3,400	770	3,200	520	2,200	320	1,600	210	1,600	180	1,000	100
10		2,800	780	2,600	520	1,800	320	1,300	210	1,300	180	800	100
12		2,300	780	2,200	530	1,500	320	1,100	210	1,100	180	700	100
Side Milling	Ad	1.5D		1.5D		1.5D		1.0D		1.5D		1.0D	
	Rd	0.1D		0.1D		0.05D		0.02D		0.1D		0.05D	
Groove Milling	Ad	0.5D		0.5D		0.2D		0.05D		0.3D		0.1D	

New

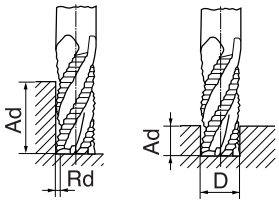
4 teeth



■ Endmills (mm)

Cat. No.	Stock	øD	ℓ	L	ød
GSRE 4060SF	●	6	13	50	6
GSRE 4070SF	●	7	16	60	8
GSRE 4080SF	●	8	19	60	8
GSRE 4090SF	●	9	19	70	10
GSRE 4100SF	●	10	22	70	10
GSRE 4110SF	●	11	22	75	12
GSRE 4120SF	●	12	26	75	12
GSRE 4140SF	●	14	26	90	16
GSRE 4160SF	●	16	32	90	16
GSRE 4180SF	●	18	32	100	20
GSRE 4200SF	●	20	38	100	20

Grade : ACZ20W



Recommended Conditions

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

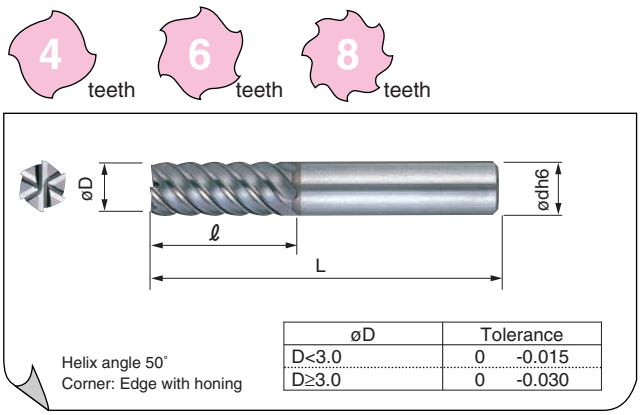
● Side Milling

Work / Cond.		Structural Steel, Carbon Steel (150～250HB)		Cast Iron FC, FCD		Alloy Steel, Pre-hardened Steel (25～35HRC)		Hardened Steel (45～50HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel, Ti-alloy	
Dia. (mm)		S/Speed (min^{-1})	Feedrate (mm/min)	S/Speed (min^{-1})	Feedrate (mm/min)	S/Speed (min^{-1})	Feedrate (mm/min)	S/Speed (min^{-1})	Feedrate (mm/min)	S/Speed (min^{-1})	Feedrate (mm/min)	S/Speed (min^{-1})	Feedrate (mm/min)
6		4,800	1,200	5,800	1,500	3,200	380	2,600	400	5,300	250	1,600	90
7		4,100	1,200	5,000	1,500	2,700	380	2,200	400	4,500	250	1,350	90
8		3,600	1,200	4,500	1,500	2,400	380	2,000	400	4,000	250	1,250	90
9		3,200	1,200	4,000	1,500	2,100	380	1,800	400	3,500	250	1,050	90
10		2,800	1,200	3,500	1,500	1,900	380	1,600	400	3,200	250	1,000	100
11		2,600	1,200	3,000	1,400	1,700	380	1,500	400	2,900	250	900	100
12		2,400	1,200	2,900	1,400	1,600	400	1,300	400	2,600	250	800	100
14		2,200	1,100	2,600	1,300	1,300	380	1,100	350	2,200	200	700	100
16		1,800	900	2,200	1,100	1,200	380	1,000	350	2,000	180	600	100
18		1,400	700	1,800	900	1,000	380	900	300	1,800	150	550	100
20		1,400	700	1,700	850	850	380	800	300	1,600	150	500	100
Depth of Cut	Ad	1.5D											
	Rd	0.5D						0.3D					

● Groove Milling

Work / Cond.		Structural Steel, Carbon Steel (150～250HB)		Cast Iron FC, FCD		Alloy Steel, Pre-hardened Steel (25～35HRC)		Hardened Steel (45～50HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel, Ti-alloy	
Dia. (mm)		S/Speed (min^{-1})	Feedrate (mm/min)	S/Speed (min^{-1})	Feedrate (mm/min)	S/Speed (min^{-1})	Feedrate (mm/min)	S/Speed (min^{-1})	Feedrate (mm/min)	S/Speed (min^{-1})	Feedrate (mm/min)	S/Speed (min^{-1})	Feedrate (mm/min)
6		3,600	900	4,300	1,100	2,400	300	1,700	260	4,200	250	1,100	60
7		3,000	900	3,700	1,100	2,000	280	1,500	260	3,600	250	900	60
8		2,700	900	3,400	1,100	1,800	280	1,350	260	3,200	250	800	60
9		2,400	900	3,000	1,100	1,600	280	1,200	260	2,800	250	700	60
10		2,100	900	2,600	1,100	1,400	280	1,100	270	2,500	250	650	65
11		2,000	900	2,300	1,100	1,300	280	1,000	270	2,300	250	600	70
12		1,800	900	2,200	1,100	1,200	300	900	270	2,100	250	550	70
14		1,600	800	2,000	1,000	1,000	290	750	240	1,800	180	450	65
16		1,350	650	1,650	850	900	280	700	240	1,600	160	400	65
18		1,200	550	1,500	750	800	280	600	230	1,400	140	350	60
20		1,050	500	1,350	700	700	280	550	210	1,250	125	300	60
Depth of Cut	Ad	1.0D						0.5D					

GSH 4000/6000/8000SF Type



Helix angle 50°
Corner: Edge with honing

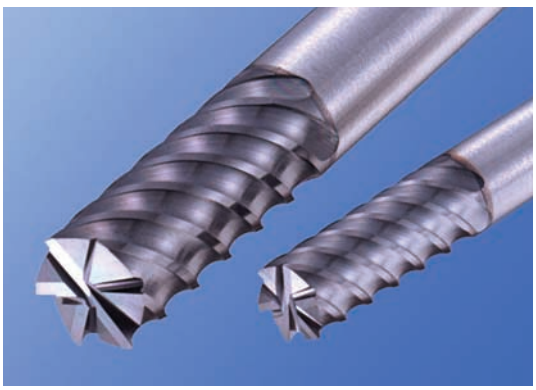
øD	Tolerance
D<3.0	0 -0.015
D≥3.0	0 -0.030

■ Endmills

(mm)

Cat. No.	Stock	øD	ℓ	L	ød	No. of teeth
GSH 4010SF	●	1.0	3	50	6	4
GSH 4015SF	●	1.5	4	50	6	4
GSH 4020SF	●	2.0	6	50	6	4
GSH 6030SF	●	3.0	8	50	6	6
GSH 6040SF	●	4.0	11	50	6	6
GSH 6050SF	●	5.0	13	50	6	6
GSH 6060SF	●	6.0	13	50	6	6
GSH 6080SF	●	8.0	19	60	8	6
GSH 6100SF	●	10.0	22	70	10	6
GSH 6120SF	●	12.0	26	75	12	6
GSH 8160SF	●	16.0	32	90	16	8
GSH 8200SF	●	20.0	38	100	20	8

Grade : ACF07C



Recommended Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If vibration or cutting noise is present, please change the cutting conditions accordingly.

■ Recommended Conditions (General Purpose Machines)

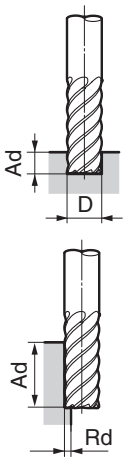
● GS MILL HARD GSH4000/6000/8000SF Type

Work / Conditions / Dia. (mm)		Carbon Steel, Alloy Steel (～35HRC)		Pre-hardened Steel, Die Steel (35～45HRC)		Hardened Steel, SKD61 (45～55HRC)		Hardened Steel, SKD11 (55～60HRC)		Hardened Steel, SKH51 (60～65HRC)		Hardened Steel, SKH55 (65HRC～)	
		S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)
1		20,000	540	20,000	390	15,600	260	12,300	160	11,100	140	7,800	95
2		19,000	1,100	17,200	770	13,400	530	10,500	320	9,500	270	6,700	190
3		15,000	2,150	13,400	1,540	10,400	1,050	8,200	650	7,400	540	5,200	380
4		11,200	2,400	10,000	1,740	7,800	1,180	6,100	730	5,600	600	3,900	420
5		9,000	2,700	8,000	1,930	6,200	1,300	4,900	810	4,400	670	3,100	470
6		7,500	2,700	6,700	1,930	5,200	1,300	4,100	810	3,700	670	2,600	470
8		5,600	2,700	5,000	1,930	3,900	1,300	3,050	810	2,800	670	1,950	470
10		4,500	2,700	4,000	1,930	3,100	1,300	2,450	810	2,200	670	1,550	470
12		3,750	2,700	3,350	1,930	2,600	1,300	2,050	810	1,850	670	1,300	470
16		2,800	2,500	2,500	1,800	1,950	1,220	1,530	760	1,400	630	980	440
20		2,250	2,100	2,000	1,540	1,550	1,050	1,230	650	1,100	540	780	380
Side Milling	Ad	1～1.5D		1～1.5D		1～1.5D		1～1.5D		1～1.5D		1～1.5D	
	Rd	0.1D		0.1D		0.05D		0.05D		0.02D		0.02D	
Groove Milling	Ad	0.1D		0.1D		0.05D		0.05D		～0.05D Max. 0.5㎜		～0.05D Max. 0.5㎜	

■ Recommended Conditions (High Speed Machining Center)

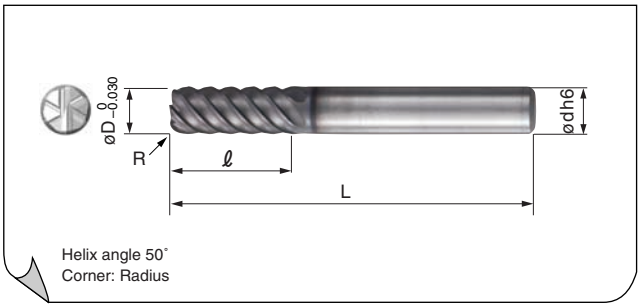
● GS MILL HARD GSH4000/6000/8000SF Type

Work / Conditions / Dia. (mm)		Carbon Steel, Alloy Steel (～35HRC)		Pre-hardened Steel, Die Steel (35～45HRC)		Hardened Steel, SKD61 (45～55HRC)		Hardened Steel, SKD11 (55～60HRC)		Hardened Steel, SKH51 (60～65HRC)	
		S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)
1		48,000	1,250	48,000	1,250	48,000	1,250	48,000	930	38,000	700
2		48,000	2,850	48,000	2,850	48,000	2,850	36,000	1,600	24,000	1,000
3		32,000	4,900	32,000	4,900	32,000	4,900	24,000	2,740	16,000	1,700
4		24,000	5,200	24,000	5,200	24,000	5,200	18,000	2,900	12,000	1,800
5		19,200	5,800	19,200	5,800	19,200	5,800	14,300	3,200	9,600	2,000
6		16,000	5,800	16,000	5,800	16,000	5,800	12,000	3,200	8,000	2,000
8		12,000	5,800	12,000	5,800	12,000	5,800	9,000	3,200	6,000	2,000
10		9,600	5,800	9,600	5,800	9,600	5,800	7,200	3,200	4,800	2,000
12		8,000	5,800	8,000	5,800	8,000	5,800	6,000	3,200	4,000	2,000
16		6,000	5,400	6,000	5,400	6,000	5,400	4,500	3,000	3,000	1,900
20		4,800	4,600	4,800	4,600	4,800	4,600	3,600	2,580	2,400	1,600
Side Milling	Ad	1～1.5D		1～1.5D		1～1.5D		1～1.5D		1～1.5D	
	Rd	0.1D		0.05D		0.05D		0.02D		0.01D	



GSH 6000/8000SF-R Type

New



Helix angle 50°
Corner: Radius

■ Endmills

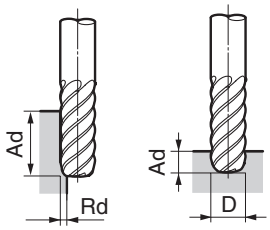
(mm)

Cat. No.	Stock	øD	R	ℓ	L	ød	No. of teeth
GSH 6060SF-R02	○	6	0.2	13	50	6	6
GSH 6060SF-R05	○	6	0.5	13	50	6	6
GSH 6060SF-R10	○	6	1.0	13	50	6	6
GSH 6080SF-R02	○	8	0.2	19	60	8	6
GSH 6080SF-R05	○	8	0.5	19	60	8	6
GSH 6080SF-R10	○	8	1.0	19	60	8	6
GSH 6100SF-R05	○	10	0.5	22	70	10	6
GSH 6100SF-R10	○	10	1.0	22	70	10	6
GSH 6100SF-R15	○	10	1.5	22	70	10	6
GSH 6100SF-R20	○	10	2.0	22	70	10	6
GSH 6120SF-R05	○	12	0.5	26	75	12	6
GSH 6120SF-R10	○	12	1.0	26	75	12	6
GSH 6120SF-R15	○	12	1.5	26	75	12	6
GSH 6120SF-R20	○	12	2.0	26	75	12	6
GSH 8160SF-R10	○	16	1.0	32	90	16	8
GSH 8160SF-R15	○	16	1.5	32	90	16	8
GSH 8160SF-R20	○	16	2.0	32	90	16	8
GSH 8200SF-R10	○	20	1.0	38	100	20	8
GSH 8200SF-R15	○	20	1.5	38	100	20	8
	○	20	2.0	38	100	20	8

Grade : ACF07C

■ Diameter and corner radius selection range

Diameter	R0.2	R0.5	R1.0	R1.5	R2.0
φ 6	●	●	●		
φ 8	●	●	●		
φ 10		●	●	●	●
φ 12		●	●	●	●
φ 16			●	●	●
φ 20			●	●	●



Recommended Conditions

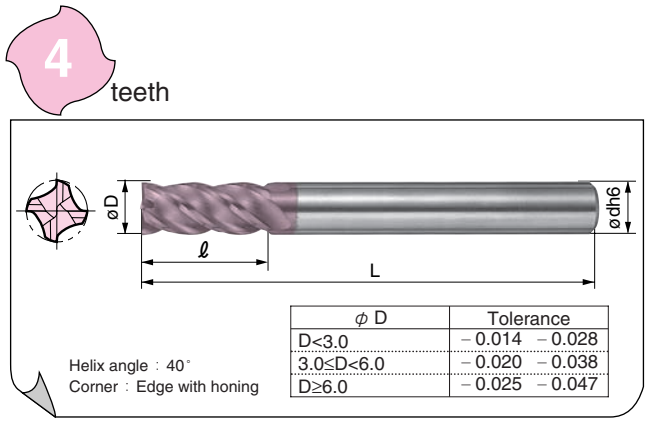
■ Recommended Conditions (General Purpose Machines)

Work / Conditions / Dia. (mm)		Carbon Steel, Alloy Steel (～HRC35)		Pre-hardened Steel, Die Steel (35～45HRC)		Hardened Steel, SKD61 (45～55HRC)		Hardened Steel, SKD11 (55～60HRC)		Hardened Steel, SKH51 (60～65HRC)		Hardened Steel, SKH55 (65～70HRC)	
		S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)
6		7,500	2,700	6,700	1,930	5,200	1,300	4,100	810	3,700	670	2,600	470
8		5,600	2,700	5,000	1,930	3,900	1,300	3,050	810	2,800	670	1,950	470
10		4,500	2,700	4,000	1,930	3,100	1,300	2,450	810	2,200	670	1,550	470
12		3,750	2,700	3,350	1,930	2,600	1,300	2,050	810	1,850	670	1,300	470
16		2,800	2,500	2,500	1,800	1,950	1,220	1,530	760	1,400	630	980	440
20		2,250	2,100	2,000	1,540	1,550	1,050	1,230	650	1,100	540	780	380
Side Milling	Ad	1～1.5D											
	Rd	0.1D				0.05D				0.02D			
Groove Milling	Ad	0.1D				0.05D				～0.05D Max.0.5mm			

■ Recommended Conditions (High Speed Machining Center)

Work / Conditions / Dia. (mm)		Carbon Steel, Alloy Steel (～HRC35)		Pre-hardened Steel, Die Steel (35～45HRC)		Hardened Steel, SKD61 (45～55HRC)		Hardened Steel, SKD11 (55～60HRC)		Hardened Steel, SKH51 (60～65HRC)	
		S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)
6		16,000	5,800	16,000	5,800	16,000	5,800	12,000	3,200	8,000	2,000
8		12,000	5,800	12,000	5,800	12,000	5,800	9,000	3,200	6,000	2,000
10		9,600	5,800	9,600	5,800	9,600	5,800	7,200	3,200	4,800	2,000
12		8,000	5,800	8,000	5,800	8,000	5,800	6,000	3,200	4,000	2,000
16		6,000	5,400	6,000	5,400	6,000	5,400	4,500	3,000	3,000	1,900
20		4,800	4,600	4,800	4,600	4,800	4,600	3,600	2,580	2,400	1,600
Side Milling	Ad	1～1.5D									
	Rd	0.1D		0.05D		0.05D		0.02D		0.01D	

New ZX Coated UP MILL
SSUP 4000ZX Type



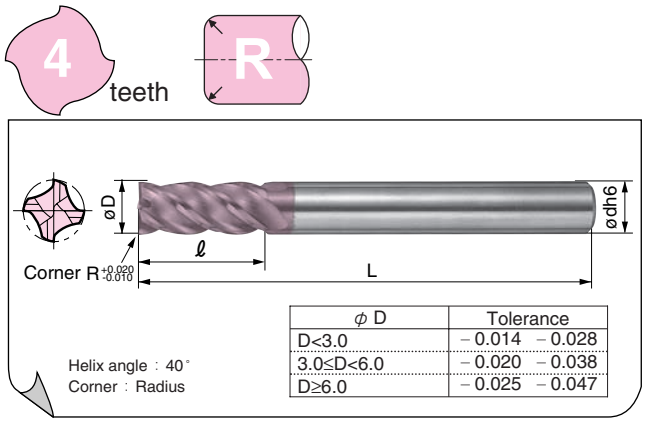
φ D	Tolerance
D<3.0	−0.014 −0.028
3.0≤D<6.0	−0.020 −0.038
D≥6.0	−0.025 −0.047

■ Endmills (mm)

Cat. No.	Stock	øD	ℓ	L	ød
SSUP 4020ZX	●	2.0	6	50	4
SSUP 4030ZX	●	3.0	8	50	6
SSUP 4040ZX	●	4.0	11	50	6
SSUP 4050ZX	●	5.0	13	60	6
SSUP 4060ZX	●	6.0	13	60	6
SSUP 4070ZX	●	7.0	16	70	8
SSUP 4080ZX	●	8.0	19	80	8
SSUP 4090ZX	●	9.0	19	90	10
SSUP 4100ZX	●	10.0	22	90	10
SSUP 4110ZX	●	11.0	22	90	12
SSUP 4120ZX	●	12.0	26	90	12
SSUP 4140ZX	●	14.0	26	110	16
SSUP 4150ZX	●	15.0	26	110	16
SSUP 4160ZX	●	16.0	32	115	16
SSUP 4180ZX	●	18.0	32	120	20
SSUP 4200ZX	●	20.0	38	125	20

Grade : ACZ50M

New ZX Coated UP MILL
SSUP 4000ZX-R Type



φ D	Tolerance
D<3.0	−0.014 −0.028
3.0≤D<6.0	−0.020 −0.038
D≥6.0	−0.025 −0.047

■ Endmills (mm)

Cat. No.	Stock	øD	R	ℓ	L	ød
SSUP 4030ZX-R02	●	3.0	0.2	8	50	6
SSUP 4030ZX-R05	●	3.0	0.5	8	50	6
SSUP 4040ZX-R02	●	4.0	0.2	11	50	6
SSUP 4040ZX-R05	●	4.0	0.5	11	50	6
SSUP 4040ZX-R10	●	4.0	1.0	11	50	6
SSUP 4050ZX-R02	●	5.0	0.2	13	60	6
SSUP 4050ZX-R05	●	5.0	0.5	13	60	6
SSUP 4050ZX-R10	●	5.0	1.0	13	60	6
SSUP 4060ZX-R03	●	6.0	0.3	13	60	6
SSUP 4060ZX-R05	●	6.0	0.5	13	60	6
SSUP 4060ZX-R10	●	6.0	1.0	13	60	6
SSUP 4060ZX-R15	●	6.0	1.5	13	60	6
SSUP 4080ZX-R03	●	8.0	0.3	19	80	8
SSUP 4080ZX-R05	●	8.0	0.5	19	80	8
SSUP 4080ZX-R10	●	8.0	1.0	19	80	8
SSUP 4080ZX-R15	●	8.0	1.5	19	80	8
SSUP 4080ZX-R20	●	8.0	2.0	19	80	8
SSUP 4100ZX-R03	●	10.0	0.3	22	90	10
SSUP 4100ZX-R05	●	10.0	0.5	22	90	10
SSUP 4100ZX-R10	●	10.0	1.0	22	90	10
SSUP 4100ZX-R15	●	10.0	1.5	22	90	10
SSUP 4100ZX-R20	●	10.0	2.0	22	90	10
SSUP 4120ZX-R05	●	12.0	0.5	26	90	12
SSUP 4120ZX-R10	●	12.0	1.0	26	90	12
SSUP 4120ZX-R15	●	12.0	1.5	26	90	12
SSUP 4120ZX-R20	●	12.0	2.0	26	90	12
SSUP 4120ZX-R30	●	12.0	3.0	26	90	12
SSUP 4160ZX-R10	●	16.0	1.0	32	115	16
SSUP 4160ZX-R15	●	16.0	1.5	32	115	16
SSUP 4160ZX-R20	●	16.0	2.0	32	115	16
SSUP 4160ZX-R30	●	16.0	3.0	32	115	16
SSUP 4200ZX-R10	●	20.0	1.0	38	125	20
SSUP 4200ZX-R15	●	20.0	1.5	38	125	20
SSUP 4200ZX-R20	●	20.0	2.0	38	125	20
SSUP 4200ZX-R30	●	20.0	3.0	38	125	20

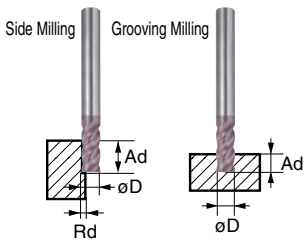
Grade : ACZ50M

● SSUP4000ZX-R series
Diameter and corner radius selection range

Diameter	R0.2	R0.3	R0.5	R1.0	R1.5	R2.0	R3.0
φ 3	●		●				
φ 4	●		●	●			
φ 5	●		●	●			
φ 6		●	●	●	●		
φ 8		●	●	●	●	●	
φ 10		●	●	●	●	●	
φ 12			●	●	●	●	●
φ 16				●	●	●	●
φ 20				●	●	●	●

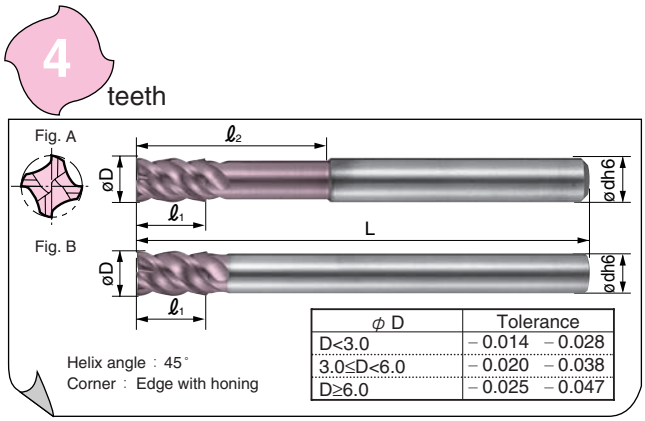
Recommended Conditions

Work / Conditions / Dia. (mm)	Carbon Steel, Cast Iron SS-, S-C, FC- (150～250HB)		Alloy Steel, SCM Pre-hardened Steel (25～35HRC)		Tampered Steel, Hardened Steel (40～50HRC)		Stainless Steel (*)		Heat Resistive Steel, Ti-alloy (20～45HRC)	
	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)
2	9,000	720	6,000	430	4,000	320	5,500	320	2,600	120
4	6,600	800	4,500	450	3,000	380	4,000	320	2,000	120
6	4,800	960	3,000	480	2,500	380	3,000	480	1,200	120
8	3,600	1,000	2,200	610	2,000	400	2,000	520	1,000	140
10	2,800	1,000	1,800	610	1,500	400	1,700	550	800	160
12	2,400	950	1,500	550	1,200	380	1,500	500	700	140
14	2,200	880	1,300	490	1,000	360	1,200	430	600	130
16	1,800	650	1,100	420	800	300	1,000	360	500	120
18	1,600	580	1,000	360	750	270	900	340	450	110
20	1,400	500	900	330	700	250	820	300	400	100
Side Milling Ad	1.5D									
Side Milling Rd	0.1D				0.05D		0.1D		0.05D	
Groove Milling Ad	1.0D				0.2D		0.3D		0.2D	



(1) For groove milling of Stainless Steel, use 60% of recommended spindle and 40% of recommended federates (*)
(2) If cutting noise and vibration are present, please reduce the cutting conditions accordingly

New ZX Coated UP MILL
SSUPR 4000ZX Type



ϕ D	Tolerance
D<3.0	−0.014 −0.028
3.0≤D<6.0	−0.020 −0.038
D≥6.0	−0.025 −0.047

■ Endmills (mm)

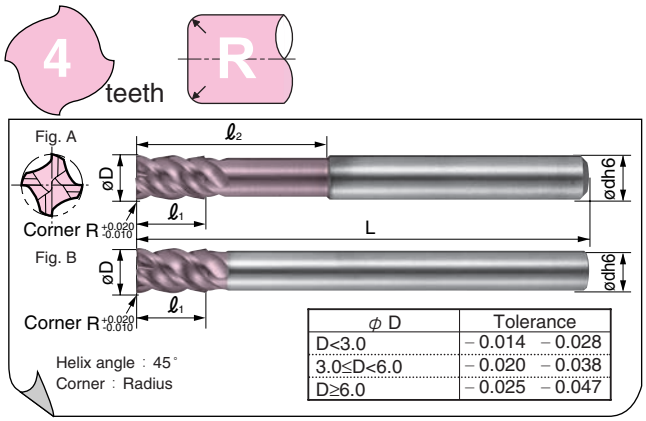
Cat. No.	Stock	øD	ℓ1	L	ℓ2	ød	Shape
SSUPR 4030ZX	●	3	4.5	60	12	6	A
SSUPR 4040ZX	●	4	6	60	16	6	A
SSUPR 4050ZX	●	5	7.5	60	20	6	A
SSUPR 4060ZX	●	6	9	60	24	6	A
SSUPR 4070ZX	●	7	10.5	80	–	6	B
SSUPR 4080ZX	●	8	12	80	34	8	A
SSUPR 4090ZX	●	9	13.5	90	–	8	B
SSUPR 4100ZX	●	10	15	100	42	10	A
SSUPR 4110ZX	●	11	16.5	120	–	10	B
SSUPR 4120ZX	●	12	18	120	50	12	A
SSUPR 4130ZX	●	13	19.5	130	–	12	B
SSUPR 4160ZX	●	16	24	160	66	16	A
SSUPR 4170ZX	●	17	25.5	170	–	16	B
SSUPR 4200ZX	●	20	30	200	82	20	A

Grade/Code: ACZ50M

● SSUPR4000ZX-R series
Diameter and corner radius selection range

Diameter	R0.2	R0.3	R0.5	R1.0	R1.5	R2.0
ϕ 3	●		●			
ϕ 4	●		●			
ϕ 5	●		●			
ϕ 6		●	●			
ϕ 7		●	●			
ϕ 8			●	●		
ϕ 9			●	●		
ϕ 10			●	●	●	
ϕ 11			●	●	●	
ϕ 12			●	●	●	
ϕ 13			●	●	●	
ϕ 16				●	●	●
ϕ 17				●	●	●
ϕ 20				●	●	●

New ZX Coated UP MILL
SSUPR 4000ZX-R Type



ϕ D	Tolerance
D<3.0	−0.014 −0.028
3.0≤D<6.0	−0.020 −0.038
D≥6.0	−0.025 −0.047

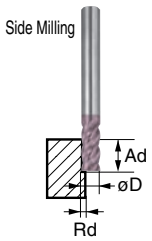
■ Endmills (mm)

Cat. No.	Stock	øD	R	ℓ1	L	ℓ2	ød	Shape
SSUPR 4030ZX-R02	●	3	0.2	4.5	60	12	6	A
SSUPR 4030ZX-R05	●	3	0.5	4.5	60	12	6	A
SSUPR 4040ZX-R02	●	4	0.2	6	60	16	6	A
SSUPR 4040ZX-R05	●	4	0.5	6	60	16	6	A
SSUPR 4050ZX-R02	●	5	0.2	7.5	60	20	6	A
SSUPR 4050ZX-R05	●	5	0.5	7.5	60	20	6	A
SSUPR 4060ZX-R03	●	6	0.3	9	60	24	6	A
SSUPR 4060ZX-R05	●	6	0.5	9	60	24	6	A
SSUPR 4070ZX-R03	●	7	0.3	10.5	80	–	6	B
SSUPR 4070ZX-R05	●	7	0.5	10.5	80	–	6	B
SSUPR 4080ZX-R05	●	8	0.5	12	80	34	8	A
SSUPR 4080ZX-R10	●	8	1.0	12	80	34	8	A
SSUPR 4090ZX-R05	●	9	0.5	13.5	90	–	8	B
SSUPR 4090ZX-R10	●	9	1.0	13.5	90	–	8	B
SSUPR 4100ZX-R05	●	10	0.5	15	100	42	10	A
SSUPR 4100ZX-R10	●	10	1.0	15	100	42	10	A
SSUPR 4100ZX-R15	●	10	1.5	15	100	42	10	A
SSUPR 4110ZX-R05	●	11	0.5	16.5	120	–	10	B
SSUPR 4110ZX-R10	●	11	1.0	16.5	120	–	10	B
SSUPR 4110ZX-R15	●	11	1.5	16.5	120	–	10	B
SSUPR 4120ZX-R05	●	12	0.5	18	120	50	12	A
SSUPR 4120ZX-R10	●	12	1.0	18	120	50	12	A
SSUPR 4120ZX-R15	●	12	1.5	18	120	50	12	A
SSUPR 4130ZX-R05	●	13	0.5	19.5	130	–	12	B
SSUPR 4130ZX-R10	●	13	1.0	19.5	130	–	12	B
SSUPR 4130ZX-R15	●	13	1.5	19.5	130	–	12	B
SSUPR 4160ZX-R10	●	16	1.0	24	160	66	16	A
SSUPR 4160ZX-R15	●	16	1.5	24	160	66	16	A
SSUPR 4160ZX-R20	●	16	2.0	24	160	66	16	A
SSUPR 4170ZX-R10	●	17	1.0	25.5	170	–	16	B
SSUPR 4170ZX-R15	●	17	1.5	25.5	170	–	16	B
SSUPR 4170ZX-R20	●	17	2.0	25.5	170	–	16	B
SSUPR 4200ZX-R10	●	20	1.0	30	200	82	20	A
SSUPR 4200ZX-R15	●	20	1.5	30	200	82	20	A
SSUPR 4200ZX-R20	●	20	2.0	30	200	82	20	A

Grade : ACZ50M

Recommended Conditions

Work / Conditions / Dia. (mm)	Carbon Steel, Cast Iron (150～250HB)		Alloy Steel, Pre-hardened Steel (25～35HRC)		Tampered Steel, Hardened Steel (40～50HRC)		Stainless Steel		Heat Resistive Steel, Ti-alloy (20～45HRC)	
	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)
3	9,000	600	5,300	400	3,100	200	4,200	350	2,600	160
4	6,600	600	4,000	400	2,400	200	3,200	350	2,000	160
6	4,200	600	2,600	400	1,600	200	2,100	350	1,300	160
8	3,200	650	2,000	450	1,200	200	1,600	350	1,000	160
10	2,500	650	1,600	450	950	200	1,200	400	800	180
12	2,100	650	1,300	450	800	200	1,000	400	650	180
13	1,900	650	1,200	450	700	200	950	400	600	180
16	1,600	650	1,000	400	600	200	800	350	500	160
17	1,500	600	900	400	550	200	750	350	450	160
20	1,200	600	800	400	500	200	650	350	400	160
Side Milling Ad	1.2D									
Side Milling Rd	0.1D				0.05D		0.1D		0.05D	

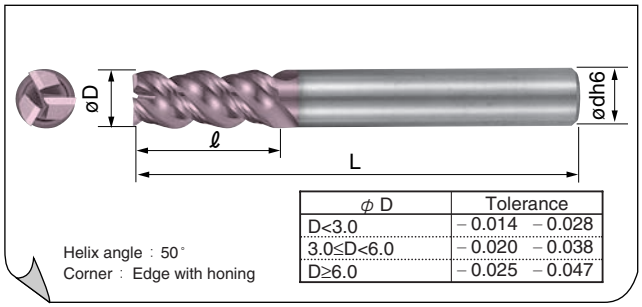


(1) The conditions recommended are for endmills with a standard overhangs of 4xD. For overhangs of 5xD or more, please use 70% (max) of recommended conditions

(2) If cutting noise and vibration are present, please reduce the cutting conditions accordingly

SSUP 3000ZX Type

3 teeth



φ D	Tolerance
D<3.0	−0.014 −0.028
3.0≤D<6.0	−0.020 −0.038
D≥6.0	−0.025 −0.047

Helix angle : 50°
Corner : Edge with honing

■ Endmills Diameter : ø2.0～8.0mm (mm)

Cat. No.	Stock	øD	ℓ	L	ød
SSUP 3020ZX	●	2.0	6	50	4
SSUP 3025ZX	●	2.5	8	50	4
SSUP 3030ZX	●	3.0	8	50	6
SSUP 3035ZX	●	3.5	10	50	6
SSUP 3040ZX	●	4.0	11	50	6
SSUP 3045ZX	●	4.5	11	50	6
SSUP 3050ZX	●	5.0	13	60	6
SSUP 3055ZX	●	5.5	13	60	6
SSUP 3060ZX	●	6.0	13	60	6
SSUP 3065ZX	●	6.5	16	70	8
SSUP 3070ZX	●	7.0	16	70	8
SSUP 3075ZX	●	7.5	16	70	8
SSUP 3080ZX	●	8.0	19	80	8

■ Endmills Diameter : ø8.5～16.0mm (mm)

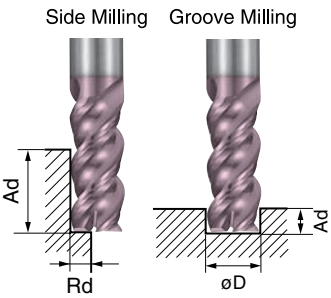
Cat. No.	Stock	øD	ℓ	L	ød
SSUP 3085ZX	●	8.5	19	90	10
SSUP 3090ZX	●	9.0	19	90	10
SSUP 3095ZX	●	9.5	19	90	10
SSUP 3100ZX	●	10.0	22	90	10
SSUP 3110ZX	●	11.0	22	90	12
SSUP 3120ZX	●	12.0	26	90	12
SSUP 3130ZX	●	13.0	26	100	12
SSUP 3140ZX	●	14.0	26	110	16
SSUP 3150ZX	●	15.0	26	110	16
SSUP 3160ZX	●	16.0	32	115	16

Grade : ACZ50M

Recommended Conditions

● Side Milling, Groove Milling

Work / Conditions / Dia. (mm)	Carbon Steel, Cast Iron (150～250HB)		Alloy Steel, Pre-hardened Steel (25～35HRC)		Tampered Steel, Hardened Steel (40～50HRC)		Stainless Steel (*)		Heat Resistive Steel, Ti-alloy (20～45HRC)	
	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)
2	9,000	540	6,000	320	4,000	240	5,500	240	2,600	90
4	6,600	600	4,500	340	3,000	280	4,000	240	2,000	90
6	4,800	720	3,000	360	2,500	280	3,000	360	1,200	90
8	3,600	750	2,200	460	2,000	300	2,000	390	1,000	100
10	2,800	750	1,800	460	1,500	300	1,700	410	800	120
12	2,400	710	1,500	410	1,200	280	1,500	380	700	100
14	2,200	660	1,300	370	1,000	270	1,200	320	600	95
16	1,800	490	1,100	320	800	230	1,000	270	500	90
Side Milling Ad	1.5D									
Side Milling Rd	0.1D				0.05D		0.1D		0.05D	
Groove Milling Slotting Ad	1.0D				0.2D		0.3D		0.2D	



1. For groove milling of Stainless steel, use 60% of recommended spindle and 40% of recommended federates (*)
2. If cutting noise and vibration are present, please reduce the cutting conditions accordingly

● Slot Milling

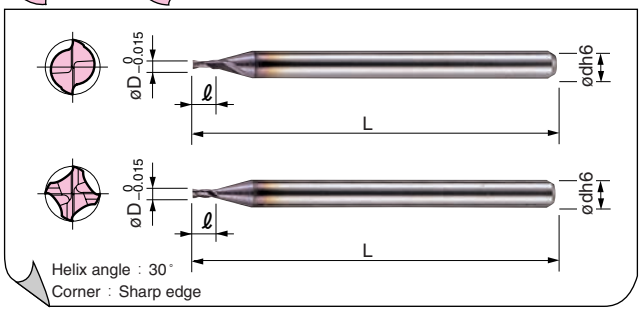
Work / Conditions / Dia. (mm)	Carbon Steel, Cast Iron (150～250HB)		Alloy Steel, Pre-hardened Steel (25～35HRC)		Tampered Steel, Hardened Steel (40～50HRC)		Stainless Steel		Heat Resistive Steel, Ti-alloy (20～45HRC)	
	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)
2	9,000	150	6,000	100	4,000	60	5,500	60	2,600	20
4	6,600	250	4,500	170	3,000	80	4,000	110	2,000	40
6	4,800	300	3,000	200	2,500	110	3,000	120	1,200	40
8	3,600	300	2,200	200	2,000	120	2,000	120	1,000	50
10	2,800	300	1,800	200	1,500	120	1,700	130	800	50
12	2,400	300	1,500	200	1,200	120	1,500	130	700	50
14	2,200	250	1,300	150	1,000	80	1,200	100	600	40
16	1,800	200	1,100	120	800	60	1,000	80	500	30

1. If cutting noise and vibration are present, please reduce the cutting conditions accordingly
2. For Stainless steel, Heat Resistive steel and TI-alloys, water-soluble coolant should be use, Dry cut (Air blown) is recommended for other work materials
3. For slot milling, please use recommended depths Ad from the above table for groove milling

New ZX Coated IT MILL

S-SIT 2000ZX/4000ZX Type

2 4 teeth



■ 2 teeth

(mm)

Cat. No.	Stock	øD	ℓ	L	ød
S-SIT 2005ZX	●	0.5	0.75	38	3
S-SIT 2006ZX		0.6	0.9	38	3
S-SIT 2007ZX		0.7	1.05	38	3
S-SIT 2008ZX		0.8	1.2	38	3
S-SIT 2009ZX		0.9	1.35	38	3
S-SIT 2010ZX	●	1.0	1.5	38	3
S-SIT 2011ZX		1.1	1.65	38	3
S-SIT 2012ZX	●	1.2	1.8	38	3
S-SIT 2013ZX		1.3	1.95	38	3
S-SIT 2014ZX		1.4	2.1	38	3
S-SIT 2015ZX	●	1.5	2.25	38	3
S-SIT 2020ZX	●	2.0	3.0	38	3
S-SIT 2025ZX	●	2.5	3.75	38	3
S-SIT 2030ZX	●	3.0	4.5	38	3

■ 4 teeth

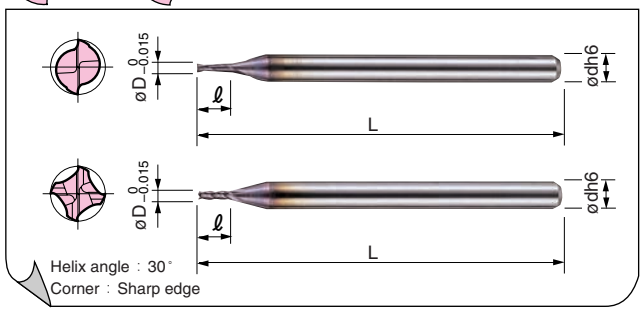
Cat. No.	Stock	øD	ℓ	L	ød
S-SIT 4010ZX	●	1.0	1.5	38	3
S-SIT 4011ZX		1.1	1.65	38	3
S-SIT 4012ZX	●	1.2	1.8	38	3
S-SIT 4013ZX		1.3	1.95	38	3
S-SIT 4014ZX		1.4	2.1	38	3
S-SIT 4015ZX	●	1.5	2.25	38	3
S-SIT 4020ZX	●	2.0	3.0	38	3
S-SIT 4025ZX	●	2.5	3.75	38	3
S-SIT 4030ZX	●	3.0	4.5	38	3

Grade : ACZ05F

New ZX Coated IT MILL

SIT 2000ZX/4000ZX Type

2 4 teeth



■ 2 teeth

(mm)

Cat. No.	Stock	øD	ℓ	L	ød
SIT 2005ZX	●	0.5	1.25	38	3
SIT 2006ZX		0.6	1.5	38	3
SIT 2007ZX		0.7	1.75	38	3
SIT 2008ZX		0.8	2.0	38	3
SIT 2009ZX		0.9	2.25	38	3
SIT 2010ZX	●	1.0	2.5	38	3
SIT 2011ZX		1.1	2.75	38	3
SIT 2012ZX	●	1.2	3.0	38	3
SIT 2013ZX		1.3	3.25	38	3
SIT 2014ZX		1.4	3.5	38	3
SIT 2015ZX	●	1.5	3.75	38	3
SIT 2020ZX	●	2.0	5.0	38	3
SIT 2025ZX	●	2.5	6.25	38	3
SIT 2030ZX	●	3.0	7.5	38	3

■ 4 teeth

Cat. No.	Stock	øD	ℓ	L	ød
SIT 4010ZX		1.0	2.5	38	3
SIT 4011ZX		1.1	2.75	38	3
SIT 4012ZX		1.2	3.0	38	3
SIT 4013ZX		1.3	3.25	38	3
SIT 4014ZX		1.4	3.5	38	3
SIT 4015ZX		1.5	3.75	38	3
SIT 4020ZX		2.0	5.0	38	3
SIT 4025ZX		2.5	6.25	38	3
SIT 4030ZX		3.0	7.5	38	3

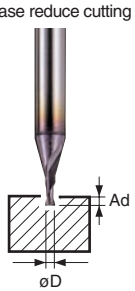
Grade : ACZ05F

Recommended Conditions (Work: Kovar material)

● Groove Milling (2 teeth)

(1) Coolant is neccessary during machining.
(2) If the machine cannot achieve the recommended spindle speed, please are the max. spindle speed available.
(3) If cutting noise and vibration are present, please reduce cutting conditions accordingly.

øD(mm)	S/Speed (min⁻¹)	Feedrate (mm/mim)
0.5	44,000	250
1.0	22,000	300
1.5	19,000	350
2.0	15,000	400
2.5	9,000	400
3.0	7,500	400
Groove Milling — Ad	0.5D	

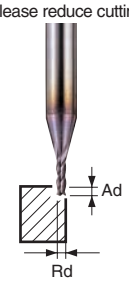


Recommended Conditions (Work: Kovar material)

● Side Milling (4 teeth)

(1) Coolant is neccessary during machining.
(2) If the machine cannot achieve the recommended spindle speed, please are the max. spindle speed available.
(3) If cutting noise and vibration are present, please reduce cutting conditions accordingly.

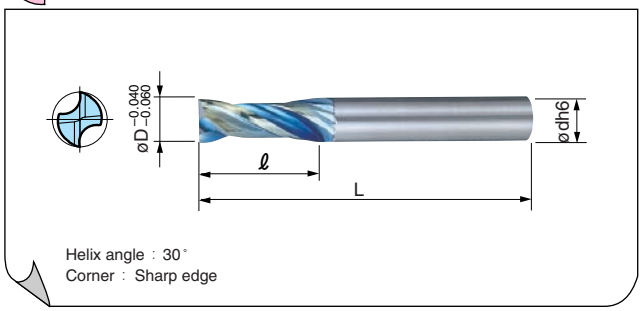
øD(mm)	S/Speed (min⁻¹)	Feedrate (mm/mim)
0.5	44,000	375
1.0	22,000	450
1.5	19,000	525
2.0	15,000	600
2.5	9,000	600
3.0	7,500	600
Groove Milling — Ad	1D	
Groove Milling — Rd	Below 0.02D	



AURORA COAT Endmills

ASM 2000DL Type

2 teeth



Helix angle : 30˚
Corner : Sharp edge

■ Endmills (mm)

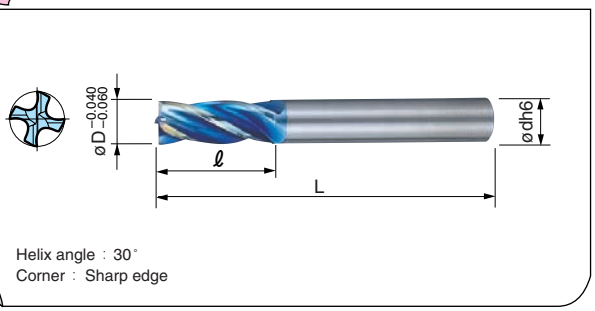
Cat. No.	Stock	øD	ℓ	L	ød
ASM 2020DL	●	2.0	6	40	4
ASM 2030DL	●	3.0	10	45	6
ASM 2040DL	●	4.0	12	45	6
ASM 2050DL	●	5.0	15	50	6
ASM 2060DL	●	6.0	15	50	6
ASM 2080DL	●	8.0	18	60	8
ASM 2100DL	●	10.0	22	71	10
ASM 2120DL	●	12.0	25	75	12
ASM 2160DL	●	16.0	32	90	16

Grade : DL1000

AURORA COAT Endmills

ASM 4000DL Type

4 teeth



Helix angle : 30˚
Corner : Sharp edge

■ Endmills (mm)

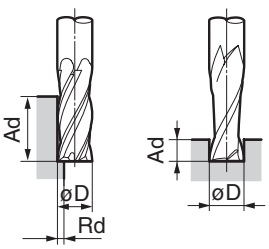
Cat. No.	Stock	øD	ℓ	L	ød
ASM 4020DL	●	2.0	6	40	4
ASM 4030DL	●	3.0	10	45	6
ASM 4040DL	●	4.0	12	45	6
ASM 4050DL	●	5.0	15	50	6
ASM 4060DL	●	6.0	15	50	6
ASM 4080DL	●	8.0	18	60	8
ASM 4100DL	●	10.0	22	71	10
ASM 4120DL	●	12.0	25	75	12
ASM 4160DL	●	16.0	32	90	16

Grade : DL1000

Recommended Conditions

Work		Aluminum Alloy							
Dia. (mm)		Wet (Emulsion)				Dry			
		Square				Square			
		Side Milling (4 teeth)		Groove Milling (2 teeth)		Side Milling (4 teeth)		Groove Milling (2 teeth)	
		S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)
2		40,000	1,400	28,000	280	40,000	980	28,000	200
3		32,000	2,000	22,000	400	32,000	1,400	22,000	280
4		26,000	2,600	18,000	520	26,000	1,800	18,000	360
5		20,000	2,600	14,000	520	20,000	1,800	14,000	360
6		17,000	2,700	12,000	540	17,000	1,900	12,000	370
8		13,000	2,700	9,000	540	13,000	1,900	9,000	370
10		11,000	2,800	7,200	560	11,000	2,000	7,200	390
12		8,500	2,800	6,000	560	8,500	2,000	6,000	390
16		6,400	2,800	4,500	560	6,400	2,000	4,500	390
Depth of Cut	Ad	1.5D		1.0D		1.5D		0.5D	
	Rd	0.2D		1.0D		0.2D		1.0D	

Side Milling (4teeth) Groove Milling (2teeth)

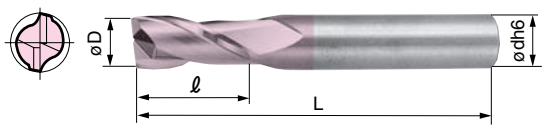


(1) For groove milling of Stainless steel, use 60% of recommended spindle and 40% of recommended federates

(2) If cutting noise and vibration are present, please reduce the cutting conditions accordingly

SSM 2000ZX Type

2 teeth



φ D	Tolerance
D<6.0	−0.010 −0.030
6.0≤D<10.0	−0.015 −0.040
D≥10.0	−0.020 −0.050

Helix angle : 30°
Corner : Sharp edge

■ Endmills Diameter ø1.0~15.0mm (mm)

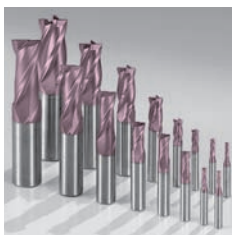
Cat. No.	Stock	øD	ℓ	L	ød
SSM 2010ZX	●	1.0	3	40	4
SSM 2015ZX	●	1.5	5	40	4
SSM 2020ZX	●	2.0	6	40	4
SSM 2021ZX	✻	2.1	6	40	4
SSM 2022ZX	✻	2.2	6	40	4
SSM 2023ZX	✻	2.3	6	40	4
SSM 2024ZX	✻	2.4	6	40	4
SSM 2025ZX	●	2.5	8	40	4
SSM 2026ZX	✻	2.6	8	40	4
SSM 2027ZX	✻	2.7	8	40	4
SSM 2028ZX	✻	2.8	8	40	4
SSM 2029ZX	✻	2.9	8	40	4
SSM 2030ZX	●	3.0	8	45	6
SSM 2035ZX	●	3.5	8	45	6
SSM 2040ZX	●	4.0	10	45	6
SSM 2045ZX	●	4.5	10	45	6
SSM 2050ZX	●	5.0	12	50	6
SSM 2055ZX	●	5.5	12	50	6
SSM 2060ZX	●	6.0	12	50	6
SSM 2065ZX	●	6.5	12	50	8
SSM 2070ZX	●	7.0	15	55	8
SSM 2075ZX	●	7.5	15	55	8
SSM 2080ZX	●	8.0	15	55	8
SSM 2085ZX	●	8.5	15	55	10
SSM 2090ZX	●	9.0	15	55	10
SSM 2095ZX	●	9.5	15	55	10
SSM 2100ZX	●	10.0	18	65	10
SSM 2105ZX	✻	10.5	18	70	12
SSM 2110ZX	●	11.0	18	70	12
SSM 2115ZX	✻	11.5	18	70	12
SSM 2120ZX	●	12.0	18	70	12
SSM 2125ZX	✻	12.5	20	80	16
SSM 2130ZX	●	13.0	20	80	16
SSM 2140ZX	●	14.0	20	80	16
SSM 2150ZX	●	15.0	25	80	16

■ Endmills Diameter ø16.0~32.0mm (mm)

Cat. No.	Stock	øD	ℓ	L	ød
SSM 2160ZX	●	16.0	35	90	16
SSM 2170ZX	✻	17.0	35	90	20
SSM 2180ZX	●	18.0	40	105	20
SSM 2190ZX	✻	19.0	40	105	20
SSM 2200ZX	●	20.0	40	105	20
SSM 2210ZX	✻	21.0	40	105	25
SSM 2220ZX	✻	22.0	40	105	25
SSM 2230ZX	✻	23.0	45	115	25
SSM 2240ZX	✻	24.0	45	115	25
SSM 2250ZX	●	25.0	50	120	25
SSM 2300ZX	●	30.0	55	130	32
SSM 2320ZX	●	32.0	55	130	32

Grade : ACZ50

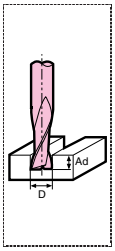
- ● Excellent edge sharpness and good chip evacuation
- ● General purpose type with a wide application range from finishing to general machining



Recommended Conditions

(Slotting) Below ø3: Ad=0.5 × øD
ø3 and above: Ad=1.0 × øD

øD		Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron	Stainless steel, Ti-alloy etc.
1.0 ~ 2.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.003 ~ 0.010	0.002 ~ 0.005	0.005 ~ 0.016	0.002 ~ 0.005
3.0 ~ 5.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.012 ~ 0.024	0.006 ~ 0.011	0.018 ~ 0.040	0.006 ~ 0.011
6.0 ~ 12.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.025 ~ 0.050	0.013 ~ 0.025	0.045 ~ 0.105	0.013 ~ 0.025
13.0 ~ 19.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.055 ~ 0.085	0.030 ~ 0.050	0.110 ~ 0.170	0.030 ~ 0.050
20.0 ~ 32.0	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.095 ~ 0.120	0.055 ~ 0.070	0.185 ~ 0.260	0.055 ~ 0.070



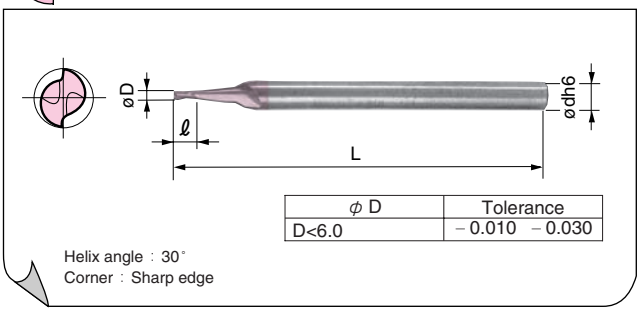
V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

✻ mark: Semi-standard stock (Please confirm stock availability)

ZX Coated Short Spiral Endmills

S-SSM 2000ZX Type

2 teeth



φ D	Tolerance
D<6.0	−0.010 −0.030

Helix angle : 30°
Corner : Sharp edge

■ Endmills (mm)

Cat. No.	Stock	øD	ℓ	L	ød
S-SSM 2003ZX	●	0.3	0.5	40	3
S-SSM 2004ZX	●	0.4	0.5	40	3
S-SSM 2005ZX	●	0.5	0.75	40	3
S-SSM 2006ZX	●	0.6	0.75	40	3
S-SSM 2007ZX	●	0.7	0.75	40	3
S-SSM 2008ZX	●	0.8	1.0	40	3
S-SSM 2009ZX	●	0.9	1.0	40	3
S-SSM 2010ZX	●	1.0	1.5	40	4
S-SSM 2011ZX	●	1.1	1.5	40	4
S-SSM 2012ZX	●	1.2	1.5	40	4
S-SSM 2013ZX	●	1.3	1.5	40	4
S-SSM 2014ZX	●	1.4	1.5	40	4
S-SSM 2015ZX	●	1.5	2.5	40	4
S-SSM 2016ZX	●	1.6	2.5	40	4
S-SSM 2017ZX	●	1.7	2.5	40	4
S-SSM 2018ZX	●	1.8	2.5	40	4
S-SSM 2019ZX	●	1.9	2.5	40	4
S-SSM 2020ZX	●	2.0	3.0	40	4
S-SSM 2025ZX	●	2.5	4.0	40	4
S-SSM 2030ZX	●	3.0	4.5	45	6
S-SSM 2035ZX	●	3.5	5.5	45	6
S-SSM 2040ZX	●	4.0	6.0	45	6
S-SSM 2045ZX	●	4.5	7.0	45	6
S-SSM 2050ZX	●	5.0	7.5	50	6
S-SSM 2055ZX	●	5.5	8.5	50	6
S-SSM 2060ZX	●	6.0	9.0	50	6

Grade : ACZ50

- SSM-ZX series short flute type
- Short flute with high rigidity
- Excellent chipping and fracture resistance
- Excellent for shallow groove machining

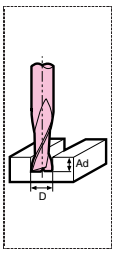
■ Application

Hardness HRC	20	30	40	50	60
Application	Finish~Light				

Recommended Conditions

(Slotting) Below ø3: Ad=0.5 × øD
ø3 and above: Ad=1.0 × øD

øD	Material	Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron	Stainless steel, Ti-alloy etc.
0.3 ~ 0.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	~ 0.002	~ 0.001	~ 0.003	~ 0.001
1.0 ~ 2.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.003 ~ 0.010	0.002 ~ 0.005	0.005 ~ 0.016	0.002 ~ 0.005
3.0 ~ 5.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.012 ~ 0.024	0.006 ~ 0.011	0.018 ~ 0.040	0.006 ~ 0.011
6.0	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.025 ~ 0.050	0.013 ~ 0.025	0.045 ~ 0.105	0.013 ~ 0.025



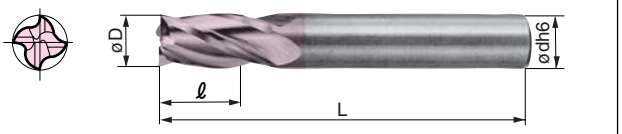
V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

✻ mark : Semi-standard stock (Please confirm stock availability)

ZX Coated Spiral Endmills

SSM 4000ZX Type

4 teeth



φ D	Tolerance
D<6.0	−0.010 −0.030
6.0≤D<10.0	−0.015 −0.040
D≥10.0	−0.020 −0.050

Helix angle : 30°
Corner : Sharp edge

■ Endmills (mm)

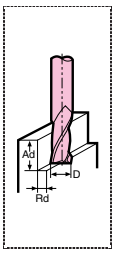
Cat. No.	Stock	øD	ℓ	L	ød
SSM 4015ZX	●	1.5	5	40	4
SSM 4020ZX	●	2.0	6	40	4
SSM 4025ZX	●	2.5	8	40	4
SSM 4030ZX	●	3.0	8	45	6
SSM 4035ZX	●	3.5	8	45	6
SSM 4040ZX	●	4.0	10	45	6
SSM 4045ZX	●	4.5	10	45	6
SSM 4050ZX	●	5.0	12	50	6
SSM 4055ZX	●	5.5	12	50	6
SSM 4060ZX	●	6.0	12	50	6
SSM 4065ZX	●	6.5	12	50	8
SSM 4070ZX	●	7.0	15	55	8
SSM 4075ZX	●	7.5	15	55	8
SSM 4080ZX	●	8.0	15	55	8
SSM 4085ZX	●	8.5	15	55	10
SSM 4090ZX	●	9.0	15	55	10
SSM 4095ZX	●	9.5	15	55	10
SSM 4100ZX	●	10.0	18	65	10
SSM 4105ZX	✻	10.5	18	65	12
SSM 4110ZX	●	11.0	18	70	12
SSM 4115ZX	✻	11.5	18	70	12
SSM 4120ZX	●	12.0	18	70	12
SSM 4130ZX	●	13.0	20	80	16
SSM 4135ZX	✻	13.5	20	80	16
SSM 4140ZX	●	14.0	20	80	16
SSM 4150ZX	●	15.0	25	80	16
SSM 4160ZX	●	16.0	35	90	16
SSM 4170ZX	✻	17.0	35	90	20
SSM 4180ZX	●	18.0	40	105	20
SSM 4190ZX	✻	19.0	40	105	20
SSM 4200ZX	●	20.0	40	105	20
SSM 4220ZX	✻	22.0	40	105	25
SSM 4240ZX	✻	24.0	45	115	25
SSM 4250ZX	●	25.0	50	120	25
SSM 4300ZX	●	30.0	55	130	32
SSM 4320ZX	●	32.0	55	130	32

Grade : ACZ50

Recommended Conditions

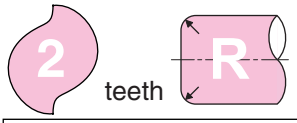
(Shoulder processing) Ad=1.5 × øD
Rd=0.1 × øD

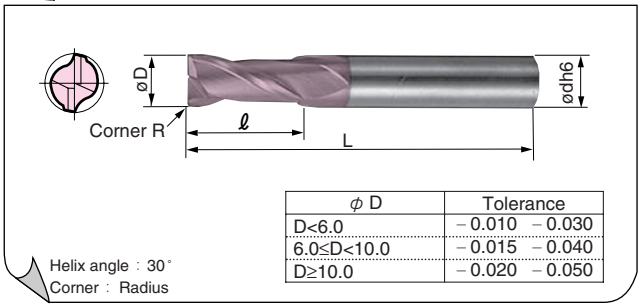
øD	Material	Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron	Stainless steel, Ti-alloy etc.
1.5 ~ 2.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.004 ~ 0.017	0.002 ~ 0.008	0.008 ~ 0.020	0.002 ~ 0.008
3.0 ~ 5.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.018 ~ 0.036	0.009 ~ 0.018	0.027 ~ 0.060	0.009 ~ 0.018
6.0 ~ 12.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.038 ~ 0.070	0.019 ~ 0.035	0.065 ~ 0.157	0.019 ~ 0.035
13.0 ~ 19.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.075 ~ 0.125	0.040 ~ 0.075	0.160 ~ 0.250	0.040 ~ 0.075
20.0 ~ 32.0	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.135 ~ 0.170	0.085 ~ 0.110	0.257 ~ 0.390	0.085 ~ 0.110



V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

ZX Coated Radius Endmills
SSM 2000ZX-R Type





φ D	Tolerance
D<6.0	−0.010 −0.030
6.0≤D<10.0	−0.015 −0.040
D≥10.0	−0.020 −0.050

Helix angle : 30°
Corner : Radius

■ Endmills (mm)

Cat. No.	Stock	øD	ℓ	L	ød	R
SSM 2060ZX-R03	▲	6.0	12	50	6	0.3
SSM 2060ZX-R05	▲	6.0	12	50	6	0.5
SSM 2080ZX-R03		8.0	15	55	8	0.3
SSM 2080ZX-R05	▲	8.0	15	55	8	0.5
SSM 2080ZX-R10	▲	8.0	15	55	8	1.0
SSM 2100ZX-R05	▲	10.0	18	65	10	0.5
SSM 2100ZX-R10		10.0	18	65	10	1.0
SSM 2120ZX-R05		12.0	18	70	12	0.5
SSM 2120ZX-R10	▲	12.0	18	70	12	1.0
SSM 2160ZX-R05	▲	16.0	35	90	16	0.5
SSM 2160ZX-R10		16.0	35	90	16	1.0

Grade : ACZ50

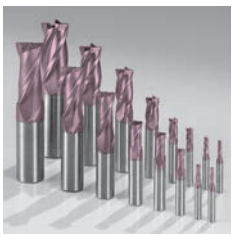
- SSM-ZX series with corner radius type
- Enhanced cutting edge promotes easy shoulder milling with corner radius and good surface finish.
- Stable cutting possible

■ Application

Hardness HRC	20	30	40	50	60
Application	Finish~Light				

Diameter and corner radius selection range

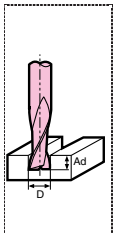
øD	R0.3	R0.5	R1.0
φ 6	●	●	
φ 8	●	●	●
φ 10		●	●
φ 12		●	●
φ 16		●	●



Recommended Conditions

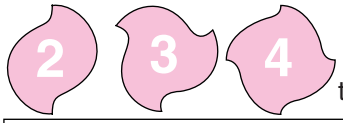
(Slotting) Below ø3: Ad=0.5 × øD
ø3 and above: Ad=1.0 × øD

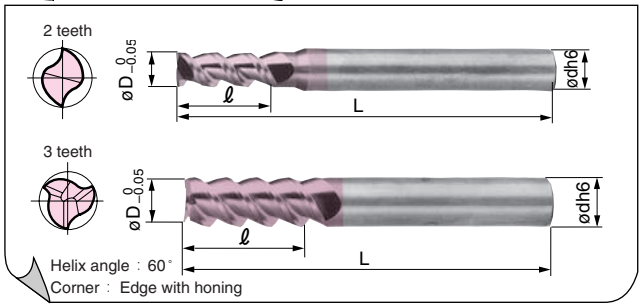
Material / øD		Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron	Stainless steel, Ti-alloy etc.
6.0 ~ 11.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.025 ~ 0.050	0.013 ~ 0.025	0.045 ~ 0.105	0.013 ~ 0.025
12.0 ~ 16.0	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.055 ~ 0.085	0.030 ~ 0.050	0.110 ~ 0.170	0.030 ~ 0.050



V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

ZX Coated High Helix Endmills
HSM 2000/3000/4000ZX Type





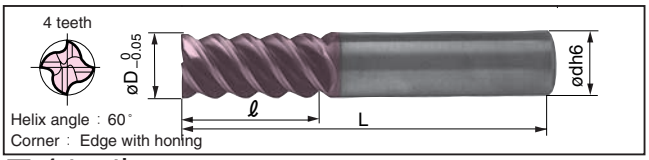
Helix angle : 60°
Corner : Edge with honing

■ 2 teeth (mm)

Cat. No.	Stock	øD	ℓ	L	ød
HSM 2020ZX	●	2.0	6	40	4
HSM 2030ZX	●	3.0	8	45	6
HSM 2040ZX	●	4.0	10	45	6

■ 3 teeth (mm)

Cat. No.	Stock	øD	ℓ	L	ød
HSM 3050ZX	●	5.0	12	50	6
HSM 3060ZX	●	6.0	15	50	6
HSM 3070ZX	●	7.0	18	60	8
HSM 3080ZX	●	8.0	18	60	8
HSM 3090ZX	●	9.0	20	65	10
HSM 3100ZX	●	10.0	25	70	10
HSM 3110ZX	●	11.0	25	75	12
HSM 3120ZX	●	12.0	30	75	12
HSM 3130ZX	●	13.0	30	80	16
HSM 3140ZX	●	14.0	30	90	16
HSM 3150ZX	●	15.0	30	95	16
HSM 3160ZX	●	16.0	35	95	16
HSM 3180ZX	●	18.0	40	110	20



Helix angle : 60°
Corner : Edge with honing

■ 4 teeth

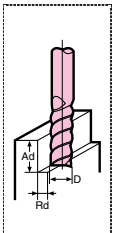
Cat. No.	Stock	øD	ℓ	L	ød
HSM 4200ZX	●	20.0	40	110	20
HSM 4250ZX	●	25.0	50	120	25

Grade : ACZ50

Recommended Conditions

(Shoulder processing) Ad=1.5 × øD
Rd=0.1 × øD

Material / øD		Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron	Stainless steel, Ti-alloy etc.
2.0 ~ 2.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.010 ~ 0.035	0.005 ~ 0.017	0.015 ~ 0.055	0.005 ~ 0.017
3.0 ~ 5.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.040 ~ 0050	0.020 ~ 0.025	0.060 ~ 0.070	0.020 ~ 0.025
6.0 ~ 12.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.055 ~ 0.110	0.028 ~ 0.055	0.080 ~ 0.220	0.028 ~ 0.055
13.0 ~ 19.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.120 ~ 0.180	0.060 ~ 0.090	0.250 ~ 0.350	0.060 ~ 0.090
20.0 ~ 25.0	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.190 ~ 0.245	0.095 ~ 0.125	0.380 ~ 0.490	0.095 ~ 0.125



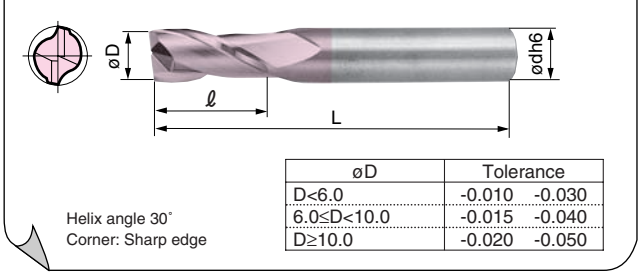
V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

▲mark : To be replaced by new item (Please confirm stock availability)

ZX Coated Spiral Endmills (Quasi-JIS Standard)

JSM 2000ZX Type

2 teeth



Helix angle 30°
Corner: Sharp edge

øD	Tolerance	
D<6.0	-0.010	-0.030
6.0≤D<10.0	-0.015	-0.040
D≥10.0	-0.020	-0.050

■ Endmills (mm)

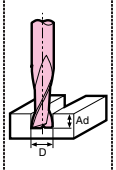
Cat. No.	Stock	øD	ℓ	L	ød
JSM 2030ZX	●	3.0	10	45	6
JSM 2035ZX	●	3.5	10	45	6
JSM 2040ZX	●	4.0	12	45	6
JSM 2045ZX	●	4.5	12	45	6
JSM 2050ZX	●	5.0	15	50	6
JSM 2055ZX	●	5.5	15	50	6
JSM 2060ZX	●	6.0	15	50	6
JSM 2065ZX	●	6.5	18	60	8
JSM 2070ZX	●	7.0	18	60	8
JSM 2075ZX	●	7.5	18	60	8
JSM 2080ZX	●	8.0	18	60	8
JSM 2085ZX	●	8.5	22	71	10
JSM 2090ZX	●	9.0	22	71	10
JSM 2095ZX	●	9.5	22	71	10
JSM 2100ZX	●	10.0	22	71	10
JSM 2110ZX	●	11.0	25	75	12
JSM 2120ZX	●	12.0	25	75	12
JSM 2130ZX	●	13.0	32	90	16
JSM 2140ZX	●	14.0	32	90	16
JSM 2150ZX	●	15.0	32	90	16

Grade : ACZ50

Recommended Conditions

(Slotting) Below ø3: Ad=0.5 × øD
ø3 and above: Ad=1.0 × øD

Material / øD		Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron	Stainless steel, Ti-alloy etc.
3.0 ~ 5.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.012 ~ 0.024	0.006 ~ 0.011	0.018 ~ 0.040	0.006 ~ 0.011
6.0 ~ 12.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.025 ~ 0.050	0.013 ~ 0.025	0.045 ~ 0.105	0.013 ~ 0.025
13.0 ~ 15.0	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.055 ~ 0.085	0.030 ~ 0.050	0.110 ~ 0.170	0.030 ~ 0.050

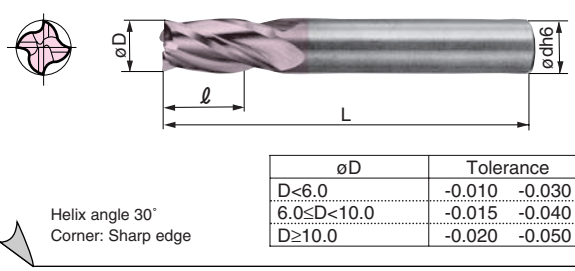


V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

ZX Coated Spiral Endmills (Quasi-JIS Standard)

JSM 4000ZX Type

4 teeth



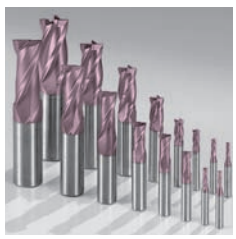
Helix angle 30°
Corner: Sharp edge

øD	Tolerance	
D<6.0	-0.010	-0.030
6.0≤D<10.0	-0.015	-0.040
D≥10.0	-0.020	-0.050

■ Endmills (mm)

Cat. No.	Stock	øD	ℓ	L	ød
JSM 4030ZX	●	3.0	10	45	6
JSM 4035ZX	●	3.5	10	45	6
JSM 4040ZX	●	4.0	12	45	6
JSM 4045ZX	●	4.5	12	45	6
JSM 4050ZX	●	5.0	15	50	6
JSM 4055ZX	●	5.5	15	50	6
JSM 4060ZX	●	6.0	15	50	6
JSM 4065ZX	●	6.5	18	60	8
JSM 4070ZX	●	7.0	18	60	8
JSM 4075ZX	●	7.5	18	60	8
JSM 4080ZX	●	8.0	18	60	8
JSM 4085ZX	●	8.5	22	71	10
JSM 4090ZX	●	9.0	22	71	10
JSM 4095ZX	●	9.5	22	71	10
JSM 4100ZX	●	10.0	22	71	10
JSM 4110ZX	●	11.0	25	75	12
JSM 4120ZX	●	12.0	25	75	12
JSM 4130ZX	●	13.0	32	90	16
JSM 4140ZX	●	14.0	32	90	16
JSM 4150ZX	●	15.0	32	90	16

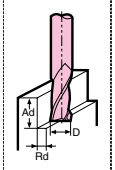
Grade :ACZ50



Recommended Conditions

(Shoulder processing) Ad=1.5 × øD
Rd=0.1 × øD

Material / øD		Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron	Stainless steel, Ti-alloy etc.
3.0 ~ 5.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.018 ~ 0.036	0.009 ~ 0.018	0.027 ~ 0.060	0.009 ~ 0.018
6.0 ~ 12.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.038 ~ 0.070	0.019 ~ 0.035	0.065 ~ 0.157	0.019 ~ 0.035
13.0 ~ 15.0	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.075 ~ 0.125	0.040 ~ 0.075	0.160 ~ 0.250	0.040 ~ 0.075

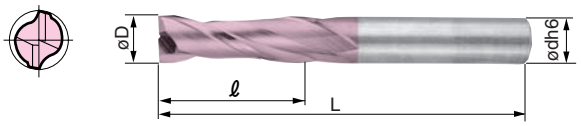


V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

ZX Coated Long Endmills

LSM 2000ZX Type

2 teeth



øD	Tolerance
D<6.0	-0.010 -0.030
6.0≤D<10.0	-0.015 -0.040
D≥10.0	-0.020 -0.050

Helix angle 30˚
Corner: Sharp edge

■ Endmills (mm)

Cat. No.	Stock	øD	ℓ	L	ød
LSM 2010ZX	✻	1.0	5	45	4
LSM 2015ZX	✻	1.5	7	45	4
LSM 2020ZX	✻	2.0	9	45	4
LSM 2025ZX	✻	2.5	12	45	4
LSM 2030ZX	●	3.0	12	50	6
LSM 2035ZX	✻	3.5	12	50	6
LSM 2040ZX	●	4.0	15	50	6
LSM 2045ZX	✻	4.5	15	50	6
LSM 2050ZX	●	5.0	18	55	6
LSM 2055ZX	✻	5.5	18	55	6
LSM 2060ZX	●	6.0	18	55	6
LSM 2065ZX	✻	6.5	18	55	8
LSM 2070ZX	●	7.0	25	65	8
LSM 2075ZX	✻	7.5	25	65	8
LSM 2080ZX	●	8.0	25	65	8
LSM 2085ZX	✻	8.5	25	65	10
LSM 2090ZX	●	9.0	25	65	10
LSM 2095ZX	✻	9.5	25	65	10
LSM 2100ZX	●	10.0	30	75	10
LSM 2105ZX	✻	10.5	30	80	12
LSM 2110ZX	●	11.0	30	80	12
LSM 2115ZX	✻	11.5	30	80	12
LSM 2120ZX	●	12.0	30	80	12
LSM 2130ZX	●	13.0	35	95	16
LSM 2140ZX	●	14.0	40	95	16
LSM 2150ZX	●	15.0	40	95	16
LSM 2160ZX	●	16.0	50	105	16
LSM 2170ZX	✻	17.0	50	105	20
LSM 2180ZX	●	18.0	50	115	20
LSM 2190ZX	✻	19.0	55	120	20
LSM 2200ZX	●	20.0	55	120	20
LSM 2240ZX	✻	24.0	65	140	25
LSM 2250ZX	●	25.0	65	140	25

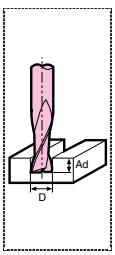
Grade : ACZ50

● SSM-ZX series, long type
● For deep endmilling

Recommended Conditions

(Slotting) Below ø3: Ad=0.5 × øD
ø3 and above: Ad=1.0 × øD

øD	Material	Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron	Stainless steel, Ti-alloy etc.
1.0 ~ 2.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.002 ~ 0.008	0.001 ~ 0.004	0.003 ~ 0.012	0.001 ~ 0.004
3.0 ~ 5.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.009 ~ 0.018	0.004 ~ 0.008	0.014 ~ 0.030	0.004 ~ 0.008
6.0 ~ 12.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.019 ~ 0.038	0.009 ~ 0.019	0.034 ~ 0.079	0.009 ~ 0.019
13.0 ~ 19.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.041 ~ 0.064	0.023 ~ 0.038	0.083 ~ 0.128	0.023 ~ 0.038
20.0 ~ 25.0	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.071 ~ 0.090	0.041 ~ 0.052	0.139 ~ 0.195	0.041 ~ 0.052

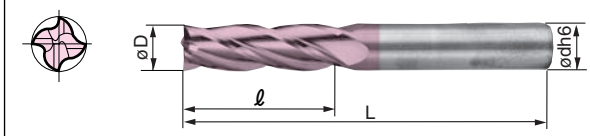


V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

ZX Coated Long Endmills

LSM 4000ZX Type

4 teeth



øD	Tolerance
D<6.0	-0.010 -0.030
6.0≤D<10.0	-0.015 -0.040
D≥10.0	-0.020 -0.050

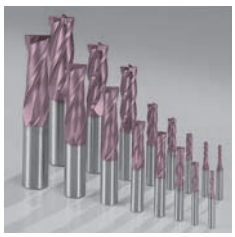
Helix angle 30˚
Corner: Sharp edge

■ Endmills (mm)

Cat. No.	Stock	øD	ℓ	L	ød
LSM 4030ZX	●	3.0	12	50	6
LSM 4035ZX	✻	3.5	12	50	6
LSM 4040ZX	●	4.0	15	50	6
LSM 4045ZX	✻	4.5	15	50	6
LSM 4050ZX	●	5.0	18	55	6
LSM 4055ZX	✻	5.5	18	55	6
LSM 4060ZX	●	6.0	18	55	6
LSM 4065ZX	✻	6.5	18	55	8
LSM 4070ZX	●	7.0	25	65	8
LSM 4075ZX	✻	7.5	25	65	8
LSM 4080ZX	●	8.0	25	65	8
LSM 4085ZX	✻	8.5	25	65	10
LSM 4090ZX	●	9.0	25	65	10
LSM 4095ZX	✻	9.5	25	65	10
LSM 4100ZX	●	10.0	30	75	10
LSM 4110ZX	●	11.0	30	80	12
LSM 4115ZX	✻	11.5	30	80	12
LSM 4120ZX	●	12.0	30	80	12
LSM 4130ZX	●	13.0	35	95	16
LSM 4140ZX	●	14.0	40	95	16
LSM 4150ZX	●	15.0	40	95	16
LSM 4160ZX	●	16.0	50	105	16
LSM 4170ZX	✻	17.0	50	105	20
LSM 4180ZX	●	18.0	50	115	20
LSM 4190ZX	✻	19.0	55	120	20
LSM 4200ZX	●	20.0	55	120	20
LSM 4220ZX	✻	22.0	60	135	25
LSM 4250ZX	●	25.0	65	140	25

Grade : ACZ50

● SSM-ZX series, long type
● For deep endmilling

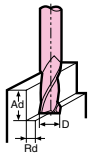


Front row LSM2000ZX type
Back row LSM4000ZX type

Recommended Conditions

(Shoulder processing) Ad=1.5 × øD
Rd=0.1 × øD

øD	Material	Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron	Stainless steel, Ti-alloy etc.
3.0 ~ 5.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.013 ~ 0.027	0.007 ~ 0.013	0.020 ~ 0.045	0.007 ~ 0.013
6.0 ~ 12.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.028 ~ 0.052	0.014 ~ 0.026	0.049 ~ 0.118	0.014 ~ 0.026
13.0 ~ 19.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.056 ~ 0.094	0.030 ~ 0.056	0.120 ~ 0.187	0.030 ~ 0.056
20.0 ~ 25.0	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.101 ~ 0.127	0.064 ~ 0.082	0.193 ~ 0.292	0.064 ~ 0.082



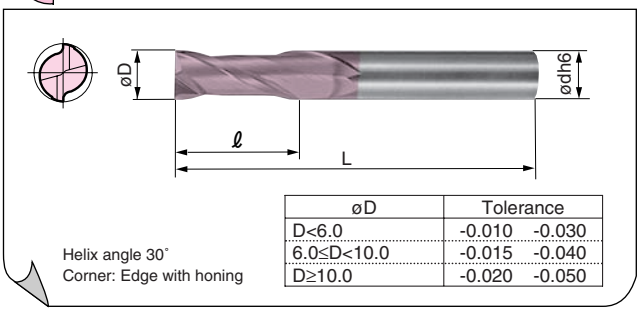
V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

✻ mark: Semi-standard stock (Please confirm stock availability)

ZX Coated Super Endmill (US MILL)

USM 2000ZX Type

2 teeth



øD	Tolerance	
D<6.0	-0.010	-0.030
6.0≤D<10.0	-0.015	-0.040
D≥10.0	-0.020	-0.050

Helix angle 30˚
Corner: Edge with honing

■ Endmills (mm)

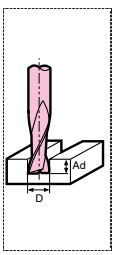
Cat. No.	Stock	øD	ℓ	L	ød
USM 2030ZX	●	3.0	10	45	6
USM 2040ZX	●	4.0	12	45	6
USM 2050ZX	●	5.0	15	50	6
USM 2060ZX	●	6.0	15	50	6
USM 2070ZX	●	7.0	18	60	8
USM 2080ZX	●	8.0	18	60	8
USM 2090ZX	●	9.0	22	71	10
USM 2100ZX	●	10.0	22	71	10
USM 2110ZX	●	11.0	25	75	12
USM 2120ZX	●	12.0	25	75	12
USM 2130ZX		13.0	32	90	16
USM 2140ZX	●	14.0	32	90	16
USM 2150ZX	●	15.0	32	90	16
USM 2160ZX	●	16.0	32	90	16
USM 2180ZX	●	18.0	40	106	20
USM 2200ZX	●	20.0	40	106	20
USM 2250ZX		25.0	50	120	25

Grade : ACZ50M

- SSM-ZX series strong edged type, excellent for machining of steel up to 55HRC
- Utilizing the new ZX Coat with increased wear resistance, stable machining at high speed can be achieved

Recommended Conditions (Slotting) Below ø3: Ad=1.0 × øD

øD		Material: Carbon steel, Alloy steel (Below 45HRC)	Hardened Steel (Below 55HRC)	Cast iron	Stainless steel, Ti-alloy etc.
3.0 ~ 5.9	V	100-**150**-200	100-**120**-140	100-**120**-150	60-**75**-90
	f	0.025 ~ 0.039	0.020 ~ 0.031	0.027 ~ 0.040	0.025 ~ 0.039
6.0 ~ 12.9	V	100-**150**-200	100-**120**-140	100-**120**-150	60-**75**-90
	f	0.046 ~ 0.081	0.037 ~ 0.065	0.047 ~ 0.105	0.046 ~ 0.081
13.0 ~ 19.9	V	100-**150**-200	100-**120**-140	100-**120**-150	60-**75**-90
	f	0.090 ~ 0.110	0.072 ~ 0.088	0.110 ~ 0.170	0.090 ~ 0.110
20.0 ~ 25.0	V	100-**150**-200	100-**120**-140	100-**120**-150	60-**75**-90
	f	0.155 ~ 0.200	0.124 ~ 0.160	0.185 ~ 0.260	0.155 ~ 0.200

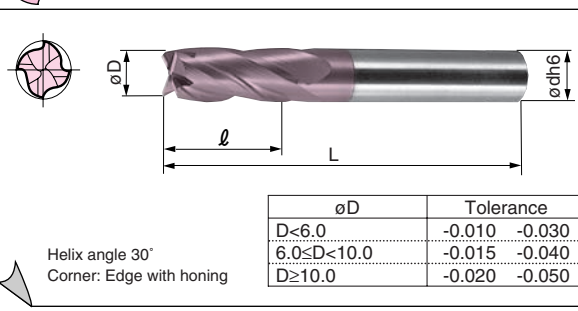


V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

ZX Coated Super Endmill (US MILL)

USM 4000ZX Type

4 teeth



øD	Tolerance	
D<6.0	-0.010	-0.030
6.0≤D<10.0	-0.015	-0.040
D≥10.0	-0.020	-0.050

Helix angle 30˚
Corner: Edge with honing

■ Endmills (mm)

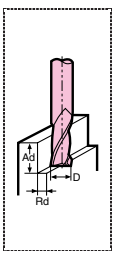
Cat. No.	Stock	øD	ℓ	L	ød
USM 4030ZX		3.0	10	45	6
USM 4040ZX	●	4.0	12	45	6
USM 4050ZX	●	5.0	15	50	6
USM 4060ZX	●	6.0	15	50	6
USM 4070ZX	●	7.0	18	60	8
USM 4080ZX	●	8.0	18	60	8
USM 4090ZX		9.0	22	71	10
USM 4100ZX	●	10.0	22	71	10
USM 4110ZX	●	11.0	25	75	12
USM 4120ZX	●	12.0	25	75	12
USM 4130ZX	●	13.0	32	90	16
USM 4140ZX	●	14.0	32	90	16
USM 4150ZX	●	15.0	32	90	16
USM 4160ZX	●	16.0	32	90	16
USM 4180ZX		18.0	40	106	20
USM 4200ZX	●	20.0	40	106	20
USM 4250ZX	●	25.0	50	120	25

Grade : ACZ50M

- SSM-ZX series strong edged type, excellent for machining of steel up to 55HRC
- Utilizing the new ZX Coat with increased wear resistance, stable machining at high speed can be achieved

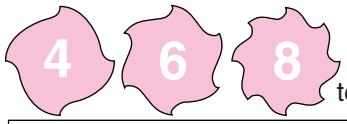
Recommended Conditions (Shoulder processing) Ad=1.5 × øD, Rd=0.1 × øD

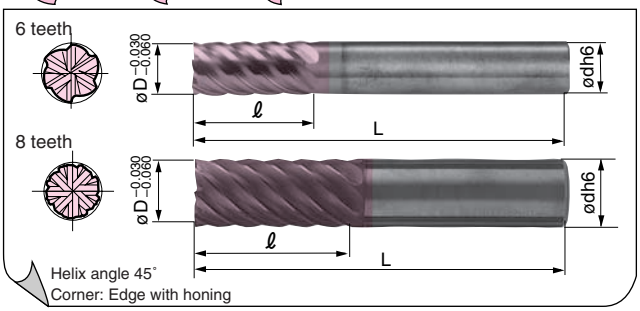
øD		Material: Carbon steel, Alloy steel (Below 45HRC)	Hardened Steel (Below 55HRC)	Cast iron	Stainless steel, Ti-alloy etc.
3.0 ~ 5.9	V	100-**150**-200	100-**120**-140	100-**120**-150	60-**75**-90
	f	0.037 ~ 0.058	0.030 ~ 0.046	0.039 ~ 0.060	0.037 ~ 0.058
6.0 ~ 12.9	V	100-**150**-200	100-**120**-140	100-**120**-150	60-**75**-90
	f	0.069 ~ 0.121	0.055 ~ 0.097	0.070 ~ 0.157	0.069 ~ 0.121
13.0 ~ 19.9	V	100-**150**-200	100-**120**-140	100-**120**-150	60-**75**-90
	f	0.135 ~ 0.165	0.108 ~ 0.132	0.160 ~ 0.250	0.135 ~ 0.165
20.0 ~ 25.0	V	100-**150**-200	100-**120**-140	100-**120**-150	60-**75**-90
	f	0.232 ~ 0.300	0.186 ~ 0.240	0.257 ~ 0.390	0.232 ~ 0.300



V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

ZX Coated HARD Endmills
HHM 4000ZX/6000ZX/8000ZX Type





■ 4 teeth (mm)

Cat. No.	Stock	øD	ℓ	L	ød
HHM 4030ZX	●	3.0	8	50	6
HHM 4040ZX	●	4.0	10	50	6
HHM 4050ZX	●	5.0	12	50	6

■ 6 teeth

Cat. No.	Stock	øD	ℓ	L	ød
HHM 6060ZX	●	6.0	12	50	6
HHM 6080ZX	●	8.0	16	60	8
HHM 6100ZX	●	10.0	20	71	10
HHM 6120ZX	●	12.0	24	75	12

■ 8 teeth

Cat. No.	Stock	øD	ℓ	L	ød
HHM 8160ZX	●	16.0	32	90	16
HHM 8200ZX	●	20.0	40	106	20
HHM 8250ZX		25.0	50	120	25
HHM 8300ZX		30.0	60	130	32
HHM 8320ZX	●	32.0	64	130	32

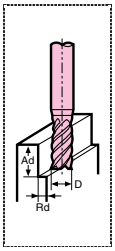
Grade : ACZ10M

- For general ~ hardened steel machining
- High rigidity design (Core diameter: 0.85xD)
- Multiple teeth

Recommended Conditions (Shoulder processing)

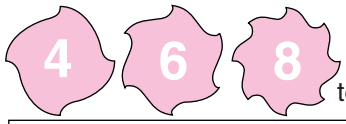
Ad=1.5 × øD
Rd=0.025(56 ~ 65HRC) ~ 0.2(Below 25HRC) × øD

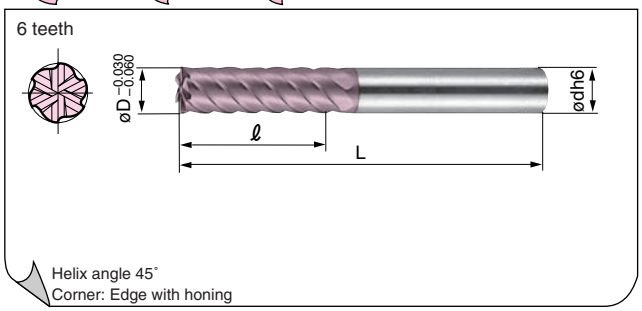
Material / øD		Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron (Below 65HRC)	Stainless steel, Ti-alloy etc.
3.0 ~ 5.0	V	200-**250**-300	100-**150**-200	80-**100**-120	100-**120**-150
	f	0.040 ~ 0.080	0.030 ~ 0.050	0.010 ~ 0.020	0.040 ~ 0.080
6.0 ~ 12.0	V	200-**250**-300	100-**150**-200	80-**100**-120	100-**120**-150
	f	0.082 ~ 0.120	0.050 ~ 0.090	0.020 ~ 0.038	0.080 ~ 0.220
16.0 ~ 32.0	V	200-**250**-300	100-**150**-200	80-**100**-120	100-**120**-150
	f	0.120 ~ 0.130	0.090 ~ 0.100	0.038 ~ 0.050	0.250 ~ 0.350



V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

ZX Coated HARD Endmills
LHHM 4000ZX/6000ZX/8000ZX Type





■ 4 teeth (mm)

Cat. No.	Stock	øD	ℓ	L	ød
LHHM 4030ZX	●	3.0	12	55	6
LHHM 4040ZX	●	4.0	15	60	6
LHHM 4050ZX	●	5.0	18	60	6

■ 6 teeth

Cat. No.	Stock	øD	ℓ	L	ød
LHHM 6060ZX	●	6.0	18	60	6
LHHM 6080ZX	●	8.0	25	75	8
LHHM 6100ZX	●	10.0	30	80	10
LHHM 6120ZX	●	12.0	30	100	12

■ 8 teeth

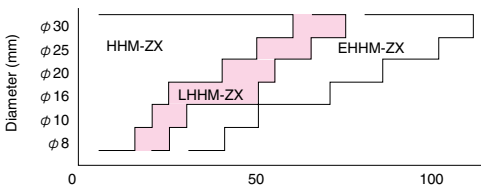
Cat. No.	Stock	øD	ℓ	L	ød
LHHM 8160ZX	●	16.0	50	105	16
LHHM 8200ZX	●	20.0	55	120	20
LHHM 8250ZX	●	25.0	65	140	25
LHHM 8300ZX	●	30.0	75	160	32
LHHM 8320ZX	●	32.0	85	170	32

Grade : ACZ10M

- HHM-ZX series long type
- High rigidity endmill for precision machining of deep steps

■ Application

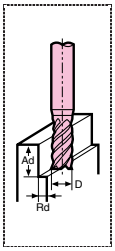
Hardness HRC	20	30	40	50	60
Application			Finish~Light		



Recommended Conditions (Shoulder processing)

Ad=1.5 × øD
Rd=0.025(56 ~ 65HRC) ~ 0.2(25HRCBelow) × øD

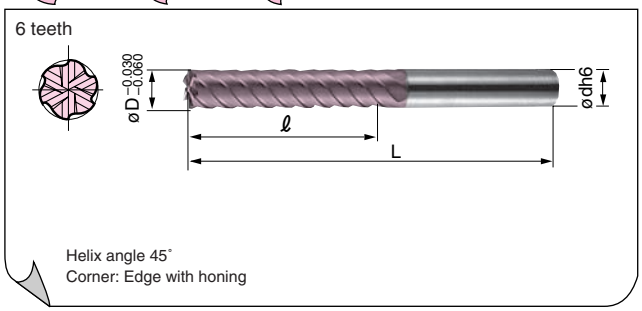
Material / øD		Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron (Below 65HRC)	Stainless steel, Ti-alloy etc.
3.0 ~ 5.0	V	200-**250**-300	100-**150**-200	80-**100**-120	60-**75**-90
	f	0.030 ~ 0.060	0.022 ~ 0.037	0.007 ~ 0.015	0.030 ~ 0.060
6.0 ~ 12.0	V	200-**250**-300	100-**150**-200	80-**100**-120	40-**50**-60
	f	0.061 ~ 0.090	0.037 ~ 0.067	0.015 ~ 0.028	0.060 ~ 0.165
16.0 ~ 32.0	V	200-**250**-300	100-**150**-200	80-**100**-120	40-**50**-60
	f	0.090 ~ 0.098	0.067 ~ 0.075	0.028 ~ 0.038	0.187 ~ 0.262



V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

ZX Coated Extra Long HARD Endmills
EHHM 4000ZX/6000ZX/8000ZX Type

4 6 8 teeth



■ 4 teeth (mm)

Cat. No.	Stock	øD	ℓ	L	ød
EHHM 4030ZX	●	3.0	20	60	6
EHHM 4040ZX	●	4.0	25	65	6
EHHM 4050ZX	●	5.0	30	70	6

■ 6 teeth

Cat. No.	Stock	øD	ℓ	L	ød
EHHM 6060ZX	●	6.0	30	70	6
EHHM 6080ZX	●	8.0	40	90	8
EHHM 6100ZX	●	10.0	50	100	10
EHHM 6120ZX	●	12.0	50	120	12

■ 8 teeth

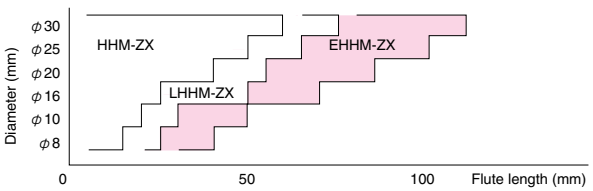
Cat. No.	Stock	øD	ℓ	L	ød
EHHM 8160ZX	●	16.0	70	140	16
EHHM 8200ZX	●	20.0	85	165	20
EHHM 8250ZX	●	25.0	100	185	25
EHHM 8300ZX	●	30.0	110	205	32
EHHM 8320ZX	●	32.0	110	205	32

Grade : ACZ10M

- HHM-ZX series extra long type
- High rigidity endmill for precision machining of deep steps

■ Application

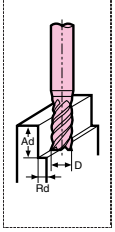
Hardness HRC	20	30	40	50	60
Application			Finish~Light		



Recommended Conditions (Shoulder processing)

Ad=1.5 × øD
Rd=0.025(56～65HRC)～0.2(Below25HRC) × øD

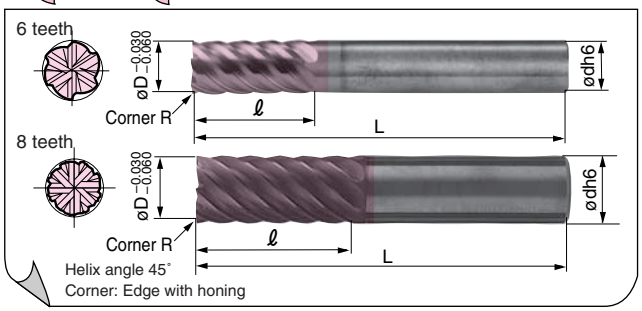
øD		Material: Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron (Below 65HRC)	Stainless steel, Ti-alloy etc.
3.0 ~ 5.0	V	200-**250**-300	100-**150**-200	80-**100**-120	100-**120**-150
	f	0.020 ~ 0.040	0.015 ~ 0.025	0.005 ~ 0.010	0.020 ~ 0.040
6.0 ~ 12.0	V	200-**250**-300	100-**150**-200	80-**100**-120	100-**120**-150
	f	0.041 ~ 0.060	0.025 ~ 0.045	0.010 ~ 0.019	0.040 ~ 0.110
16.0 ~ 32.0	V	200-**250**-300	100-**150**-200	80-**100**-120	100-**120**-150
	f	0.060 ~ 0.065	0.045 ~ 0.050	0.019 ~ 0.025	0.125 ~ 0.175



V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

ZX Coated HARD Radius Endmills
HHM 6000ZX-R/8000ZX-R Type

6 8 teeth R



■ 6 teeth (mm)

Cat. No.	Stock	øD	ℓ	L	ød	R
HHM 6060ZX-R03	●	6.0	12	50	6	0.3
HHM 6060ZX-R05	●	6.0	12	50	6	0.5
HHM 6060ZX-R10	●	6.0	12	50	6	1.0
HHM 6080ZX-R03	●	8.0	16	60	8	0.3
HHM 6080ZX-R05	●	8.0	16	60	8	0.5
HHM 6080ZX-R10	●	8.0	16	60	8	1.0
HHM 6100ZX-R05	●	10.0	20	71	10	0.5
HHM 6100ZX-R10	●	10.0	20	71	10	1.0
HHM 6100ZX-R15	●	10.0	20	71	10	1.5
HHM 6100ZX-R20	●	10.0	20	71	10	2.0
HHM 6120ZX-R05	●	12.0	24	75	12	0.5
HHM 6120ZX-R10	●	12.0	24	75	12	1.0
HHM 6120ZX-R15	●	12.0	24	75	12	1.5
HHM 6120ZX-R20	●	12.0	24	75	12	2.0

■ 8 teeth

Cat. No.	Stock	øD	ℓ	L	ød	R
HHM 8160ZX-R10	●	16.0	32	90	16	1.0
HHM 8160ZX-R15	●	16.0	32	90	16	1.5
HHM 8160ZX-R20	●	16.0	32	90	16	2.0
HHM 8200ZX-R10	●	20.0	40	106	20	1.0
HHM 8200ZX-R15	●	20.0	40	106	20	1.5
HHM 8200ZX-R20	●	20.0	40	106	20	2.0
HHM 8250ZX-R10	●	25.0	50	120	25	1.0
HHM 8250ZX-R15	●	25.0	50	120	25	1.5
HHM 8250ZX-R20	●	25.0	50	120	25	2.0

Grade : ACZ10M

- HHM-ZX corner radius type
- Enhanced cutting edge promotes easy shoulder milling with corner radius and good surface finish.

■ Application

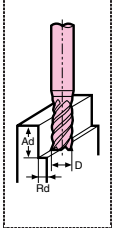
Hardness HRC	20	30	40	50	60
Application			Finish~Light		

Dia.	R0.3	R0.5	R1.0	R1.5	R2.0
φ 6	●	●	●		
φ 8	●	●	●		
φ 10		●	●	●	●
φ 12		●	●	●	●
φ 16			●	●	●
φ 20			●	●	●
φ 25			●	●	●

Recommended Conditions (Shoulder processing)

Ad=1.5 × øD
Rd=0.025(56～65HRC)～0.2(Below25HRC) × øD

øD		Material: Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron (Below 65HRC)	Stainless steel, Ti-alloy etc.
6.0 ~ 12.0	V	200-**250**-300	100-**150**-200	80-**100**-120	100-**120**-150
	f	0.082 ~ 0.120	0.050 ~ 0.090	0.020 ~ 0.038	0.080 ~ 0.220
16.0 ~ 25.0	V	200-**250**-300	100-**150**-200	80-**100**-120	100-**120**-150
	f	0.120 ~ 0.130	0.090 ~ 0.100	0.038 ~ 0.050	0.250 ~ 0.350

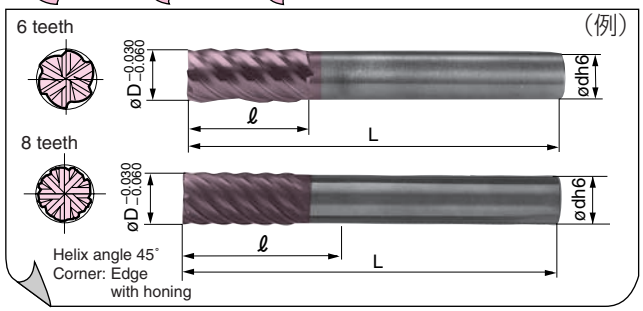


V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

ZX Coated HARD Endmills (With Relief Shank)

HHMR 4000ZX/6000ZX/8000ZX Type

4 6 8 teeth



■ 4 teeth

(mm)

Cat. No.	Stock	øD	ℓ	L	ød
HHMR 4040ZX		4.0	8	50	3
HHMR 4050ZX		5.0	10	60	4

■ 6 teeth

HHMR 6070ZX	▲	7.0	14	80	6
HHMR 6090ZX	▲	9.0	18	90	8
HHMR 6110ZX	▲	11.0	22	100	10
HHMR 6130ZX	▲	13.0	26	110	12

■ 8 teeth

HHMR 8170ZX	▲	17.0	34	120	16
HHMR 8210ZX		21.0	42	130	20
HHMR 8300ZX		30.0	60	160	25
HHMR 8320ZX		32.0	64	165	25

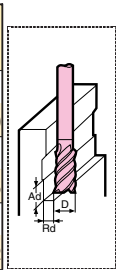
Grade : ACZ10M

- HHM-ZX series with relief shank type
- Strong cutting edge (Core diameter: 0.85xD)
- Excellent for deep shoulder milling

Recommended Conditions (Shoulder processing)

Ad=1.5 × øD
Rd=0.025(56～65HRC)～0.2(Below 25HRC) × øD

øD		Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron (Below 65HRC)	Stainless steel, Ti-alloy etc.
4.0 ~ 5.0	V	200-**250**-300	100-**150**-200	80-**100**-120	100-**120**-150
	f	0.030 ~ 0.060	0.022 ~ 0.037	0.007 ~ 0.015	0.030 ~ 0.060
6.0 ~ 12.0	V	200-**250**-300	100-**150**-200	80-**100**-120	100-**120**-150
	f	0.061 ~ 0.090	0.037 ~ 0.067	0.015 ~ 0.028	0.060 ~ 0.165
16.0 ~ 32.0	V	200-**250**-300	100-**150**-200	80-**100**-120	100-**120**-150
	f	0.090 ~ 0.098	0.067 ~ 0.075	0.028 ~ 0.038	0.187 ~ 0.262



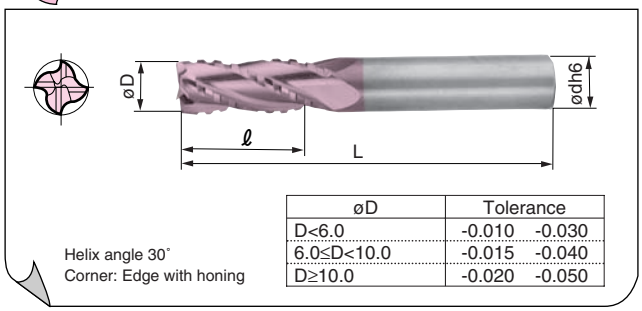
V=m/min f=mm/t

For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

ZX Coated Roughing Endmills

RSM 4000 ZX Type

4 teeth



øD	Tolerance	
D<6.0	-0.010	-0.030
6.0≤D<10.0	-0.015	-0.040
D≥10.0	-0.020	-0.050

■ Endmills

(mm)

Cat. No.	Stock	øD	ℓ	L	ød
RSM 4060ZX	●	6.0	18	55	6
RSM 4080ZX	●	8.0	25	65	8
RSM 4100ZX	●	10.0	30	75	10
RSM 4120ZX	●	12.0	30	80	12
RSM 4140ZX	●	14.0	40	95	16
RSM 4150ZX	●	15.0	40	95	16
RSM 4160ZX	●	16.0	50	105	16
RSM 4180ZX	●	18.0	50	115	20
RSM 4200ZX	●	20.0	55	120	20
RSM 4250ZX	●	25.0	65	140	25

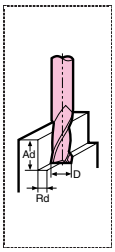
Grade : ACZ50

- Cutting edge with nicked design provides high efficiency milling with good chip control
- Anti-chattering design with low cutting force

Recommended Conditions (Shoulder processing)

Ad=1.5 × øD
Rd=0.025 (56~65HRC)~0.2 (Below HRC25) × øD

øD		Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 40HRC)	Stainless steel, Ti-alloy etc.
6 ~ 14	V	200-**250**-300	150-**200**-250	100-**120**-150
	f	0.010 ~ 0.030	0.005 ~ 0.025	0.030 ~ 0.050
15 ~ 25	V	200-**250**-300	150-**200**-250	100-**120**-150
	f	0.030 ~ 0.050	0.020 ~ 0.040	0.060 ~ 0.080

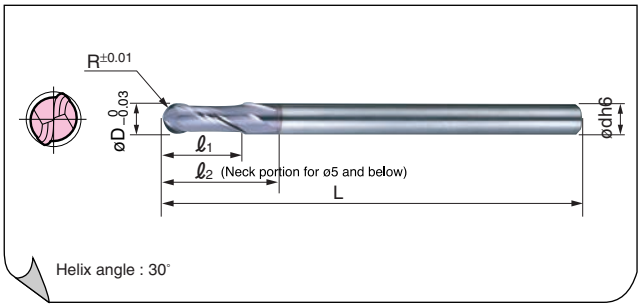


V=m/min f=mm/t

▲mark : To be replaced by new item (Please confirm stock availability)

GLB 2000SF Type

2 teeth



Helix angle : 30°

■ Endmills

(mm)

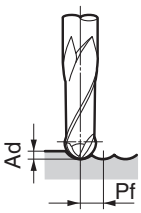
Cat. No.	Stock	R	øD	ℓ1	ℓ2	L	ød
GLB 2010SF	●	0.5	1.0	1.5	2	50	4
GLB 2015SF	●	0.75	1.5	2.5	3	50	4
GLB 2020SF	●	1.0	2.0	3	4	60	6
GLB 2025SF	●	1.25	2.5	4	5	60	6
GLB 2030SF	●	1.5	3.0	4.5	6	60	6
GLB 2040SF	●	2.0	4.0	6	8	70	6
GLB 2050SF	●	2.5	5.0	7.5	10	80	6
GLB 2060SF	●	3.0	6.0	9	–	80	6
GLB 2080SF	●	4.0	8.0	12	–	90	8
GLB 2100SF	●	5.0	10.0	15	–	100	10
GLB 2120SF	●	6.0	12.0	21	–	110	12

Grade : ACZ20W

Recommended Conditions

(1) If cutting noise and vibration are present, please reduce the cutting conditions accordingly.

(2) If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available



● General Purpose Machines

Work / Conditions / Endmill	Structural Steel, Carbon Steel, Cast Iron SS, SC, FC (150～250HB)		Alloy Steel, Pre-hardened Steel SCM, NAK, HPM (25～35HRC)		Tampered Steel, Hardened Steel (35～45HRC)		Hardened Steel (45～55HRC)		Stainless Steel SUS304, SUS316		Heat Resistive Steel, Ti-alloy	
Radius (mm)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)
1	19,100	770	12,800	370	10,200	270	8,900	190	8,900	210	6,400	120
2	10,800	1,100	7,200	550	5,700	400	5,000	280	5,000	310	3,600	180
3	7,700	1,300	5,200	660	4,100	480	3,600	330	3,600	380	2,600	210
4	6,000	1,400	4,000	700	3,200	510	2,800	360	2,800	400	2,000	230
5	4,800	1,400	3,200	700	2,600	520	2,300	370	2,300	410	1,600	230
6	4,000	1,400	2,700	710	2,200	530	1,900	370	1,900	410	1,400	240
Depth of Cut Ad	0.1D		0.1D		0.05D		0.05D		0.1D		0.05D	
Depth of Cut Pf	0.2D		0.2D		0.1D		0.1D		0.2D		0.1D	

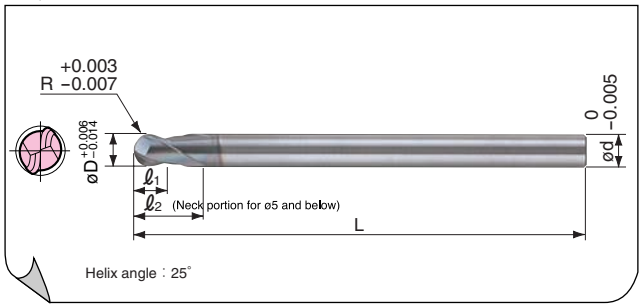
● High Speed Machining Center

Work / Conditions / Endmill	Structural Steel, Carbon Steel, Cast Iron SS, SC, FC(150~250HB)		Alloy Steel, Pre-hardened Steel SCM, NAK, HPM (25～35HRC)		Tampered Steel, Hardened Steel (35～45HRC)		Hardened Steel (45～55HRC)		Stainless Steel SUS304, SUS316	
Radius (mm)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)
1	51,000	2,100	39,800	1,300	35,700	960	23,700	640	35,700	960
2	25,500	2,700	19,900	1,700	17,900	1,300	11,900	830	17,900	1,300
3	17,000	3,000	13,300	1,900	11,900	1,400	7,900	920	11,900	1,400
4	12,800	3,100	10,000	2,000	9,000	1,500	6,000	960	9,000	1,500
5	10,200	3,100	8,000	2,000	7,200	1,500	4,800	960	7,200	1,500
6	8,500	3,100	6,700	2,000	6,000	1,500	4,000	960	6,000	1,500
Depth of Cut Ad	0.05D		0.05D		0.05D		0.02D		0.05D	
Depth of Cut Pf	0.1D		0.1D		0.1D		0.05D		0.1D	

GSBH 20000SF Type

2 teeth

New



■ Endmills

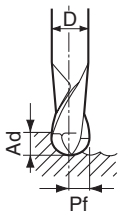
(mm)

Cat. No.	Stock	R	øD	ℓ1	ℓ2	L	ød
GSBH 20020SF	●	0.2	0.4	0.4	0.6	50	4
GSBH 20030SF	●	0.3	0.6	0.6	0.9	50	4
GSBH 20050SF	●	0.5	1.0	1.0	1.5	50	4
GSBH 20075SF	●	0.75	1.5	1.5	2.3	50	4
GSBH 20100SF	●	1.0	2.0	2.0	3.0	60	6
GSBH 20125SF	●	1.25	2.5	2.5	3.8	60	6
GSBH 20150SF	●	1.5	3.0	3.0	4.5	60	6
GSBH 20200SF	●	2.0	4.0	4.0	6.0	70	6
GSBH 20250SF	●	2.5	5.0	5.0	7.5	80	6
GSBH 20300SF	●	3.0	6.0	6.0	–	80	6
GSBH 20400SF	●	4.0	8.0	8.0	–	90	8
GSBH 20500SF	●	5.0	10.0	10.0	–	100	10
GSBH 20600SF	●	6.0	12.0	12.0	–	110	12

Grade : ACF07D

Recommended Conditions

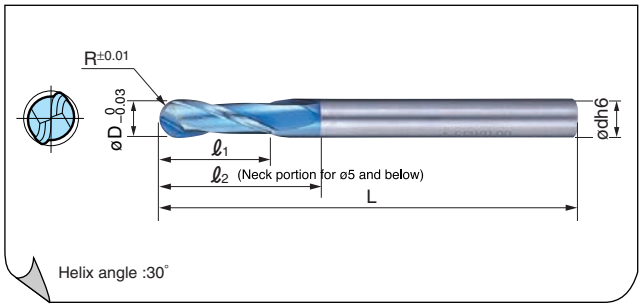
(1) When depth-of-cut is lowered, feedrate can be increased further.
(2) If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available
(3) If cutting noise and vibration are present, please reduce the cutting conditions accordingly.



Work / Conditions / Endmill Radius (mm)		Middle Hardened Steel Pre-hardened Steel,Die Steel (40～50HRC) S/Speed (min⁻¹)	Feedrate (mm/min)	Hardened Steel SKD61 (50～55HRC) S/Speed (min⁻¹)	Feedrate (mm/min)	Hardened Steel SKD11 (55～60HRC) S/Speed (min⁻¹)	Feedrate (mm/min)	Hardened Steel SKH55 (60～65HRC) S/Speed (min⁻¹)	Feedrate (mm/min)
R0.2		50,000	500	50,000	500	50,000	500	50,000	500
R0.3		50,000	800	50,000	800	50,000	800	50,000	700
R0.5		50,000	1,400	50,000	1,400	50,000	1,300	42,000	1,000
R0.75		50,000	2,000	50,000	2,000	37,300	1,400	28,000	1,000
R1		38,100	2,100	38,100	2,100	28,000	1,400	21,000	1,000
R1.25		30,500	2,100	30,500	2,100	22,400	1,400	16,800	1,000
R1.5		25,400	2,100	25,400	2,100	18,700	1,400	14,000	1,000
R2		19,100	2,100	19,100	2,100	14,000	1,400	10,500	1,000
R2.5		15,300	2,100	15,300	2,100	11,200	1,400	8,400	1,000
R3		12,700	2,100	12,700	2,100	9,300	1,400	7,000	1,000
R4		9,500	2,100	9,500	2,100	7,000	1,400	5,300	1,000
R5		7,600	2,100	7,600	2,100	5,600	1,400	4,200	1,000
R6		6,400	2,100	6,400	2,100	4,700	1,400	3,500	1,000
Depth of Cut	Ad	0.08D				0.05D			
	Pf	0.25D				0.15D			

SNB 2000DL Type

2 teeth



Helix angle :30°

■ Endmills

(mm)

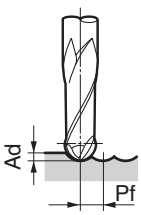
Cat. No.	Stock	R	øD	ℓ1	ℓ2	L	ød
SNB 2020DL	●	1.0	2.0	3	5	60	6
SNB 2030DL	●	1.5	3.0	4.5	8	80	6
SNB 2040DL	●	2.0	4.0	6	12	80	6
SNB 2050DL	●	2.5	5.0	7.5	14	90	6
SNB 2060DL	●	3.0	6.0	9	–	100	6
SNB 2080DL	●	4.0	8.0	12	–	100	8
SNB 2100DL	●	5.0	10.0	15	–	120	10
SNB 2120DL	●	6.0	12.0	18	–	120	12
SNB 2160DL	●	8.0	16.0	24	–	160	16

Grade : DL1200

Recommended Conditions

(1) If cutting noise and vibration are present, please reduce the cutting conditions accordingly.

(2) If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available

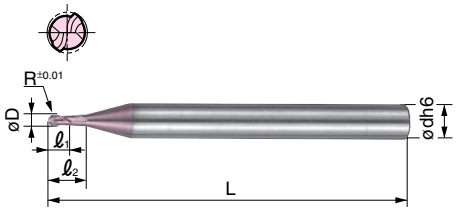


Work		Aluminum alloy			
Radius (mm)		Wet (Emulsion)		Dry	
		S/Speed (min⁻¹)	Feedrate (mm/min)	S/Speed (min⁻¹)	Feedrate (mm/min)
2		48,000	1,500	48,000	1,000
3		38,000	2,100	38,000	1,500
4		31,000	2,800	31,000	2,000
5		24,000	2,800	24,000	2,000
6		20,000	2,800	20,000	2,000
8		15,000	2,800	15,000	2,000
10		13,000	3,000	13,000	2,100
12		10,000	3,000	10,000	2,100
16		7,700	3,000	7,700	2,100
Depth of Cut	Ad	0.1D		0.1D	
	Pf	0.2D		0.2D	

ZX Coated Neo Ball

S-SNB 2000ZX Type

2 teeth



Helix angle : 30°

ϕ D	Tolerance
3.0～20.0	0～−0.03
20.0<D	0～−0.04

■ Endmills

(mm)

Cat. No.	Stock	R	øD	ℓ1	ℓ2	L	ød
S-SNB 2030ZX	▲	1.5	3.0	4.5	6	50	6
S-SNB 2040ZX	▲	2.0	4.0	6.0	8	50	6
S-SNB 2050ZX	▲	2.5	5.0	7.5	10	50	6
S-SNB 2060ZX	▲	3.0	6.0	9.0	–	60	6
S-SNB 2070ZX	▲	3.5	7.0	11.0	14	60	8
S-SNB 2080ZX	▲	4.0	8.0	12.0	–	60	8
S-SNB 2100ZX	▲	5.0	10.0	15.0	–	80	10
S-SNB 2120ZX	▲	6.0	12.0	18.0	–	80	12
S-SNB 2140ZX	▲	7.0	14.0	21.0	28	100	16
S-SNB 2160ZX	▲	8.0	16.0	24.0	–	100	16
S-SNB 2180ZX	▲	9.0	18.0	27.0	36	120	20
S-SNB 2200ZX	▲	10.0	20.0	30.0	–	120	20
S-SNB 2250ZX	▲	12.5	25.0	38.0	–	150	25
S-SNB 2300ZX	▲	15.0	30.0	45.0	60	150	32

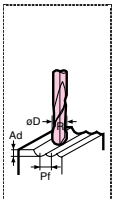
Grade : ACZ10M

- SNB-ZX series short type
- Excellent for high precision and high efficiency

Recommended Conditions

Ad=0.3 × øD (Below R1.0: 0.2 × øD)
Pf=0.7 × øD (Below R1.0: 0.6 × øD)

Material / Radius		Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron	Stainless steel, Ti-alloy etc.
R1.5 ~ R2.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.010 ~ 0.019	0.005 ~ 0.010	0.013 ~ 0.031	0.005 ~ 0.010
R3.0 ~ R6.4	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.022 ~ 0.037	0.013 ~ 0.025	0.042 ~ 0.102	0.013 ~ 0.025
R6.5 ~ R9.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.052 ~ 0.075	0.030 ~ 0.043	0.125 ~ 0.178	0.030 ~ 0.043
R10.0 ~ R15.0	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.088 ~ 0.125	0.064 ~ 0.071	0.187 ~ 0.262	0.064 ~ 0.071

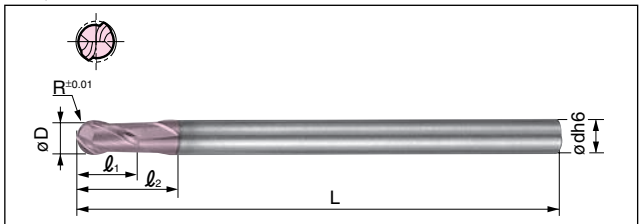


V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

ZX Coated Neo Ball

SNB 2000ZX Type

2 teeth



Helix angle : 30°

ϕ D	Tolerance
1.0～16.0	0～−0.03
16.0<D	0～−0.04

■ Endmills

(mm)

Cat. No.	Stock	R	øD	ℓ1	ℓ2	L	ød
SNB 2010ZX	●	0.5	1.0	1.5	3	50	4
SNB 2020ZX	●	1.0	2.0	3.0	5	60	6
SNB 2030ZX	●	1.5	3.0	4.5	8	80	6
SNB 2040ZX	●	2.0	4.0	6.0	12	80	6
SNB 2050ZX	●	2.5	5.0	7.5	14	90	6
SNB 2060ZX	●	3.0	6.0	9.0	–	100	6
SNB 2070ZX	●	3.5	7.0	11.0	20	100	8
SNB 2080ZX	●	4.0	8.0	12.0	–	100	8
SNB 2100ZX	●	5.0	10.0	15.0	–	120	10
SNB 2120ZX	●	6.0	12.0	18.0	–	120	12
SNB 2140ZX	●	7.0	14.0	21.0	38	160	16
SNB 2160ZX	●	8.0	16.0	24.0	–	160	16
SNB 2180ZX	●	9.0	18.0	27.0	50	180	20
SNB 2200ZX	●	10.0	20.0	30.0	–	180	20
SNB 2250ZX	●	12.5	25.0	38.0	–	200	25
SNB 2300ZX	●	15.0	30.0	45.0	80	200	32

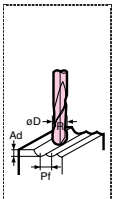
Grade : ACZ10M

- Neo Ball endmill series standard type
- Excellent for high precision and high efficiency

Recommended Conditions

Ad=0.3 × øD (Below R1.0: 0.2 × øD)
Pf=0.7 × øD (Below R1.0: 0.6 × øD)

Material / Radius		Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron	Stainless steel, Ti-alloy etc.
R0.5 ~ R1.4	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.005 ~ 0.010	0.003 ~ 0.005	0.008 ~ 0.015	0.003 ~ 0.005
R1.5 ~ R2.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.013 ~ 0.025	0.007 ~ 0.013	0.017 ~ 0.042	0.007 ~ 0.013
R3.0 ~ R6.4	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.030 ~ 0.050	0.017 ~ 0.033	0.056 ~ 0.136	0.017 ~ 0.033
R6.5 ~ R9.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.070 ~ 0.100	0.040 ~ 0.057	0.167 ~ 0.238	0.040 ~ 0.057
R10.0 ~ R15.0	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.118 ~ 0.167	0.085 ~ 0.095	0.250 ~ 0.350	0.085 ~ 0.095

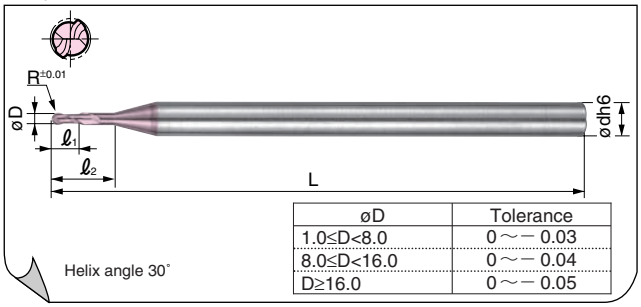


V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

▲mark : To be replaced by new item (Please confirm stock availability)

ZX Coated Neo Ball Long Endmills
LSNB 2000 ZX Type

2 teeth



øD	Tolerance
1.0≤D<8.0	0 ～ − 0.03
8.0≤D<16.0	0 ～ − 0.04
D≥16.0	0 ～ − 0.05

Helix angle 30°

■ Endmills (mm)

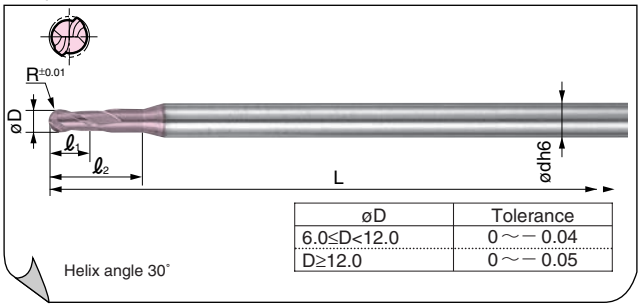
Cat. No.	Stock	R	øD	ℓ1	ℓ2	L	ød
LSNB 2010ZX	●	0.5	1.0	1.5	6	80	4
LSNB 2020ZX	●	1.0	2.0	3.0	10	90	6
LSNB 2030ZX	●	1.5	3.0	4.5	12	120	6
LSNB 2040ZX	●	2.0	4.0	6.0	15	120	6
LSNB 2050ZX	●	2.5	5.0	7.5	20	140	6
LSNB 2060ZX	●	3.0	6.0	9.0	–	160	6
LSNB 2070ZX	●	3.5	7.0	11.0	25	160	8
LSNB 2080ZX	●	4.0	8.0	12.0	–	180	8
LSNB 2100ZX	●	5.0	10.0	15.0	–	200	10
LSNB 2120ZX	●	6.0	12.0	18.0	–	200	12
LSNB 2140ZX	●	7.0	14.0	21.0	50	230	16
LSNB 2160ZX	●	8.0	16.0	24.0	–	230	16
LSNB 2180ZX	●	9.0	18.0	27.0	65	230	20
LSNB 2200ZX	●	10.0	20.0	30.0	–	230	20
LSNB 2250ZX	●	12.5	25.0	38.0	–	230	25
LSNB 2300ZX	●	15.0	30.0	45.0	100	230	32

Grade : ACZ10M

- SNB-ZX series long type
- Excellent for high precision and high efficiency finishing of molds
- Excellent for finishing of shoulders with corner radius

ZX Coated Neo Ball Extra Long Endmills
ESNB 2000 ZX Type

2 teeth



øD	Tolerance
6.0≤D<12.0	0 ～ − 0.04
D≥12.0	0 ～ − 0.05

Helix angle 30°

■ Endmills (mm)

Cat. No.	Stock	R	øD	ℓ1	ℓ2	L	ød
ESNB 2060ZX	▲	3.0	6.0	9.0	–	250	6
ESNB 2080ZX	▲	4.0	8.0	12.0	–	250	8
ESNB 2100ZX	▲	5.0	10.0	15.0	–	250	10
ESNB 2120ZX	▲	6.0	12.0	18.0	–	250	12
ESNB 2160ZX	▲	8.0	16.0	24.0	–	280	16
ESNB 2200ZX	▲	10.0	20.0	30.0	–	280	20
ESNB 2250ZX	▲	12.5	25.0	38.0	–	280	25
ESNB 2300ZX	▲	15.0	30.0	45.0	130	280	32

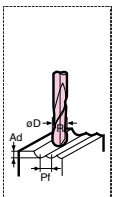
Grade : ACZ10M

- SNB-ZX series extra long type
- Excellent for high precision and high efficiency finishing of molds
- Excellent for processing deep molds for automotive components

Recommended Conditions

Ad = 0.3 × øD (Below R1.0: 0.2 × øD)
Pf = 0.7 × øD (Below R1.0: 0.6 × øD)

Material / Radius		Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron	Stainless steel, Ti-alloy etc.
R0.5 ~ R1.4	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.004 ~ 0.008	0.002 ~ 0.004	0.006 ~ 0.012	0.002 ~ 0.004
R1.5 ~ R2.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.010 ~ 0.019	0.005 ~ 0.010	0.013 ~ 0.031	0.005 ~ 0.010
R3.0 ~ R6.4	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.022 ~ 0.037	0.013 ~ 0.025	0.042 ~ 0.102	0.013 ~ 0.025
R6.5 ~ R9.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.052 ~ 0.075	0.030 ~ 0.043	0.125 ~ 0.178	0.030 ~ 0.043
R10.0 ~ R15.0	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.088 ~ 0.125	0.064 ~ 0.071	0.187 ~ 0.262	0.064 ~ 0.071

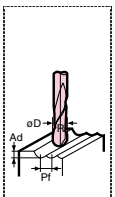


V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

Recommended Conditions

Ad = 0.3 × øD (BelowR1.0: 0.2 × øD)
Pf = 0.7 × øD (Below R1.0: 0.6 × øD)

Material / Radius		Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron	Stainless steel, Ti-alloy etc.
R3.0 ~ R6.4	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.02 ~ 0.03	0.01 ~ 0.02	0.035 ~ 0.08	0.01 ~ 0.02
R6.5 ~ R9.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.048 ~ 0.064	0.024 ~ 0.048	0.104 ~ 0.144	0.028 ~ 0.036
R10.0 ~ R15.0	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.072 ~ 0.104	0.056 ~ 0.072	0.144 ~ 0.224	0.054 ~ 0.061

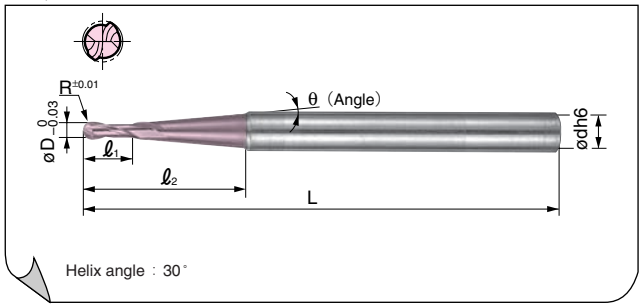


V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

▲mark : To be replaced by new item (Please confirm stock availability)

ZX Coated Neo Ball Pencil Neck Endmills
PSNB 2000ZX Type

2 teeth



Helix angle : 30°

■ Endmills (mm)

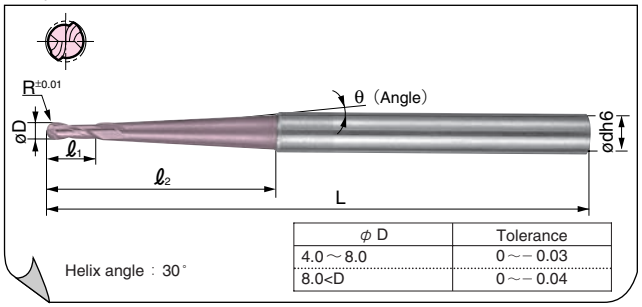
Cat. No.	Stock	R	øD	ℓ1	ℓ2	θ	L	ød
PSNB 2010ZX-15	●	0.5	1.0	2.5	20	1°30'	70	6
PSNB 2010ZX-30	●	0.5	1.0	2.5	40	3°	80	6
PSNB 2010ZX-50	●	0.5	1.0	2.5	20	5°	60	6
PSNB 2020ZX-15	●	1.0	2.0	5.0	20	1°30'	70	6
PSNB 2020ZX-30	●	1.0	2.0	5.0	40	3°	80	6
PSNB 2020ZX-50	●	1.0	2.0	5.0	20	5°	60	6
PSNB 2030ZX-15	●	1.5	3.0	8.0	50	1°30'	90	6
PSNB 2030ZX-30	●	1.5	3.0	8.0	30	3°	70	6
PSNB 2040ZX-15	●	2.0	4.0	8.0	48	1°30'	90	6
PSNB 2040ZX-30	●	2.0	4.0	8.0	28	3°	70	6
PSNB 2050ZX-15	●	2.5	5.0	10.0	60	1°30'	110	8
PSNB 2050ZX-30	●	2.5	5.0	10.0	40	3°	90	8
PSNB 2060ZX-15	●	3.0	6.0	12.0	52	1°30'	110	8
PSNB 2060ZX-30	●	3.0	6.0	12.0	33.5	3°	90	8
PSNB 2080ZX-15	●	4.0	8.0	14.0	54.5	1°30'	120	10
PSNB 2080ZX-30	●	4.0	8.0	14.0	35.5	3°	100	10
PSNB 2100ZX-15	●	5.0	10.0	18.0	58.5	1°30'	130	12
PSNB 2100ZX-30	●	5.0	10.0	18.0	39.5	3°	110	12
PSNB 2120ZX-15	●	6.0	12.0	22.0	80	1°30'	160	16
PSNB 2120ZX-30	●	6.0	12.0	22.0	60	3°	140	16

Grade : ACZ10M

- SNB-ZX series pencil neck type
- Excellent for high precision and high efficiency finishing of molds
- 3 different types of angles to select for mold processing

ZX Coated Neo Ball Pencil Neck Long Endmills
PLSNB 2000ZX Type

2 teeth



Helix angle : 30°

φ D	Tolerance
4.0～8.0	0～－0.03
8.0<D	0～－0.04

■ Endmills (mm)

Cat. No.	Stock	R	øD	ℓ1	ℓ2	θ	L	ød
PLSNB 2040ZX-15	▲	2.0	4.0	8.0	100	1°30'	200	10
PLSNB 2060ZX-15	▲	3.0	6.0	12.0	120	1°30'	200	12
PLSNB 2080ZX-15	▲	4.0	8.0	14.0	100	1°30'	200	12
PLSNB 2100ZX-15	▲	5.0	10.0	18.0	140	1°30'	250	16
PLSNB 2120ZX-15	▲	6.0	12.0	22.0	110	1°30'	250	16

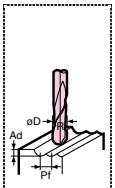
Grade : ACZ10M

- SNB-ZX series long pencil neck type
- Excellent for high precision and high efficiency finishing of molds
- Excellent for processing deep molds for automotive components

Recommended Conditions

Ad=0.3 × øD (Below R1.0: 0.2 × øD)
Pf=0.7 × øD (Below R1.0: 0.6 × øD)

Radius \ Material		Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron	Stainless steel, Ti-alloy etc.
R0.5 ~ R1.4	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.005 ~ 0.010	0.003 ~ 0.005	0.008 ~ 0.015	0.003 ~ 0.005
R1.5 ~ R2.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.013 ~ 0.025	0.007 ~ 0.013	0.017 ~ 0.042	0.007 ~ 0.013
R3.0 ~ R6.0	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.030 ~ 0.050	0.017 ~ 0.033	0.056 ~ 0.136	0.017 ~ 0.033

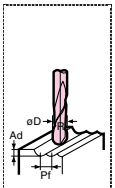


V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

Recommended Conditions

Ad=0.3 × øD (Below R1.0: 0.2 × øD)
Pf=0.7 × øD (Below R1.0: 0.6 × øD)

Radius \ Material		Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron	Stainless steel, Ti-alloy etc.
R2.0 ~ R2.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.01 ~ 0.02	0.006 ~ 0.01	0.013 ~ 0.03	0.006 ~ 0.01
R3.0 ~ R6.0	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.025 ~ 0.04	0.013 ~ 0.025	0.045 ~ 0.10	0.013 ~ 0.025



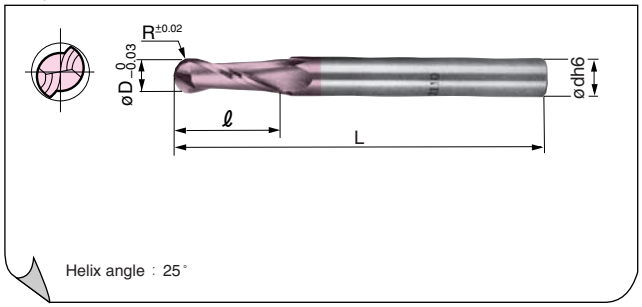
V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

▲mark : To be replaced by new item (Please confirm stock availability)

ZX Coated Short Flute Ball Endmills

S-SSB 2000ZX Type

2 teeth



■ Endmills (mm)

Cat. No.	Stock	R	øD	ℓ	L	ød
S-SSB 2030ZX	▲	1.5	3.0	4.5	60	4
S-SSB 2040ZX	▲	2.0	4.0	6.0	70	4
S-SSB 2050ZX	▲	2.5	5.0	7.0	80	6
S-SSB 2060ZX	▲	3.0	6.0	8.0	80	6
S-SSB 2070ZX	▲	3.5	7.0	10.0	90	8
S-SSB 2080ZX	▲	4.0	8.0	12.0	90	8

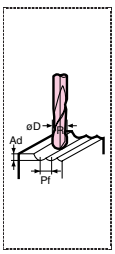
Grade : ACZ50

- SSB-ZX series short type
- High rigidity endmill for high efficiency machining

Recommended Conditions

Ad=0.3 × øD (Below R1.0: 0.2 × øD)
Pf=0.7 × øD (Below R1.0: 0.6 × øD)

Radius \ Material		Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron	Stainless steel, Ti-alloy etc.
R1.5 ~ R2.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.013 ~ 0.025	0.007 ~ 0.013	0.017 ~ 0.042	0.007 ~ 0.013
R3.0 ~ R4.0	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.030 ~ 0.050	0.017 ~ 0.033	0.056 ~ 0.136	0.017 ~ 0.033

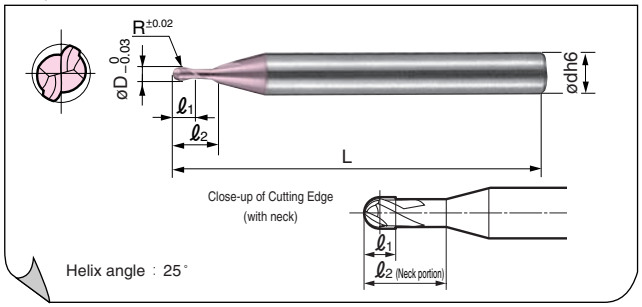


V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

ZX Coated Small Diameter Precision Ball Endmills

SSBS 2000ZX Type

2 teeth



■ Endmills (mm)

Cat. No.	Stock	R	øD	ℓ1	ℓ2	L	ød
SSBS 2004ZX	▲	0.2	0.4	0.4	1.0	50	6
SSBS 2006ZX	▲	0.3	0.6	0.6	1.5	50	6
SSBS 2008ZX	▲	0.4	0.8	0.8	2.0	50	6
SSBS 2010ZX	▲	0.5	1.0	1.0	2.5	50	6
SSBS 2012ZX	▲	0.6	1.2	1.2	3.0	50	6
SSBS 2015ZX	▲	0.75	1.5	1.5	4.0	50	6
SSBS 2020ZX	▲	1.0	2.0	2.0	5.0	50	6
SSBS 2025ZX	▲	1.25	2.5	2.5	6.5	50	6
SSBS 2030ZX	▲	1.5	3.0	3.0	7.5	60	6
SSBS 2040ZX	▲	2.0	4.0	4.0	10.0	60	6
SSBS 2050ZX	▲	2.5	5.0	5.0	12.5	70	6
SSBS 2060ZX	▲	3.0	6.0	6.0	15.0	70	6

Grade : ACZ50

- SSB-ZX series high precision small diameter type
- Improved clamping force with ø6 shank
- High rigidity endmill for precision machining

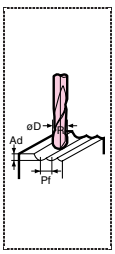
■ Application

Hardness HRC	20	30	40	50	60
Application	Finish~Light				

Recommended Conditions

Ad=0.3 × øD (Below R1.0: 0.2 × øD)
Pf=0.7 × øD (Below R1.0: 0.6 × øD)

Radius \ Material		Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron	Stainless steel, Ti-alloy etc.
~ R0.4	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.002 ~ 0.004	0.001 ~ 0.002	0.004 ~ 0.008	0.001 ~ 0.002
R0.5 ~ R1.4	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.005 ~ 0.010	0.003 ~ 0.005	0.008 ~ 0.015	0.003 ~ 0.005
R1.5 ~ R2.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.013 ~ 0.025	0.007 ~ 0.013	0.017 ~ 0.042	0.007 ~ 0.013
R3.0 ~	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.030 ~ 0.050	0.017 ~ 0.033	0.056 ~ 0.136	0.017 ~ 0.033

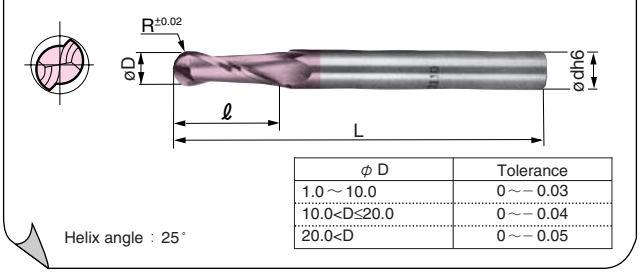


V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

▲mark : To be replaced by new item (Please confirm stock availability)

ZX Coated Ball Endmills
SSB 2000ZX Type

2 teeth



φ D	Tolerance
1.0～10.0	0～−0.03
10.0<D≤20.0	0～−0.04
20.0<D	0～−0.05

Helix angle : 25°

■ Endmills (mm)

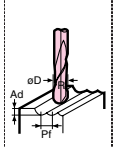
Cat. No.	Stock	R	øD	ℓ	L	ød
SSB 2010ZX	●	0.5	1.0	3	50	4
SSB 2020ZX	●	1.0	2.0	6	50	4
SSB 2030ZX	●	1.5	3.0	9	60	6
SSB 2040ZX	●	2.0	4.0	12	70	6
SSB 2050ZX	●	2.5	5.0	15	80	6
SSB 2060ZX	●	3.0	6.0	15	80	6
SSB 2070ZX	●	3.5	7.0	20	90	8
SSB 2080ZX	●	4.0	8.0	20	90	8
SSB 2090ZX	●	4.5	9.0	25	100	10
SSB 2100ZX	●	5.0	10.0	25	100	10
SSB 2110ZX	●	5.5	11.0	30	110	12
SSB 2120ZX	●	6.0	12.0	30	110	12
SSB 2130ZX	●	6.5	13.0	35	120	16
SSB 2140ZX	●	7.0	14.0	35	120	16
SSB 2150ZX	●	7.5	15.0	40	120	16
SSB 2160ZX	●	8.0	16.0	40	120	16
SSB 2180ZX	●	9.0	18.0	40	130	20
SSB 2200ZX	●	10.0	20.0	45	130	20
SSB 2250ZX	●	12.5	25.0	55	140	25

Grade : ACZ50

Recommended Conditions

Ad=0.3 × øD (Below R1.0: 0.2 × øD)
Pf=0.7 × øD (Below R1.0: 0.6 × øD)

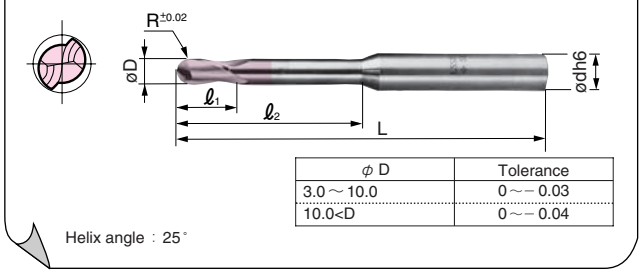
Radius \ Material		Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron	Stainless steel, Ti-alloy etc.
R0.5 ~ R1.4	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.005 ~ 0.010	0.003 ~ 0.005	0.008 ~ 0.015	0.003 ~ 0.005
R1.5 ~ R2.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.013 ~ 0.025	0.007 ~ 0.013	0.017 ~ 0.042	0.007 ~ 0.013
R3.0 ~ R6.4	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.030 ~ 0.050	0.017 ~ 0.033	0.056 ~ 0.136	0.017 ~ 0.033
R6.5 ~ R9.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.070 ~ 0.100	0.040 ~ 0.057	0.167 ~ 0.238	0.040 ~ 0.057
R10.0 ~ R12.5	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.118 ~ 0.167	0.085 ~ 0.095	0.250 ~ 0.350	0.085 ~ 0.095



V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

ZX Coated Ball Long Endmills
LSSB 2000ZX Type

2 teeth



φ D	Tolerance
3.0～10.0	0～−0.03
10.0<D	0～−0.04

Helix angle : 25°

■ Endmills (mm)

Cat. No.	Stock	R	øD	ℓ1	ℓ2	L	ød
LSSB 2030ZX	▲	1.5	3.0	4	35	100	6
LSSB 2040ZX	▲	2.0	4.0	6	35	100	6
LSSB 2050ZX	▲	2.5	5.0	7	40	115	8
LSSB 2060ZX	▲	3.0	6.0	8	45	115	8
LSSB 2070ZX	▲	3.5	7.0	10	45	125	10
LSSB 2080ZX	▲	4.0	8.0	12	55	125	10
LSSB 2090ZX	▲	4.5	9.0	15	65	140	12
LSSB 2100ZX	▲	5.0	10.0	15	65	140	12
LSSB 2120ZX	▲	6.0	12.0	28	75	150	16
LSSB 2140ZX	▲	7.0	14.0	32	75	155	16
LSSB 2160ZX	▲	8.0	16.0	36	–	155	16
LSSB 2180ZX	▲	9.0	18.0	40	75	155	20
LSSB 2200ZX	▲	10.0	20.0	46	–	160	20
LSSB 2250ZX	▲	12.5	25.0	55	–	170	25

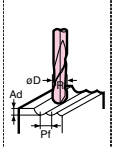
Grade : ACZ50

● SSB-ZX series long shank type

Recommended Conditions

Ad=0.3 × øD (Below R1.0: 0.2 × øD)
Pf=0.7 × øD (Below R1.0: 0.6 × øD)

Radius \ Material		Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron	Stainless steel, Ti-alloy etc.
R1.5 ~ R2.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.010 ~ 0.019	0.005 ~ 0.010	0.013 ~ 0.031	0.005 ~ 0.010
R3.0 ~ R6.49	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.022 ~ 0.037	0.013 ~ 0.025	0.042 ~ 0.102	0.013 ~ 0.025
R6.5 ~ R9.9	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.052 ~ 0.075	0.030 ~ 0.043	0.125 ~ 0.178	0.030 ~ 0.043
R10.0 ~ R12.5	V	200-**250**-300	100-**150**-200	100-**120**-150	60-**75**-90
	f	0.088 ~ 0.125	0.064 ~ 0.071	0.187 ~ 0.262	0.064 ~ 0.071

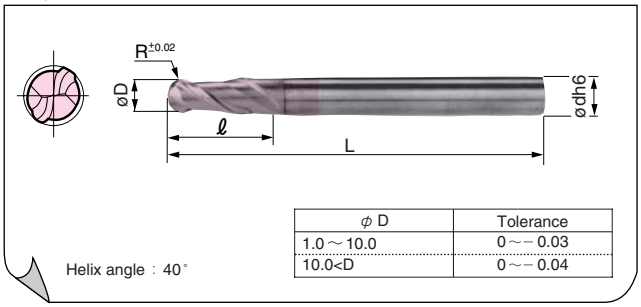


V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

▲mark : To be replaced by new item (Please confirm stock availability)

ZX Coated HARD Ball Endmills
SHB 2000ZX Type

2 teeth



ϕ D	Tolerance
1.0～10.0	0～−0.03
10.0<D	0～−0.04

Helix angle : 40°

■ Endmills (mm)

Cat. No.	Stock	R	øD	ℓ	L	ød
SHB 2010ZX	●	0.5	1.0	3	50	4
SHB 2020ZX	●	1.0	2.0	6	50	4
SHB 2030ZX	●	1.5	3.0	6	60	6
SHB 2040ZX	●	2.0	4.0	8	70	6
SHB 2050ZX	●	2.5	5.0	10	80	6
SHB 2060ZX	●	3.0	6.0	12	80	6
SHB 2080ZX	●	4.0	8.0	16	90	8
SHB 2100ZX	●	5.0	10.0	20	100	10
SHB 2120ZX	●	6.0	12.0	24	110	12
SHB 2140ZX	●	7.0	14.0	28	120	16
SHB 2160ZX	●	8.0	16.0	32	120	16
SHB 2200ZX	●	10.0	20.0	40	130	20

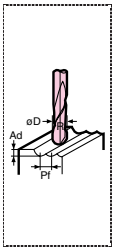
Grade : ACZ50

- Large helix angle promotes low shearing force
- Improved machining precision with large core diameter
- Improved fracture resistance with strengthened chisel edge
- Perform rough and finish copy milling in a single pass

Recommended Conditions

Ad=0.3 × øD (Below R1.0: 0.2 × øD)
Pf=0.7 × øD (Below R1.0: 0.6 × øD)

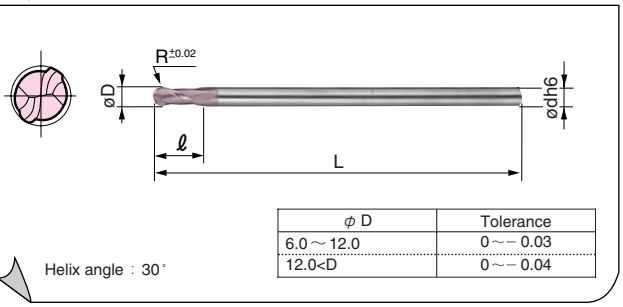
Radius \ Material		Carbon steel, Alloy steel (Below 45HRC)	Hardened Steel (Below 65HRC)	Cast iron	Stainless steel, Ti-alloy etc.
R0.5 ~ R1.49	V	100-**150**-200	80-**100**-120	100-**120**-150	60-**75**-90
	f	0.004 ~ 0.010	0.003 ~ 0.007	0.008 ~ 0.015	0.004 ~ 0.010
R1.5 ~ R2.99	V	100-**150**-200	80-**100**-120	100-**120**-150	60-**75**-90
	f	0.015 ~ 0.026	0.010 ~ 0.020	0.017 ~ 0.042	0.015 ~ 0.026
R3.0 ~ R6.49	V	100-**150**-200	80-**100**-120	100-**120**-150	60-**75**-90
	f	0.030 ~ 0.071	0.025 ~ 0.055	0.056 ~ 0.136	0.030 ~ 0.071
R6.5 ~ R9.99	V	100-**150**-200	80-**100**-120	100-**120**-150	60-**75**-90
	f	0.075 ~ 0.125	0.060 ~ 0.090	0.167 ~ 0.238	0.075 ~ 0.125
R10.0 ~	V	100-**150**-200	80-**100**-120	100-**120**-150	60-**75**-90
	f	0.170 ~ 0.190	0.110 ~ 0.127	0.250 ~ 0.350	0.170 ~ 0.190



V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

ZX Coated HARD Ball Long Endmills
LSHB 2000ZX Type

2 teeth



ϕ D	Tolerance
6.0～12.0	0～−0.03
12.0<D	0～−0.04

Helix angle : 30°

■ Endmills (mm)

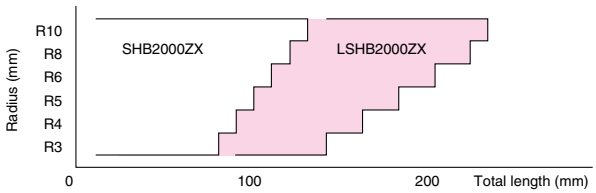
Cat. No.	Stock	R	øD	ℓ	L	ød
LSHB 2060ZX	▲	3.0	6.0	12	140	6
LSHB 2080ZX	▲	4.0	8.0	14	160	8
LSHB 2100ZX	▲	5.0	10.0	18	180	10
LSHB 2120ZX	▲	6.0	12.0	22	200	12
LSHB 2160ZX	▲	8.0	16.0	30	220	16
LSHB 2200ZX	▲	10.0	20.0	38	230	20

Grade : ACZ50

- SHB-ZX series long shank type
- Utilizes the basic SHB-ZX cutting edge profile
- Straight type with similar cutting edge and shank diameters
- Excellent for deep copy milling

■ Application

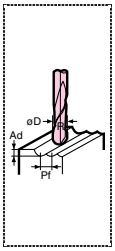
Hardness HRC	20	30	40	50	60
Application			Finish~Light		



Recommended Conditions

Ad=0.3 × øD (Below R1.0: 0.2 × øD)
Pf=0.7 × øD (Below R1.0: 0.6 × øD)

Radius \ Material		Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron	Stainless steel, Ti-alloy etc.
R3.0 ~ R6.49	V	100-**150**-200	80-**100**-120	100-**120**-150	60-**75**-90
	f	0.022 ~ 0.053	0.019 ~ 0.041	0.042 ~ 0.102	0.022 ~ 0.053
R6.5 ~ R9.99	V	100-**150**-200	80-**100**-120	100-**120**-150	60-**75**-90
	f	0.056 ~ 0.094	0.045 ~ 0.067	0.125 ~ 0.178	0.056 ~ 0.094
R10.0 ~	V	100-**150**-200	80-**100**-120	100-**120**-150	60-**75**-90
	f	0.127 ~ 0.142	0.082 ~ 0.095	0.187 ~ 0.262	0.127 ~ 0.142



V=m/min f=mm/t
For small diameter endmills,if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

▲mark : To be replaced by new item (Please confirm stock availability)

New

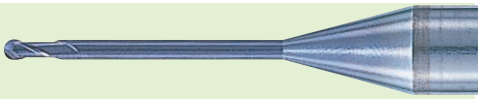
■ Item list

※Colored part ( ) refers to standard stock dimension.

GS MILL Long Neck Ball

→J40～J41

GS MILL Long Neck Ball



●Long Neck Ball GSBN2 type (φ4 Shank series)

R \ Length below neck	0.5	1	1.5	2	2.5	3	4	5	6	7	8	9	10	12	14	16	18	20	22	25	30
0.10	■	■	■	■	■	■															
0.15		■	■	■	■	■															
0.20		■	■	■	■	■	■	■													
0.25			■	■		■	■	■	■		■										
0.30				■		■	■	■	■	■	■		■								
0.40				■		■	■	■	■	■	■		■								
0.50						■	■	■	■	■	■	■	■	■	■	■	■	■			
0.60									■		■		■		■		■				
0.70											■		■		■						
0.75											■		■	■	■	■	■	■			
0.80											■		■		■		■				
0.90											■		■		■		■				
1.00							■		■		■		■	■	■	■	■	■	■	■	■
1.50																					
2.00																					
2.50																					
3.00																					

●Long Neck Ball GSBN2 type (φ6 Shank series)

R \ Length below neck	0.5	1	1.5	2	2.5	3	4	5	6	7	8	9	10	12	14	16	18	20	22	25	30	35	40	45	50
0.10	■	■	■	■																					
0.15		■	■	■																					
0.20		■	■	■	■	■																			
0.25			■	■		■	■	■	■		■														
0.30				■		■	■	■	■		■		■												
0.40				■		■	■	■	■		■		■												
0.50						■	■	■	■		■		■	■	■	■	■	■							
0.60									■		■			■	■		■								
0.70																									
0.75										■		■	■		■		■		■						
0.80																									
0.90																									
1.00									■		■		■	■	■	■	■	■	■	■	■	■	■		
1.50										■				■	■		■		■	■	■	■			
2.00														■	■		■		■	■	■	■	■	■	■
2.50																			■	■	■	■			
3.00																				■					■

GS MILL Long Neck

→J42～J43

GS MILL Long Neck

●Long Neck GSN2 type (2 Flutes)

φD \ Length below neck	0.5	1	1.5	2	3	4	6	8	9	10	12	14	15	16	18	20	24	25	30	35	38	40	45	50	60
0.2	■	■	■																						
0.3		■		■	■		■		■																
0.4				■	■	■		■			■														
0.5				■		■	■	■		■			■												
0.6				■		■	■	■		■	■				■										
0.7				■		■	■	■		■															
0.8						■	■	■		■	■			■			■								
0.9							■	■		■			■												
1.0						■	■	■		■	■			■		■			■	■					
1.2							■	■		■	■			■		■			■						
1.5							■	■		■	■	■		■	■	■			■	■		■			
2.0							■	■		■	■	■		■	■	■			■	■	■	■	■	■	■
2.5								■			■			■		■			■	■		■	■		
3.0								■			■			■		■			■	■		■	■		
4.0											■			■		■			■	■	■	■	■	■	■
5.0														■					■	■	■	■	■	■	■
6.0																■				■		■	■	■	■
8.0																									
10.0																									

●Long Neck GSN4 type (4 Flutes)

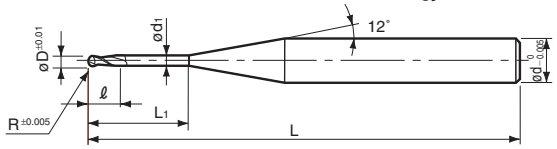
φD \ Length below neck	4	6	8	10	12	14	16	18	20	25	30	35	40	45	50	60	80
0.2																	
0.3																	
0.4																	
0.5																	
0.6																	
0.7																	
0.8																	
0.9																	
1.0	■	■	■	■	■		■										
1.2																	
1.5		■	■	■	■	■	■	■	■								
2.0		■	■	■	■	■	■	■	■	■							
2.5			■		■		■		■	■							
3.0			■		■		■		■	■	■						
4.0					■		■		■	■	■	■	■	■	■		
5.0					■		■			■	■		■		■		
6.0									■			■		■			
8.0													■		■	■	
10.0													■			■	■

■ Endmill Indentification

●GS MILL Long Neck Ball

(Example) **GSBN 2 0060 160 6**

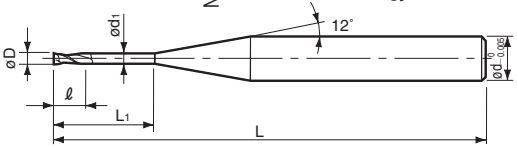
- GSBN: Ballnose Type
- 2: Number of Flutes (2 Flutes)
- 0060: Ballnose Radius R (0.60mm)
- 160: Length of Neck L1 (16.0mm)
- 6: Shank Diameter ød (6mm)



●GS MILL Long Neck

(Example) **GSN 4 0120 080 4**

- GSN: SquareType
- 4: Number of Flutes (4 Flutes)
- 0120: Endmill Diameter øD (1.20mm)
- 080: Length of Neck L1 (8.0mm)
- 4: Shank Diameter ød (4mm)

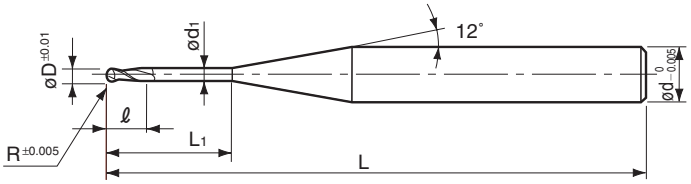


Coated Endmills

GSBN 2 Type

New

2 teeth



ø4 Shank Series (mm)

Cat. No.	Stock	R	øD	L_1	ℓ	L	$ød_1$	ød
GSBN2 0010 0054	●	0.10	0.2	0.5	0.2	45	0.18	4
GSBN2 0010 0104	●	0.10	0.2	1.0	0.2	45	0.18	4
GSBN2 0010 0154	●	0.10	0.2	1.5	0.2	45	0.18	4
GSBN2 0010 0204	●	0.10	0.2	2.0	0.2	45	0.18	4
GSBN2 0010 0254	●	0.10	0.2	2.5	0.2	45	0.18	4
GSBN2 0010 0304	●	0.10	0.2	3.0	0.2	45	0.18	4
GSBN2 0015 0104	●	0.15	0.3	1.0	0.3	45	0.28	4
GSBN2 0015 0154	●	0.15	0.3	1.5	0.3	45	0.28	4
GSBN2 0015 0204	●	0.15	0.3	2.0	0.3	45	0.28	4
GSBN2 0015 0254	●	0.15	0.3	2.5	0.3	45	0.28	4
GSBN2 0015 0304	●	0.15	0.3	3.0	0.3	45	0.28	4
GSBN2 0020 0104	●	0.20	0.4	1.0	0.4	45	0.37	4
GSBN2 0020 0154	●	0.20	0.4	1.5	0.4	45	0.37	4
GSBN2 0020 0204	●	0.20	0.4	2.0	0.4	45	0.37	4
GSBN2 0020 0254	●	0.20	0.4	2.5	0.4	45	0.37	4
GSBN2 0020 0304	●	0.20	0.4	3.0	0.4	45	0.37	4
GSBN2 0020 0404	●	0.20	0.4	4.0	0.4	45	0.37	4
GSBN2 0020 0504	●	0.20	0.4	5.0	0.4	45	0.37	4
GSBN2 0025 0154	●	0.25	0.5	1.5	0.5	45	0.47	4
GSBN2 0025 0204	●	0.25	0.5	2.0	0.5	45	0.47	4
GSBN2 0025 0304	●	0.25	0.5	3.0	0.5	45	0.47	4
GSBN2 0025 0404	●	0.25	0.5	4.0	0.5	45	0.47	4
GSBN2 0025 0504	●	0.25	0.5	5.0	0.5	45	0.47	4
GSBN2 0025 0604	●	0.25	0.5	6.0	0.5	45	0.47	4
GSBN2 0025 0804	●	0.25	0.5	8.0	0.5	45	0.47	4
GSBN2 0030 0204	●	0.30	0.6	2.0	0.6	45	0.56	4
GSBN2 0030 0304	●	0.30	0.6	3.0	0.6	45	0.56	4
GSBN2 0030 0404	●	0.30	0.6	4.0	0.6	45	0.56	4
GSBN2 0030 0504	●	0.30	0.6	5.0	0.6	45	0.56	4
GSBN2 0030 0604	●	0.30	0.6	6.0	0.6	45	0.56	4
GSBN2 0030 0704	●	0.30	0.6	7.0	0.6	45	0.56	4
GSBN2 0030 0804	●	0.30	0.6	8.0	0.6	45	0.56	4
GSBN2 0030 1004	●	0.30	0.6	10.0	0.6	45	0.56	4
GSBN2 0040 0204	●	0.40	0.8	2.0	1.4	45	0.76	4
GSBN2 0040 0304	●	0.40	0.8	3.0	1.4	45	0.76	4
GSBN2 0040 0404	●	0.40	0.8	4.0	1.4	45	0.76	4
GSBN2 0040 0504	●	0.40	0.8	5.0	1.4	45	0.76	4
GSBN2 0040 0604	●	0.40	0.8	6.0	1.4	45	0.76	4
GSBN2 0040 0704	●	0.40	0.8	7.0	1.4	45	0.76	4
GSBN2 0040 0804	●	0.40	0.8	8.0	1.4	45	0.76	4
GSBN2 0040 1004	●	0.40	0.8	10.0	1.4	45	0.76	4
GSBN2 0050 0304	●	0.50	1.0	3.0	1.5	45	0.96	4
GSBN2 0050 0404	●	0.50	1.0	4.0	1.5	45	0.96	4
GSBN2 0050 0504	●	0.50	1.0	5.0	1.5	45	0.96	4
GSBN2 0050 0604	●	0.50	1.0	6.0	1.5	45	0.96	4
GSBN2 0050 0704	●	0.50	1.0	7.0	1.5	45	0.96	4
GSBN2 0050 0804	●	0.50	1.0	8.0	1.5	45	0.96	4
GSBN2 0050 0904	●	0.50	1.0	9.0	1.5	45	0.96	4
GSBN2 0050 1004	●	0.50	1.0	10.0	1.5	45	0.96	4
GSBN2 0050 1204	●	0.50	1.0	12.0	1.5	45	0.96	4
GSBN2 0050 1404	●	0.50	1.0	14.0	1.5	50	0.96	4
GSBN2 0050 1604	●	0.50	1.0	16.0	1.5	50	0.96	4
GSBN2 0050 1804	●	0.50	1.0	18.0	1.5	55	0.96	4
GSBN2 0050 2004	●	0.50	1.0	20.0	1.5	55	0.96	4
GSBN2 0050 2204	●	0.50	1.0	22.0	1.5	60	0.96	4
GSBN2 0060 0604	●	0.60	1.2	6.0	1.6	45	1.15	4
GSBN2 0060 0804	●	0.60	1.2	8.0	1.6	45	1.15	4
GSBN2 0060 1004	●	0.60	1.2	10.0	1.6	45	1.15	4
GSBN2 0060 1204	●	0.60	1.2	12.0	1.6	45	1.15	4
GSBN2 0060 1604	●	0.60	1.2	16.0	1.6	50	1.15	4

Cutting Condition J44 Grade : ACZ20W

ø4 Shank Series (mm)

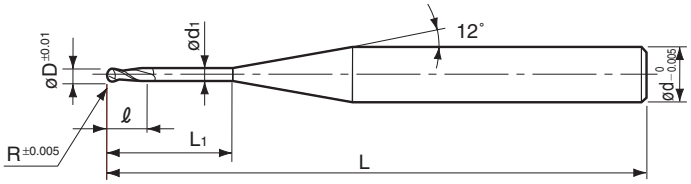
Cat. No.	Stock	R	øD	L_1	ℓ	L	$ød_1$	ød
GSBN2 0070 0804	●	0.70	1.4	8.0	1.7	45	1.35	4
GSBN2 0070 1204	●	0.70	1.4	12.0	1.7	45	1.35	4
GSBN2 0070 1604	●	0.70	1.4	16.0	1.7	50	1.35	4
GSBN2 0075 0804	●	0.75	1.5	8.0	1.8	45	1.45	4
GSBN2 0075 1004	●	0.75	1.5	10.0	1.8	45	1.45	4
GSBN2 0075 1204	●	0.75	1.5	12.0	1.8	45	1.45	4
GSBN2 0075 1404	●	0.75	1.5	14.0	1.8	50	1.45	4
GSBN2 0075 1604	●	0.75	1.5	16.0	1.8	50	1.45	4
GSBN2 0075 1804	●	0.75	1.5	18.0	1.8	55	1.45	4
GSBN2 0075 2004	●	0.75	1.5	20.0	1.8	55	1.45	4
GSBN2 0080 0804	●	0.80	1.6	8.0	1.8	45	1.55	4
GSBN2 0080 1204	●	0.80	1.6	12.0	1.8	45	1.55	4
GSBN2 0080 1604	●	0.80	1.6	16.0	1.8	50	1.55	4
GSBN2 0080 2004	●	0.80	1.6	20.0	1.8	55	1.55	4
GSBN2 0090 0804	●	0.90	1.8	8.0	1.8	45	1.75	4
GSBN2 0090 1204	●	0.90	1.8	12.0	1.8	45	1.75	4
GSBN2 0090 1604	●	0.90	1.8	16.0	1.8	50	1.75	4
GSBN2 0090 2004	●	0.90	1.8	20.0	1.8	55	1.75	4
GSBN2 0100 0404	●	1.00	2.0	4.0	2.0	45	1.95	4
GSBN2 0100 0604	●	1.00	2.0	6.0	2.0	45	1.95	4
GSBN2 0100 0804	●	1.00	2.0	8.0	2.0	45	1.95	4
GSBN2 0100 1004	●	1.00	2.0	10.0	2.0	45	1.95	4
GSBN2 0100 1204	●	1.00	2.0	12.0	2.0	45	1.95	4
GSBN2 0100 1404	●	1.00	2.0	14.0	2.0	50	1.95	4
GSBN2 0100 1604	●	1.00	2.0	16.0	2.0	50	1.95	4
GSBN2 0100 1804	●	1.00	2.0	18.0	2.0	55	1.95	4
GSBN2 0100 2004	●	1.00	2.0	20.0	2.0	55	1.95	4
GSBN2 0100 2204	●	1.00	2.0	22.0	2.0	60	1.95	4
GSBN2 0100 2504	●	1.00	2.0	25.0	2.0	65	1.95	4
GSBN2 0100 3004	●	1.00	2.0	30.0	2.0	70	1.95	4

Cutting Condition J44 Grade : ACZ20W

GSBN 2 Type

New

2 teeth



ø6 Shank Series (mm)

Cat. No.	Stock	R	øD	L_1	ℓ	L	$ød_1$	ød
GSBN2 0010 0056	●	0.10	0.2	0.5	0.2	50	0.18	6
GSBN2 0010 0106	●	0.10	0.2	1.0	0.2	50	0.18	6
GSBN2 0010 0156	●	0.10	0.2	1.5	0.2	50	0.18	6
GSBN2 0010 0206	●	0.10	0.2	2.0	0.2	50	0.18	6
GSBN2 0015 0106	●	0.15	0.3	1.0	0.3	50	0.28	6
GSBN2 0015 0156	●	0.15	0.3	1.5	0.3	50	0.28	6
GSBN2 0015 0206	●	0.15	0.3	2.0	0.3	50	0.28	6
GSBN2 0020 0106	●	0.20	0.4	1.0	0.4	50	0.37	6
GSBN2 0020 0156	●	0.20	0.4	1.5	0.4	50	0.37	6
GSBN2 0020 0206	●	0.20	0.4	2.0	0.4	50	0.37	6
GSBN2 0020 0256	●	0.20	0.4	2.5	0.4	50	0.37	6
GSBN2 0020 0306	●	0.20	0.4	3.0	0.4	50	0.37	6
GSBN2 0025 0156	●	0.25	0.5	1.5	0.5	50	0.47	6
GSBN2 0025 0206	●	0.25	0.5	2.0	0.5	50	0.47	6
GSBN2 0025 0306	●	0.25	0.5	3.0	0.5	50	0.47	6
GSBN2 0025 0406	●	0.25	0.5	4.0	0.5	50	0.47	6
GSBN2 0025 0506	●	0.25	0.5	5.0	0.5	50	0.47	6
GSBN2 0025 0606	●	0.25	0.5	6.0	0.5	50	0.47	6
GSBN2 0025 0806	●	0.25	0.5	8.0	0.5	50	0.47	6
GSBN2 0030 0206	●	0.30	0.6	2.0	0.6	50	0.56	6
GSBN2 0030 0306	●	0.30	0.6	3.0	0.6	50	0.56	6
GSBN2 0030 0406	●	0.30	0.6	4.0	0.6	50	0.56	6
GSBN2 0030 0506	●	0.30	0.6	5.0	0.6	50	0.56	6
GSBN2 0030 0606	●	0.30	0.6	6.0	0.6	50	0.56	6
GSBN2 0030 0806	●	0.30	0.6	8.0	0.6	50	0.56	6
GSBN2 0030 1006	●	0.30	0.6	10.0	0.6	50	0.56	6
GSBN2 0040 0206	●	0.40	0.8	2.0	1.4	50	0.76	6
GSBN2 0040 0306	●	0.40	0.8	3.0	1.4	50	0.76	6
GSBN2 0040 0406	●	0.40	0.8	4.0	1.4	50	0.76	6
GSBN2 0040 0506	●	0.40	0.8	5.0	1.4	50	0.76	6
GSBN2 0040 0606	●	0.40	0.8	6.0	1.4	50	0.76	6
GSBN2 0040 0806	●	0.40	0.8	8.0	1.4	50	0.76	6
GSBN2 0040 1006	●	0.40	0.8	10.0	1.4	50	0.76	6
GSBN2 0050 0306	●	0.50	1.0	3.0	1.5	50	0.96	6
GSBN2 0050 0406	●	0.50	1.0	4.0	1.5	50	0.96	6
GSBN2 0050 0506	●	0.50	1.0	5.0	1.5	50	0.96	6
GSBN2 0050 0606	●	0.50	1.0	6.0	1.5	50	0.96	6
GSBN2 0050 0806	●	0.50	1.0	8.0	1.5	50	0.96	6
GSBN2 0050 1006	●	0.50	1.0	10.0	1.5	50	0.96	6
GSBN2 0050 1206	●	0.50	1.0	12.0	1.5	50	0.96	6
GSBN2 0050 1406	●	0.50	1.0	14.0	1.5	50	0.96	6
GSBN2 0050 1606	●	0.50	1.0	16.0	1.5	60	0.96	6
GSBN2 0050 1806	●	0.50	1.0	18.0	1.5	60	0.96	6
GSBN2 0050 2006	●	0.50	1.0	20.0	1.5	60	0.96	6
GSBN2 0050 2206	●	0.50	1.0	22.0	1.5	60	0.96	6
GSBN2 0060 0606	●	0.60	1.2	6.0	1.6	50	1.15	6
GSBN2 0060 0806	●	0.60	1.2	8.0	1.6	50	1.15	6
GSBN2 0060 1006	●	0.60	1.2	10.0	1.6	50	1.15	6
GSBN2 0060 1206	●	0.60	1.2	12.0	1.6	50	1.15	6
GSBN2 0060 1606	●	0.60	1.2	16.0	1.6	60	1.15	6
GSBN2 0075 0806	●	0.75	1.5	8.0	1.8	50	1.45	6
GSBN2 0075 1006	●	0.75	1.5	10.0	1.8	50	1.45	6
GSBN2 0075 1206	●	0.75	1.5	12.0	1.8	50	1.45	6
GSBN2 0075 1606	●	0.75	1.5	16.0	1.8	60	1.45	6
GSBN2 0075 2006	●	0.75	1.5	20.0	1.8	60	1.45	6
GSBN2 0100 0406	●	1.00	2.0	4.0	2.0	50	1.95	6
GSBN2 0100 0606	●	1.00	2.0	6.0	2.0	50	1.95	6
GSBN2 0100 0806	●	1.00	2.0	8.0	2.0	50	1.95	6
GSBN2 0100 1006	●	1.00	2.0	10.0	2.0	50	1.95	6
GSBN2 0100 1206	●	1.00	2.0	12.0	2.0	50	1.95	6

Cutting Condition J44 Grade : ACZ20W

ø6 Shank Series (mm)

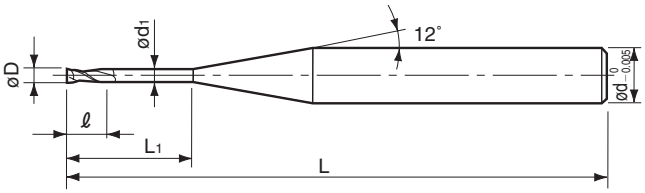
Cat. No.	Stock	R	øD	L_1	ℓ	L	$ød_1$	ød
GSBN2 0100 1406	●	1.00	2.0	14.0	2.0	50	1.95	6
GSBN2 0100 1606	●	1.00	2.0	16.0	2.0	60	1.95	6
GSBN2 0100 1806	●	1.00	2.0	18.0	2.0	60	1.95	6
GSBN2 0100 2006	●	1.00	2.0	20.0	2.0	60	1.95	6
GSBN2 0100 2206	●	1.00	2.0	22.0	2.0	60	1.95	6
GSBN2 0100 2506	●	1.00	2.0	25.0	2.0	80	1.95	6
GSBN2 0100 3006	●	1.00	2.0	30.0	2.0	80	1.95	6
GSBN2 0100 3506	●	1.00	2.0	35.0	2.0	80	1.95	6
GSBN2 0150 0806	●	1.50	3.0	8.0	2.5	60	2.90	6
GSBN2 0150 1006	●	1.50	3.0	10.0	2.5	60	2.90	6
GSBN2 0150 1206	●	1.50	3.0	12.0	2.5	60	2.90	6
GSBN2 0150 1606	●	1.50	3.0	16.0	2.5	60	2.90	6
GSBN2 0150 2006	●	1.50	3.0	20.0	2.5	65	2.90	6
GSBN2 0150 2506	●	1.50	3.0	25.0	2.5	65	2.90	6
GSBN2 0150 3006	●	1.50	3.0	30.0	2.5	70	2.90	6
GSBN2 0150 3506	●	1.50	3.0	35.0	2.5	80	2.90	6
GSBN2 0200 1006	●	2.00	4.0	10.0	3.0	65	3.90	6
GSBN2 0200 1206	●	2.00	4.0	12.0	3.0	65	3.90	6
GSBN2 0200 1606	●	2.00	4.0	16.0	3.0	65	3.90	6
GSBN2 0200 2006	●	2.00	4.0	20.0	3.0	65	3.90	6
GSBN2 0200 2506	●	2.00	4.0	25.0	3.0	70	3.90	6
GSBN2 0200 3006	●	2.00	4.0	30.0	3.0	70	3.90	6
GSBN2 0200 3506	●	2.00	4.0	35.0	3.0	80	3.90	6
GSBN2 0200 4006	●	2.00	4.0	40.0	3.0	85	3.90	6
GSBN2 0200 4506	●	2.00	4.0	45.0	3.0	90	3.90	6
GSBN2 0200 5006	●	2.00	4.0	50.0	3.0	100	3.90	6
GSBN2 0250 2006	●	2.50	5.0	20.0	3.5	70	4.90	6
GSBN2 0250 2506	●	2.50	5.0	25.0	3.5	70	4.90	6
GSBN2 0250 3006	●	2.50	5.0	30.0	3.5	80	4.90	6
GSBN2 0250 3506	●	2.50	5.0	35.0	3.5	80	4.90	6
GSBN2 0300 3006	●	3.00	6.0	30.0	6.0	80	5.80	6
GSBN2 0300 5006	●	3.00	6.0	50.0	6.0	120	5.80	6

Cutting Condition J44 Grade : ACZ20W

GSN 2 Type (Two Flutes)

New

φD	Tolerance
0.1≤D<0.4	0～−0.01
0.4≤D<2.9	0～−0.015
2.9≤D<6.0	0～−0.02



2 teeth

(mm)

Cat. No.	Stock	øD	L1	ℓ	L	ød1	ød
GSN2 0020 0054	●	0.2	0.5	0.3	45	0.18	4
GSN2 0020 0104	●	0.2	1.0	0.3	45	0.18	4
GSN2 0020 0154	●	0.2	1.5	0.3	45	0.18	4
GSN2 0030 0104	●	0.3	1.0	0.4	45	0.28	4
GSN2 0030 0204	●	0.3	2.0	0.4	45	0.28	4
GSN2 0030 0304	●	0.3	3.0	0.4	45	0.28	4
GSN2 0030 0604	●	0.3	6.0	0.4	45	0.28	4
GSN2 0030 0904	●	0.3	9.0	0.4	45	0.28	4
GSN2 0040 0204	●	0.4	2.0	0.6	45	0.37	4
GSN2 0040 0304	●	0.4	3.0	0.6	45	0.37	4
GSN2 0040 0404	●	0.4	4.0	0.6	45	0.37	4
GSN2 0040 0804	●	0.4	8.0	0.6	45	0.37	4
GSN2 0040 1204	●	0.4	12.0	0.6	45	0.37	4
GSN2 0050 0204	●	0.5	2.0	0.7	45	0.47	4
GSN2 0050 0404	●	0.5	4.0	0.7	45	0.47	4
GSN2 0050 0604	●	0.5	6.0	0.7	45	0.47	4
GSN2 0050 0804	●	0.5	8.0	0.7	50	0.47	4
GSN2 0050 1004	●	0.5	10.0	0.7	50	0.47	4
GSN2 0050 1504	●	0.5	15.0	0.7	50	0.47	4
GSN2 0060 0204	●	0.6	2.0	0.9	45	0.57	4
GSN2 0060 0404	●	0.6	4.0	0.9	45	0.57	4
GSN2 0060 0604	●	0.6	6.0	0.9	45	0.57	4
GSN2 0060 0804	●	0.6	8.0	0.9	50	0.57	4
GSN2 0060 1004	●	0.6	10.0	0.9	50	0.57	4
GSN2 0060 1204	●	0.6	12.0	0.9	50	0.57	4
GSN2 0060 1804	●	0.6	18.0	0.9	50	0.57	4
GSN2 0070 0204	●	0.7	2.0	1.0	45	0.67	4
GSN2 0070 0404	●	0.7	4.0	1.0	45	0.67	4
GSN2 0070 0604	●	0.7	6.0	1.0	45	0.67	4
GSN2 0070 0804	●	0.7	8.0	1.0	50	0.67	4
GSN2 0070 1004	●	0.7	10.0	1.0	50	0.67	4
GSN2 0080 0404	●	0.8	4.0	1.2	45	0.77	4
GSN2 0080 0604	●	0.8	6.0	1.2	45	0.77	4
GSN2 0080 0804	●	0.8	8.0	1.2	50	0.77	4
GSN2 0080 1004	●	0.8	10.0	1.2	50	0.77	4
GSN2 0080 1204	●	0.8	12.0	1.2	50	0.77	4
GSN2 0080 1604	●	0.8	16.0	1.2	50	0.77	4
GSN2 0080 2404	●	0.8	24.0	1.2	60	0.77	4
GSN2 0090 0604	●	0.9	6.0	1.4	45	0.87	4
GSN2 0090 0804	●	0.9	8.0	1.4	50	0.87	4
GSN2 0090 1004	●	0.9	10.0	1.4	50	0.87	4
GSN2 0090 1504	●	0.9	15.0	1.4	60	0.87	4
GSN2 0100 0404	●	1.0	4.0	1.5	50	0.97	4
GSN2 0100 0604	●	1.0	6.0	1.5	50	0.97	4
GSN2 0100 0804	●	1.0	8.0	1.5	50	0.97	4
GSN2 0100 1004	●	1.0	10.0	1.5	50	0.97	4
GSN2 0100 1204	●	1.0	12.0	1.5	50	0.97	4
GSN2 0100 1604	●	1.0	16.0	1.5	60	0.97	4
GSN2 0100 2004	●	1.0	20.0	1.5	60	0.97	4
GSN2 0100 2504	●	1.0	25.0	1.5	70	0.97	4
GSN2 0100 3004	●	1.0	30.0	1.5	70	0.97	4
GSN2 0120 0604	●	1.2	6.0	1.8	50	1.15	4
GSN2 0120 0804	●	1.2	8.0	1.8	50	1.15	4
GSN2 0120 1004	●	1.2	10.0	1.8	50	1.15	4
GSN2 0120 1204	●	1.2	12.0	1.8	50	1.15	4
GSN2 0120 1604	●	1.2	16.0	1.8	60	1.15	4
GSN2 0120 2004	●	1.2	20.0	1.8	60	1.15	4
GSN2 0150 0604	●	1.5	6.0	2.3	50	1.45	4
GSN2 0150 0804	●	1.5	8.0	2.3	50	1.45	4
GSN2 0150 1004	●	1.5	10.0	2.3	50	1.45	4

Cutting Condition J46 Grade : ACZ20W

(mm)

Cat. No.	Stock	øD	L1	ℓ	L	ød1	ød
GSN2 0150 1204	●	1.5	12.0	2.3	50	1.45	4
GSN2 0150 1404	●	1.5	14.0	2.3	60	1.45	4
GSN2 0150 1604	●	1.5	16.0	2.3	60	1.45	4
GSN2 0150 1804	●	1.5	18.0	2.3	60	1.45	4
GSN2 0150 2004	●	1.5	20.0	2.3	60	1.45	4
GSN2 0150 2504	●	1.5	25.0	2.3	70	1.45	4
GSN2 0150 3004	●	1.5	30.0	2.3	70	1.45	4
GSN2 0150 3804	●	1.5	38.0	2.3	80	1.45	4
GSN2 0150 4504	●	1.5	45.0	2.3	80	1.45	4
GSN2 0200 0604	●	2.0	6.0	3.0	50	1.95	4
GSN2 0200 0804	●	2.0	8.0	3.0	50	1.95	4
GSN2 0200 1004	●	2.0	10.0	3.0	50	1.95	4
GSN2 0200 1204	●	2.0	12.0	3.0	50	1.95	4
GSN2 0200 1404	●	2.0	14.0	3.0	60	1.95	4
GSN2 0200 1604	●	2.0	16.0	3.0	60	1.95	4
GSN2 0200 1804	●	2.0	18.0	3.0	60	1.95	4
GSN2 0200 2004	●	2.0	20.0	3.0	60	1.95	4
GSN2 0200 2504	●	2.0	25.0	3.0	70	1.95	4
GSN2 0200 3004	●	2.0	30.0	3.0	70	1.95	4
GSN2 0200 3504	●	2.0	35.0	3.0	80	1.95	4
GSN2 0200 4004	●	2.0	40.0	3.0	90	1.95	4
GSN2 0200 5004	●	2.0	50.0	3.0	100	1.95	4
GSN2 0200 6004	●	2.0	60.0	3.0	110	1.95	4
GSN2 0250 0804	●	2.5	8.0	3.7	50	2.45	4
GSN2 0250 1204	●	2.5	12.0	3.7	50	2.45	4
GSN2 0250 1604	●	2.5	16.0	3.7	60	2.45	4
GSN2 0250 2004	●	2.5	20.0	3.7	60	2.45	4
GSN2 0250 2504	●	2.5	25.0	3.7	70	2.45	4
GSN2 0250 3004	●	2.5	30.0	3.7	70	2.45	4
GSN2 0250 4004	●	2.5	40.0	3.7	90	2.45	4
GSN2 0250 5004	●	2.5	50.0	3.7	100	2.45	4
GSN2 0300 0806	●	3.0	8.0	4.5	50	2.90	6
GSN2 0300 1206	●	3.0	12.0	4.5	50	2.90	6
GSN2 0300 1606	●	3.0	16.0	4.5	60	2.90	6
GSN2 0300 2006	●	3.0	20.0	4.5	60	2.90	6
GSN2 0300 2506	●	3.0	25.0	4.5	70	2.90	6
GSN2 0300 3006	●	3.0	30.0	4.5	70	2.90	6
GSN2 0300 4006	●	3.0	40.0	4.5	90	2.90	6
GSN2 0300 5006	●	3.0	50.0	4.5	100	2.90	6
GSN2 0400 1206	●	4.0	12.0	6.0	50	3.90	6
GSN2 0400 1606	●	4.0	16.0	6.0	60	3.90	6
GSN2 0400 2006	●	4.0	20.0	6.0	60	3.90	6
GSN2 0400 2506	●	4.0	25.0	6.0	70	3.90	6
GSN2 0400 3006	●	4.0	30.0	6.0	70	3.90	6
GSN2 0400 3506	●	4.0	35.0	6.0	80	3.90	6
GSN2 0400 4006	●	4.0	40.0	6.0	90	3.90	6
GSN2 0400 4506	●	4.0	45.0	6.0	90	3.90	6
GSN2 0400 5006	●	4.0	50.0	6.0	100	3.90	6
GSN2 0400 6006	●	4.0	60.0	6.0	110	3.90	6
GSN2 0500 1606	●	5.0	16.0	7.5	60	4.90	6
GSN2 0500 2506	●	5.0	25.0	7.5	70	4.90	6
GSN2 0500 3506	●	5.0	35.0	7.5	80	4.90	6
GSN2 0500 5006	●	5.0	50.0	7.5	110	4.90	6
GSN2 0500 6006	●	5.0	60.0	7.5	120	4.90	6
GSN2 0600 2006	●	6.0	20.0	9.0	80	5.90	6
GSN2 0600 3006	●	6.0	30.0	9.0	90	5.90	6
GSN2 0600 4006	●	6.0	40.0	9.0	100	5.90	6
GSN2 0600 5006	●	6.0	50.0	9.0	110	5.90	6
GSN2 0600 6006	●	6.0	60.0	9.0	120	5.90	6

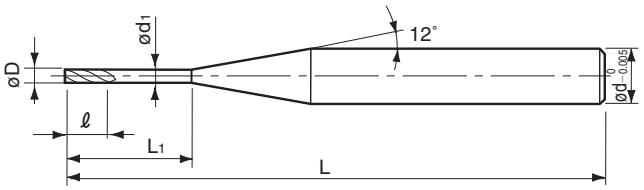
Cutting Condition J46 Grade : ACZ20W

GSN 4 Type (Four Flutes)

New

φD	Tolerance
0.9≤D<2.9	0～−0.015
2.9≤D<10.0	0～−0.02

4 teeth



(mm)

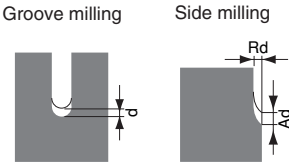
Cat. No.	Stock	øD	L_1	ℓ	L	$ød_1$	ød
GSN4 0100 0404	●	1.0	4.0	1.5	50	0.97	4
GSN4 0100 0604	●	1.0	6.0	1.5	50	0.97	4
GSN4 0100 0804	●	1.0	8.0	1.5	50	0.97	4
GSN4 0100 1004	●	1.0	10.0	1.5	50	0.97	4
GSN4 0100 1204	●	1.0	12.0	1.5	50	0.97	4
GSN4 0100 1604	●	1.0	16.0	1.5	60	0.97	4
GSN4 0120 0604	●	1.2	6.0	1.8	50	1.15	4
GSN4 0120 0804	●	1.2	8.0	1.8	50	1.15	4
GSN4 0120 1004	●	1.2	10.0	1.8	50	1.15	4
GSN4 0120 1204	●	1.2	12.0	1.8	50	1.15	4
GSN4 0120 1604	●	1.2	16.0	1.8	60	1.15	4
GSN4 0150 0604	●	1.5	6.0	2.3	50	1.45	4
GSN4 0150 0804	●	1.5	8.0	2.3	50	1.45	4
GSN4 0150 1004	●	1.5	10.0	2.3	50	1.45	4
GSN4 0150 1204	●	1.5	12.0	2.3	50	1.45	4
GSN4 0150 1404	●	1.5	14.0	2.3	60	1.45	4
GSN4 0150 1604	●	1.5	16.0	2.3	60	1.45	4
GSN4 0150 1804	●	1.5	18.0	2.3	60	1.45	4
GSN4 0150 2004	●	1.5	20.0	2.3	60	1.45	4
GSN4 0200 0604	●	2.0	6.0	3.0	50	1.95	4
GSN4 0200 0804	●	2.0	8.0	3.0	50	1.95	4
GSN4 0200 1004	●	2.0	10.0	3.0	50	1.95	4
GSN4 0200 1204	●	2.0	12.0	3.0	50	1.95	4
GSN4 0200 1404	●	2.0	14.0	3.0	60	1.95	4
GSN4 0200 1604	●	2.0	16.0	3.0	60	1.95	4
GSN4 0200 1804	●	2.0	18.0	3.0	60	1.95	4
GSN4 0200 2004	●	2.0	20.0	3.0	60	1.95	4
GSN4 0200 2504	●	2.0	25.0	3.0	70	1.95	4
GSN4 0200 3004	●	2.0	30.0	3.0	70	1.95	4
GSN4 0250 0804	●	2.5	8.0	3.7	50	2.45	4
GSN4 0250 1204	●	2.5	12.0	3.7	50	2.45	4
GSN4 0250 1604	●	2.5	16.0	3.7	60	2.45	4
GSN4 0250 2004	●	2.5	20.0	3.7	60	2.45	4
GSN4 0250 2504	●	2.5	25.0	3.7	70	2.45	4
GSN4 0300 0806	●	3.0	8.0	4.5	50	2.90	6
GSN4 0300 1206	●	3.0	12.0	4.5	50	2.90	6
GSN4 0300 1606	●	3.0	16.0	4.5	60	2.90	6
GSN4 0300 2006	●	3.0	20.0	4.5	60	2.90	6
GSN4 0300 2506	●	3.0	25.0	4.5	70	2.90	6
GSN4 0300 3006	●	3.0	30.0	4.5	70	2.90	6
GSN4 0400 1206	●	4.0	12.0	6.0	50	3.90	6
GSN4 0400 1606	●	4.0	16.0	6.0	60	3.90	6
GSN4 0400 2006	●	4.0	20.0	6.0	60	3.90	6
GSN4 0400 2506	●	4.0	25.0	6.0	70	3.90	6
GSN4 0400 3006	●	4.0	30.0	6.0	70	3.90	6
GSN4 0400 3506	●	4.0	35.0	6.0	80	3.90	6
GSN4 0400 4006	●	4.0	40.0	6.0	90	3.90	6
GSN4 0400 4506	●	4.0	45.0	6.0	90	3.90	6
GSN4 0400 5006	●	4.0	50.0	6.0	100	3.90	6
GSN4 0500 1606	●	5.0	16.0	7.5	60	4.90	6
GSN4 0500 2506	●	5.0	25.0	7.5	70	4.90	6
GSN4 0500 3506	●	5.0	35.0	7.5	80	4.90	6
GSN4 0500 5006	●	5.0	50.0	7.5	110	4.90	6
GSN4 0600 2006	●	6.0	20.0	9.0	80	5.90	6
GSN4 0600 3006	●	6.0	30.0	9.0	90	5.90	6
GSN4 0600 4006	●	6.0	40.0	9.0	100	5.90	6
GSN4 0600 5006	●	6.0	50.0	9.0	110	5.90	6
GSN4 0800 3008	●	8.0	30.0	12.0	100	7.80	8
GSN4 0800 5008	●	8.0	50.0	12.0	120	7.80	8
GSN4 0800 6008	●	8.0	60.0	12.0	130	7.80	8

(mm)

Cat. No.	Stock	øD	L_1	ℓ	L	$ød_1$	ød
GSN4 10004 0010	●	10.0	40.0	15.0	110	9.80	10
GSN4 10006 0010	●	10.0	60.0	15.0	130	9.80	10
GSN4 10008 0010	●	10.0	80.0	15.0	150	9.80	10

Cutting Condition J45 Grade : ACZ20W

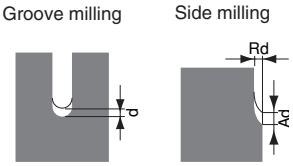
Recommended Conditions



■ GS MILL Long Neck Ball GSBN2

Work Cond.			Carbon Steel, Alloy Steel (150～250HB)					Stainless Steel, Die Steel (25～35HRC)					Pre-hardened Steel (35～45HRC)					Hardened Steel (45～55HRC)				
Ball Radius R mm	Ball Diameter D mm	Neck Length L_1 mm	S/Speed min⁻¹	Feedrate mm/min	Depth of Cut mm Ad	Rd	d	S/Speed min⁻¹	Feedrate mm/min	Depth of Cut mm Ad	Rd	d	S/Speed min⁻¹	Feedrate mm/min	Depth of Cut mm Ad	Rd	d	S/Speed min⁻¹	Feedrate mm/min	Depth of Cut mm Ad	Rd	d
0.1	0.2	0.5	50000	410	0.005	0.005	0.02	50000	370	0.005	0.005	0.018	50000	320	0.005	0.005	0.015	50000	290	0.005	0.005	0.013
0.1	0.2	1	50000	410	0.005	0.005	0.014	50000	370	0.005	0.005	0.013	50000	320	0.005	0.005	0.01	50000	290	0.005	0.005	0.01
0.1	0.2	2	50000	280	0.005	0.005	0.006	50000	250	0.005	0.005	0.005	50000	220	0.005	0.005	0.004	50000	200	0.005	0.005	0.004
0.15	0.3	1	50000	600	0.005	0.005	0.02	50000	540	0.005	0.005	0.02	50000	360	0.005	0.005	0.02	50000	310	0.005	0.005	0.014
0.15	0.3	2	50000	600	0.005	0.005	0.01	50000	540	0.005	0.005	0.01	50000	360	0.005	0.005	0.01	50000	310	0.005	0.005	0.008
0.15	0.3	3	50000	450	0.005	0.005	0.01	50000	380	0.005	0.005	0.007	50000	330	0.005	0.005	0.006	50000	280	0.005	0.005	0.005
0.2	0.4	1	50000	900	0.02	0.05	0.04	50000	810	0.02	0.05	0.04	50000	720	0.02	0.05	0.03	50000	500	0.02	0.05	0.03
0.2	0.4	1.5	50000	900	0.02	0.03	0.03	50000	810	0.02	0.03	0.03	50000	720	0.02	0.03	0.02	50000	500	0.02	0.03	0.02
0.2	0.4	2	50000	800	0.01	0.02	0.03	50000	810	0.01	0.02	0.025	50000	640	0.01	0.02	0.02	50000	500	0.01	0.02	0.02
0.2	0.4	2.5	50000	800	0.005	0.01	0.016	50000	740	0.005	0.01	0.014	50000	640	0.005	0.01	0.01	50000	500	0.005	0.01	0.01
0.2	0.4	3	50000	800	0.005	0.01	0.016	50000	740	0.005	0.01	0.014	50000	640	0.005	0.01	0.01	50000	500	0.005	0.01	0.01
0.2	0.4	4	50000	800	0.005	0.005	0.01	50000	740	0.005	0.005	0.01	50000	640	0.005	0.005	0.008	50000	500	0.005	0.005	0.008
0.2	0.4	5	48000	480	0.005	0.005	0.01	46000	420	0.005	0.005	0.01	44000	350	0.005	0.005	0.008	42000	290	0.005	0.005	0.008
0.25	0.5	2	50000	1100	0.02	0.03	0.04	50000	990	0.02	0.03	0.03	45000	770	0.02	0.03	0.03	32000	500	0.02	0.03	0.02
0.25	0.5	4	50000	1100	0.01	0.01	0.02	50000	990	0.01	0.01	0.02	40000	700	0.01	0.01	0.016	29000	450	0.01	0.01	0.01
0.25	0.5	5	50000	1100	0.005	0.01	0.015	40000	790	0.005	0.01	0.014	40000	700	0.005	0.01	0.01	29000	450	0.005	0.01	0.01
0.25	0.5	6	50000	1100	0.005	0.005	0.013	40000	790	0.005	0.005	0.012	31000	540	0.005	0.005	0.009	29000	450	0.005	0.005	0.008
0.25	0.5	8	38000	480	0.005	0.005	0.01	34000	390	0.005	0.005	0.01	31000	310	0.005	0.005	0.008	29000	270	0.005	0.005	0.007
0.3	0.6	2	50000	1300	0.03	0.05	0.04	48000	1110	0.03	0.05	0.04	37000	780	0.03	0.05	0.035	27000	520	0.03	0.05	0.03
0.3	0.6	3	50000	1300	0.02	0.03	0.04	46000	1060	0.02	0.03	0.04	35000	740	0.02	0.03	0.03	25000	480	0.02	0.03	0.03
0.3	0.6	4	50000	1300	0.01	0.02	0.02	43000	990	0.01	0.02	0.02	33000	700	0.01	0.02	0.02	24000	460	0.01	0.02	0.016
0.3	0.6	5	42000	1090	0.01	0.02	0.02	38000	880	0.01	0.02	0.016	30000	630	0.01	0.02	0.015	24000	440	0.01	0.02	0.01
0.3	0.6	6	42000	1090	0.01	0.01	0.02	33000	760	0.01	0.01	0.016	26000	550	0.01	0.01	0.012	24000	440	0.01	0.01	0.01
0.3	0.6	8	42000	840	0.005	0.005	0.02	33000	600	0.005	0.005	0.016	26000	420	0.005	0.005	0.01	24000	330	0.005	0.005	0.01
0.3	0.6	10	32000	640	0.005	0.005	0.01	30000	550	0.005	0.005	0.01	26000	420	0.005	0.005	0.01	24000	330	0.005	0.005	0.007
0.4	0.8	2	48000	1750	0.1	0.1	0.08	36000	1180	0.1	0.1	0.07	28800	840	0.1	0.1	0.06	20000	500	0.1	0.1	0.05
0.4	0.8	4	48000	1750	0.05	0.1	0.06	36000	1180	0.05	0.1	0.05	28800	840	0.05	0.1	0.04	20000	500	0.05	0.1	0.04
0.4	0.8	5	40000	1460	0.05	0.1	0.03	30000	980	0.05	0.1	0.03	24000	700	0.05	0.1	0.03	18000	420	0.05	0.1	0.02
0.4	0.8	6	40000	1460	0.03	0.05	0.03	30000	980	0.03	0.05	0.03	24000	700	0.03	0.05	0.024	18000	420	0.03	0.05	0.02
0.4	0.8	7	32000	1120	0.01	0.02	0.02	24000	780	0.01	0.02	0.02	20000	560	0.01	0.02	0.02	18000	420	0.01	0.02	0.016
0.4	0.8	8	32000	1120	0.005	0.01	0.02	24000	780	0.005	0.01	0.02	20000	560	0.005	0.01	0.016	18000	420	0.005	0.01	0.016
0.4	0.8	10	24000	840	0.005	0.005	0.02	21000	680	0.005	0.005	0.02	18000	500	0.005	0.005	0.016	16000	380	0.005	0.005	0.016
0.5	1	3	38000	1710	0.2	0.3	0.1	29000	1160	0.2	0.3	0.09	22800	770	0.2	0.3	0.08	16000	480	0.2	0.3	0.07
0.5	1	4	38000	1710	0.2	0.3	0.07	29000	1160	0.2	0.3	0.06	22800	770	0.2	0.3	0.06	16000	480	0.2	0.3	0.05
0.5	1	5	38000	1710	0.1	0.3	0.07	29000	1160	0.1	0.3	0.06	22800	770	0.1	0.3	0.05	16000	480	0.1	0.3	0.04
0.5	1	6	32000	1440	0.1	0.3	0.04	24000	960	0.1	0.3	0.04	19200	650	0.1	0.3	0.03	14500	435	0.1	0.3	0.03
0.5	1	7	32000	1440	0.1	0.2	0.04	24000	960	0.1	0.2	0.04	19200	650	0.1	0.2	0.03	14500	435	0.1	0.2	0.03
0.5	1	8	32000	1440	0.05	0.1	0.04	24000	960	0.05	0.1	0.04	19200	650	0.05	0.1	0.03	14500	435	0.05	0.1	0.03
0.5	1	9	26000	1170	0.03	0.05	0.03	20000	800	0.03	0.05	0.03	15600	530	0.03	0.05	0.02	14500	435	0.03	0.05	0.02
0.5	1	10	26000	1170	0.01	0.01	0.03	20000	800	0.01	0.01	0.03	15600	530	0.01	0.01	0.02	13000	390	0.01	0.01	0.02
0.5	1	12	26000	1170	0.01	0.01	0.03	20000	800	0.01	0.01	0.03	15600	530	0.01	0.01	0.02	13000	390	0.01	0.01	0.02
0.5	1	14	20000	900	0.005	0.01	0.03	16000	640	0.005	0.01	0.03	12000	410	0.005	0.01	0.02	13000	390	0.005	0.01	0.02
0.5	1	16	20000	900	0.005	0.01	0.02	16000	640	0.005	0.01	0.02	12000	410	0.005	0.01	0.016	13000	390	0.005	0.01	0.01
0.5	1	18	20000	900	0.005	0.005	0.015	16000	640	0.005	0.005	0.01	12000	410	0.005	0.005	0.012	13000	390	0.005	0.005	0.01
0.5	1	20	20000	900	0.005	0.005	0.015	16000	640	0.005	0.005	0.01	12000	410	0.005	0.005	0.012	13000	390	0.005	0.005	0.01
0.6	1.2	6	32000	1600	0.1	0.2	0.08	24000	1120	0.1	0.2	0.08	19200	720	0.1	0.2	0.07	12800	480	0.1	0.2	0.05
0.6	1.2	8	26000	1300	0.1	0.2	0.05	19500	910	0.1	0.2	0.04	15600	590	0.1	0.2	0.04	10400	390	0.1	0.2	0.03
0.6	1.2	10	22000	1100	0.05	0.1	0.04	16500	770	0.05	0.1	0.03	13200	500	0.05	0.1	0.03	8800	330	0.05	0.1	0.02
0.6	1.2	12	22000	1100	0.03	0.05	0.04	16500	770	0.03	0.05	0.03	13200	500	0.03	0.05	0.03	8800	330	0.03	0.05	0.02
0.75	1.5	8	22000	1500	0.1	0.2	0.06	16500	1050	0.1	0.2	0.05	13200	680	0.1	0.2	0.05	8800	450	0.1	0.2	0.04
0.75	1.5	10	22000	1500	0.1	0.2	0.06	16500	1050	0.1	0.2	0.05	13200	680	0.1	0.2	0.05	8800	450	0.1	0.2	0.04
0.75	1.5	12	22000	1500	0.1	0.1	0.06	16500	1050	0.1	0.1	0.05	13200	680	0.1	0.1	0.05	8800	450	0.1	0.1	0.04
0.75	1.5	14	17000	1160	0.05	0.1	0.05	12750	810	0.05	0.1	0.04	10200	520	0.05	0.1	0.04	6800	350	0.05	0.1	0.03
0.75	1.5	16	17000	1160	0.03	0.05	0.05	12750	810	0.03	0.05	0.04	10200	520	0.03	0.05	0.04	6800	350	0.03	0.05	0.03
0.75	1.5	18	17000	1160	0.02	0.03	0.05	12750	810	0.02	0.03	0.04	10200	520	0.02	0.03	0.04	6800	350	0.02	0.03	0.03
0.75	1.5	20	12800	870	0.01	0.02	0.05	9600	610	0.01	0.02	0.04	7680	390	0.01	0.02	0.04	5120	260	0.01	0.02	0.03
0.8	1.6	8	24000	1800	0.1	0.3	0.11	18000	1260	0.1	0.3	0.1	14400	810	0.1	0.3	0.09	9600	540	0.1	0.3	0.07
0.8	1.6	12	20000	1500	0.05	0.1	0.06	15000	1050	0.05	0.1	0.06	12000	680	0.05	0.1	0.05	8000	450	0.05	0.1	0.04
0.8	1.6	16	16000	1200	0.03	0.05	0.05	12000	840	0.03	0.05	0.04	9600	540	0.03	0.05	0.04	6400	360	0.03	0.05	0.03
0.8	1.6	20	12000	900	0.02	0.03	0.05	9000	630	0.02	0.03	0.04	7200	410	0.02	0.03	0.04	4800	270	0.02	0.03	0.03
1	2	4	19000	1710	0.3	0.5	0.2	14250	1200	0.3	0.5	0.18	11400	770	0.3	0.5	0.16	7600	510	0.3	0.5	0.13
1	2	6	19000	1710	0.2	0.5	0.2	14250	1200	0.2	0.5	0.18	11400	770	0.2	0.5	0.16	7600	510	0.2	0.5	0.13
1	2	8	19000	1710	0.1	0.3	0.14	14250	1200	0.1	0.3	0.13	11400	770	0.1	0.3	0.11	7600	510	0.1	0.3	0.09
1	2	12	16000	1440	0.1	0.2	0.08	12000	1010	0.1	0.2	0.07	9600	650	0.1	0.2	0.06	6400	430	0.1	0.2	0.05

Recommended Conditions

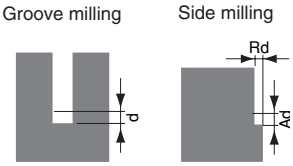


■ GS MILL Long Neck Ball GSBN2

Work / Cond.			Carbon Steel, Alloy Steel (150～250HB)					Stainless Steel, Die Steel (25～35HRC)					Pre-hardened Steel (35～45HRC)					Hardened Steel (45～55HRC)				
Ball Radius R mm	Ball Diameter D mm	Neck Length L_1 mm	S/Speed min⁻¹	Feedrate mm/min	Depth of Cut mm Ad	Rd	d	S/Speed min⁻¹	Feedrate mm/min	Depth of Cut mm Ad	Rd	d	S/Speed min⁻¹	Feedrate mm/min	Depth of Cut mm Ad	Rd	d	S/Speed min⁻¹	Feedrate mm/min	Depth of Cut mm Ad	Rd	d
1	2	14	16000	1440	0.1	0.2	0.08	12000	1010	0.1	0.2	0.07	9600	650	0.1	0.2	0.06	6400	430	0.1	0.2	0.05
1	2	16	16000	1440	0.1	0.1	0.08	12000	1010	0.1	0.1	0.07	9600	650	0.1	0.1	0.06	6400	430	0.1	0.1	0.05
1	2	18	12800	1150	0.1	0.1	0.06	9600	810	0.1	0.1	0.05	7680	520	0.1	0.1	0.05	5120	350	0.1	0.1	0.04
1	2	20	12800	1150	0.05	0.1	0.06	9600	810	0.05	0.1	0.05	7680	520	0.05	0.1	0.05	5120	350	0.05	0.1	0.04
1	2	22	12800	1150	0.03	0.05	0.06	9600	810	0.03	0.05	0.05	7680	520	0.03	0.05	0.05	5120	350	0.03	0.05	0.04
1	2	25	10000	900	0.02	0.03	0.06	7500	630	0.02	0.03	0.05	6000	410	0.02	0.03	0.05	4000	270	0.02	0.03	0.04
1	2	30	10000	900	0.01	0.02	0.04	7500	630	0.01	0.02	0.04	6000	410	0.01	0.02	0.03	4000	270	0.01	0.02	0.03
1.5	3	8	12800	2180	0.3	0.5	0.3	9600	1530	0.3	0.5	0.27	7680	980	0.3	0.5	0.24	5120	650	0.3	0.5	0.2
1.5	3	10	12800	2180	0.2	0.5	0.21	9600	1530	0.2	0.5	0.19	7680	980	0.2	0.5	0.17	5120	650	0.2	0.5	0.14
1.5	3	16	10600	1800	0.1	0.3	0.12	7950	1260	0.1	0.3	0.11	6360	810	0.1	0.3	0.1	4240	540	0.1	0.3	0.08
1.5	3	20	10600	1800	0.1	0.2	0.12	7950	1260	0.1	0.2	0.11	6360	810	0.1	0.2	0.1	4240	540	0.1	0.2	0.08
1.5	3	25	8500	1450	0.05	0.1	0.09	6375	1020	0.05	0.1	0.08	5100	650	0.05	0.1	0.07	3400	440	0.05	0.1	0.06
1.5	3	30	8500	1450	0.03	0.05	0.09	6375	1020	0.03	0.05	0.08	5100	650	0.03	0.05	0.07	3400	440	0.03	0.05	0.06
1.5	3	35	8500	1450	0.02	0.03	0.09	6375	1020	0.02	0.03	0.08	5100	650	0.02	0.03	0.07	3400	440	0.02	0.03	0.06
2	4	10	10000	2200	0.3	0.5	0.4	7500	1540	0.3	0.5	0.36	6000	990	0.3	0.5	0.32	4000	660	0.3	0.5	0.26
2	4	16	10000	2200	0.2	0.5	0.28	7500	1540	0.2	0.5	0.25	6000	990	0.2	0.5	0.22	4000	660	0.2	0.5	0.18
2	4	20	10000	2200	0.1	0.3	0.28	7500	1540	0.1	0.3	0.25	6000	990	0.1	0.3	0.22	4000	660	0.1	0.3	0.18
2	4	25	8000	1760	0.1	0.3	0.16	6000	1230	0.1	0.3	0.14	4800	790	0.1	0.3	0.13	3200	530	0.1	0.3	0.1
2	4	30	8000	1760	0.1	0.2	0.16	6000	1230	0.1	0.2	0.14	4800	790	0.1	0.2	0.13	3200	530	0.1	0.2	0.1
2	4	35	6400	1410	0.1	0.2	0.12	4800	990	0.1	0.2	0.11	3840	630	0.1	0.2	0.1	2560	420	0.1	0.2	0.08
2	4	40	6400	1410	0.05	0.1	0.12	4800	990	0.05	0.1	0.11	3840	630	0.05	0.1	0.1	2560	420	0.05	0.1	0.08
2	4	45	6400	1410	0.03	0.05	0.12	4800	990	0.03	0.05	0.11	3840	630	0.03	0.05	0.1	2560	420	0.03	0.05	0.08
2	4	50	4800	1060	0.02	0.03	0.12	3600	740	0.02	0.03	0.11	2880	480	0.02	0.03	0.1	1920	320	0.02	0.03	0.08
2.5	5	20	7700	1930	0.2	0.3	0.35	5775	1350	0.2	0.3	0.32	4620	870	0.2	0.3	0.28	3080	580	0.2	0.3	0.23
2.5	5	25	7700	1930	0.2	0.3	0.35	5775	1350	0.2	0.3	0.32	4620	870	0.2	0.3	0.28	3080	580	0.2	0.3	0.23
2.5	5	30	6400	1600	0.1	0.3	0.2	4800	1120	0.1	0.3	0.18	3840	720	0.1	0.3	0.16	2560	480	0.1	0.3	0.13
2.5	5	35	6400	1600	0.1	0.3	0.2	4800	1120	0.1	0.3	0.18	3840	720	0.1	0.3	0.16	2560	480	0.1	0.3	0.13
3	6	30	6400	1860	0.3	0.5	0.42	4800	1300	0.3	0.5	0.38	3840	840	0.3	0.5	0.34	2560	560	0.3	0.5	0.27
3	6	50	4200	1220	0.2	0.3	0.18	3150	850	0.2	0.3	0.16	2520	550	0.2	0.3	0.14	1680	370	0.2	0.3	0.12

1. Reduce the feeding speed to 1/2 for machining of corner.
2. Use of insoluble cutting liquid is recommended.
3. Use a ball with shorter length under neck sequentially in accordance with the depth of grooves.
4. Suppress the runout of mounting below 10 μm due to machining by high speed rotation.

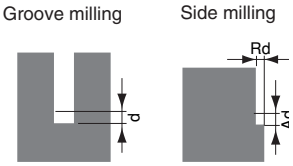
Recommended Conditions



■ GS MILL Long Neck 2 Flutes GSN2

Work Conditions		Carbon Steel, Alloy Steel (150～250HB)					Stainless Steel, Die Steel (25～35HRC)					Pre-hardened Steel (35～45HRC)					Hardened Steel (45～55HRC)				
Diameter D mm	Neck Length L1 mm	S/Speed min⁻¹	Feedrate mm/min	Depth of Cut mm Ad	Rd	d	S/Speed min⁻¹	Feedrate mm/min	Depth of Cut mm Ad	Rd	d	S/Speed min⁻¹	Feedrate mm/min	Depth of Cut mm Ad	Rd	d	S/Speed min⁻¹	Feedrate mm/min	Depth of Cut mm Ad	Rd	d
0.2	0.5	50000	300	0.02	0.005	0.02	50000	270	0.02	0.005	0.02	50000	240	0.02	0.004	0.014	50000	210	0.02	0.003	0.01
0.2	1	50000	300	0.02	0.005	0.014	50000	270	0.02	0.005	0.013	50000	240	0.02	0.004	0.01	50000	210	0.02	0.003	0.007
0.2	1.5	50000	300	0.02	0.005	0.008	50000	270	0.02	0.005	0.007	50000	240	0.02	0.004	0.006	50000	210	0.02	0.003	0.004
0.3	1	50000	500	0.03	0.005	0.021	50000	450	0.03	0.005	0.02	50000	400	0.03	0.004	0.015	42000	300	0.03	0.003	0.011
0.3	2	50000	500	0.03	0.005	0.012	50000	450	0.03	0.005	0.011	50000	400	0.03	0.004	0.008	42000	300	0.03	0.003	0.006
0.3	3	50000	500	0.03	0.005	0.009	50000	450	0.03	0.005	0.008	45000	400	0.03	0.004	0.006	42000	300	0.03	0.003	0.005
0.3	6	50000	500	0.03	0.005	0.006	50000	450	0.03	0.005	0.005	42000	400	0.03	0.004	0.004	42000	300	0.03	0.003	0.003
0.3	9	50000	500	0.03	0.005	0.003	50000	350	0.03	0.005	0.003	40000	300	0.03	0.004	0.002	42000	250	0.03	0.003	0.002
0.4	2	50000	750	0.04	0.01	0.028	50000	680	0.04	0.009	0.03	50000	560	0.04	0.007	0.02	34000	340	0.04	0.005	0.014
0.4	3	50000	750	0.04	0.01	0.016	50000	680	0.04	0.009	0.014	50000	560	0.04	0.007	0.011	34000	340	0.04	0.005	0.008
0.4	4	50000	750	0.04	0.008	0.012	50000	680	0.04	0.007	0.011	35000	560	0.04	0.006	0.008	34000	340	0.04	0.004	0.006
0.4	8	48000	550	0.04	0.006	0.008	38000	500	0.04	0.005	0.007	32000	410	0.04	0.004	0.006	34000	250	0.04	0.003	0.004
0.4	12	48000	450	0.04	0.005	0.004	38000	410	0.04	0.005	0.004	32000	340	0.04	0.004	0.003	34000	200	0.04	0.003	0.002
0.5	2	50000	900	0.1	0.02	0.035	43000	770	0.05	0.02	0.03	30000	450	0.05	0.014	0.02	25000	320	0.05	0.01	0.018
0.5	4	50000	900	0.1	0.015	0.02	43000	770	0.05	0.014	0.02	30000	450	0.05	0.011	0.014	25000	320	0.05	0.008	0.01
0.5	6	48000	860	0.1	0.012	0.015	41000	730	0.05	0.011	0.014	29000	430	0.05	0.008	0.011	24000	300	0.05	0.006	0.008
0.5	8	38000	680	0.1	0.01	0.01	32000	580	0.05	0.009	0.009	23000	340	0.05	0.007	0.007	19000	240	0.05	0.005	0.005
0.5	10	38000	600	0.1	0.008	0.01	32000	510	0.05	0.007	0.009	23000	300	0.05	0.006	0.007	19000	210	0.05	0.004	0.005
0.5	15	38000	500	0.1	0.006	0.005	32000	430	0.05	0.005	0.005	23000	250	0.05	0.004	0.004	19000	180	0.05	0.003	0.003
0.6	2	50000	1000	0.12	0.02	0.04	43000	850	0.06	0.02	0.04	30000	500	0.06	0.014	0.03	25000	350	0.06	0.01	0.021
0.6	4	50000	1000	0.12	0.02	0.02	43000	850	0.06	0.02	0.02	30000	500	0.06	0.014	0.02	25000	350	0.06	0.01	0.012
0.6	6	42000	840	0.12	0.015	0.02	36000	710	0.06	0.014	0.016	25000	420	0.06	0.011	0.013	21000	290	0.06	0.008	0.009
0.6	8	32000	640	0.12	0.012	0.02	27000	540	0.06	0.011	0.016	19000	320	0.06	0.008	0.013	16000	220	0.06	0.006	0.009
0.6	10	32000	640	0.12	0.012	0.012	27000	540	0.06	0.011	0.011	19000	320	0.06	0.008	0.008	16000	220	0.06	0.006	0.006
0.6	12	32000	640	0.12	0.01	0.012	27000	540	0.06	0.009	0.011	19000	320	0.06	0.007	0.008	16000	220	0.06	0.005	0.006
0.6	18	32000	640	0.12	0.005	0.006	27000	540	0.06	0.005	0.005	19000	320	0.06	0.004	0.004	16000	220	0.06	0.003	0.003
0.7	2	45000	990	0.14	0.02	0.07	38000	840	0.07	0.02	0.06	27000	500	0.07	0.014	0.05	23000	350	0.07	0.01	0.035
0.7	4	45000	990	0.14	0.015	0.03	38000	840	0.07	0.014	0.03	27000	500	0.07	0.011	0.02	23000	350	0.07	0.008	0.014
0.7	6	36000	790	0.14	0.015	0.02	31000	670	0.07	0.014	0.02	22000	400	0.07	0.011	0.015	18000	280	0.07	0.008	0.011
0.7	8	36000	790	0.14	0.01	0.02	31000	670	0.07	0.009	0.02	22000	400	0.07	0.007	0.015	18000	280	0.07	0.005	0.011
0.7	10	28000	620	0.14	0.005	0.014	24000	530	0.07	0.005	0.013	17000	310	0.07	0.004	0.01	14000	220	0.07	0.003	0.007
0.8	4	40000	1000	0.24	0.04	0.06	34000	850	0.08	0.04	0.05	24000	500	0.08	0.03	0.04	20000	350	0.08	0.02	0.03
0.8	6	40000	1000	0.24	0.03	0.03	34000	850	0.08	0.03	0.03	24000	500	0.08	0.02	0.02	20000	350	0.08	0.015	0.016
0.8	8	32000	800	0.24	0.02	0.02	27000	680	0.08	0.02	0.02	19000	400	0.08	0.014	0.02	16000	280	0.08	0.01	0.012
0.8	10	24000	600	0.24	0.02	0.02	20000	510	0.08	0.02	0.02	14000	300	0.08	0.014	0.02	12000	210	0.08	0.01	0.012
0.8	12	24000	600	0.24	0.015	0.016	20000	510	0.08	0.014	0.014	14000	300	0.08	0.011	0.011	12000	210	0.08	0.008	0.008
0.8	16	24000	600	0.24	0.01	0.016	20000	510	0.08	0.009	0.014	14000	300	0.08	0.007	0.011	12000	210	0.08	0.005	0.008
0.8	24	24000	600	0.24	0.008	0.008	20000	510	0.08	0.007	0.007	14000	300	0.08	0.006	0.006	12000	210	0.08	0.004	0.004
0.9	6	36000	1190	0.27	0.05	0.04	31000	1010	0.09	0.05	0.03	22000	600	0.09	0.04	0.03	18000	420	0.09	0.03	0.02
0.9	8	30000	990	0.27	0.03	0.03	26000	840	0.09	0.03	0.02	18000	500	0.09	0.02	0.02	15000	350	0.09	0.015	0.014
0.9	10	30000	990	0.27	0.02	0.03	26000	840	0.09	0.02	0.02	18000	500	0.09	0.014	0.02	15000	350	0.09	0.01	0.014
0.9	15	22000	730	0.27	0.01	0.02	19000	620	0.09	0.01	0.016	13000	370	0.09	0.007	0.013	11000	260	0.09	0.005	0.009
1	4	32000	1280	0.5	0.08	0.07	27000	900	0.1	0.07	0.06	22000	640	0.1	0.06	0.05	11000	300	0.1	0.04	0.04
1	6	32000	1280	0.5	0.06	0.04	27000	900	0.1	0.05	0.04	22000	640	0.1	0.04	0.03	11000	300	0.1	0.03	0.02
1	8	32000	1280	0.5	0.05	0.04	27000	900	0.1	0.05	0.04	22000	640	0.1	0.04	0.03	11000	300	0.1	0.03	0.02
1	10	26000	1040	0.5	0.04	0.03	22000	730	0.1	0.04	0.03	18000	520	0.1	0.03	0.02	9000	250	0.1	0.02	0.015
1	12	26000	1040	0.5	0.03	0.03	22000	730	0.1	0.03	0.03	18000	520	0.1	0.02	0.02	9000	250	0.1	0.015	0.015
1	16	19000	760	0.5	0.03	0.02	16000	530	0.1	0.03	0.02	13000	380	0.1	0.02	0.014	9000	250	0.1	0.015	0.01
1	20	19000	760	0.5	0.02	0.02	16000	530	0.1	0.02	0.02	13000	380	0.1	0.014	0.014	9000	250	0.1	0.01	0.01
1	25	19000	760	0.5	0.015	0.01	16000	530	0.1	0.014	0.009	13000	380	0.1	0.011	0.007	9000	250	0.1	0.008	0.005
1	30	19000	760	0.5	0.01	0.01	16000	530	0.1	0.009	0.009	13000	380	0.1	0.007	0.007	9000	250	0.1	0.005	0.005
1.2	6	26000	1170	0.6	0.12	0.08	22000	820	0.12	0.11	0.08	18000	590	0.12	0.08	0.06	9000	290	0.12	0.06	0.04
1.2	8	26000	1170	0.6	0.06	0.05	22000	820	0.12	0.05	0.04	18000	590	0.12	0.04	0.03	9000	290	0.12	0.03	0.02
1.2	10	22000	990	0.6	0.05	0.05	19000	690	0.12	0.05	0.04	15000	500	0.12	0.04	0.03	8000	260	0.12	0.03	0.02
1.2	12	22000	990	0.6	0.04	0.04	19000	690	0.12	0.04	0.03	15000	500	0.12	0.03	0.03	8000	260	0.12	0.02	0.02
1.2	16	16000	720	0.6	0.02	0.04	14000	500	0.12	0.02	0.03	11000	360	0.12	0.014	0.03	8000	260	0.12	0.01	0.02
1.2	20	16000	720	0.6	0.01	0.02	14000	500	0.12	0.01	0.02	11000	360	0.12	0.007	0.02	8000	260	0.12	0.005	0.012
1.5	6	21000	1130	0.75	0.12	0.11	18000	790	0.15	0.11	0.09	15000	570	0.15	0.08	0.07	7000	300	0.15	0.06	0.05
1.5	8	21000	1130	0.75	0.1	0.06	18000	790	0.15	0.09	0.05	15000	570	0.15	0.07	0.04	7000	300	0.15	0.05	0.03
1.5	10	21000	1130	0.75	0.08	0.06	18000	790	0.15	0.07	0.05	15000	570	0.15	0.06	0.04	7000	300	0.15	0.04	0.03
1.5	12	21000	1130	0.75	0.07	0.06	18000	790	0.15	0.06	0.05	15000	570	0.15	0.05	0.04	7000	300	0.15	0.04	0.03
1.5	14	17000	920	0.75	0.05	0.05	14000	640	0.15	0.05	0.04	12000	460	0.15	0.04	0.03	6000	260	0.15	0.03	0.02
1.5	16	17000	920	0.75	0.04	0.05	14000	640	0.15	0.04	0.04	12000	460	0.15	0.03	0.03	6000	260	0.15	0.02	0.02
1.5	18	17000	920	0.75	0.03	0.05	14000	640	0.15	0.03	0.04	12000	460	0.15	0.02	0.03	6000	260	0.15	0.015	0.02
1.5	20	12800	690	0.75	0.03	0.05	11000	480	0.15	0.03	0.04	9000	350	0.15	0.02	0.03	6000	260	0.15	0.015	0.02

Recommended Conditions

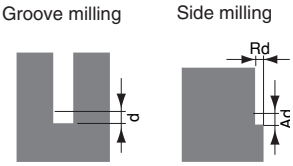


■ GS MILL Long Neck 2 Flutes GSN2

Work Conditions		Carbon Steel, Alloy Steel (150～250HB)					Stainless Steel, Die Steel (25～35HRC)					Pre-hardened Steel (35～45HRC)					Hardened Steel (45～55HRC)				
Diameter D mm	Neck Length L1 mm	S/Speed min⁻¹	Feedrate mm/min	Depth of Cut mm Ad	Rd	d	S/Speed min⁻¹	Feedrate mm/min	Depth of Cut mm Ad	Rd	d	S/Speed min⁻¹	Feedrate mm/min	Depth of Cut mm Ad	Rd	d	S/Speed min⁻¹	Feedrate mm/min	Depth of Cut mm Ad	Rd	d
1.5	25	12800	690	0.75	0.02	0.03	11000	480	0.15	0.02	0.03	9000	350	0.15	0.014	0.02	6000	260	0.15	0.01	0.015
1.5	30	12800	690	0.75	0.02	0.03	11000	480	0.15	0.02	0.03	9000	350	0.15	0.014	0.02	6000	260	0.15	0.01	0.015
1.5	38	12800	690	0.75	0.015	0.015	11000	480	0.15	0.014	0.014	9000	350	0.15	0.011	0.011	6000	260	0.15	0.008	0.008
1.5	45	12800	690	0.75	0.01	0.015	11000	480	0.15	0.009	0.014	9000	350	0.15	0.007	0.011	6000	260	0.15	0.005	0.008
2	6	16000	1120	1	0.15	0.2	14000	780	0.2	0.14	0.18	11000	560	0.2	0.11	0.14	6000	360	0.2	0.08	0.1
2	8	16000	1120	1	0.12	0.14	14000	780	0.2	0.11	0.13	11000	560	0.2	0.08	0.1	6000	360	0.2	0.06	0.07
2	10	16000	1120	1	0.11	0.14	14000	780	0.2	0.1	0.13	11000	560	0.2	0.08	0.1	6000	360	0.2	0.06	0.07
2	12	16000	1120	1	0.1	0.08	14000	780	0.2	0.09	0.07	11000	560	0.2	0.07	0.06	6000	360	0.2	0.05	0.04
2	14	16000	1120	1	0.08	0.08	14000	780	0.2	0.07	0.07	11000	560	0.2	0.06	0.06	6000	360	0.2	0.04	0.04
2	16	16000	1120	1	0.08	0.08	14000	780	0.2	0.07	0.07	11000	560	0.2	0.05	0.06	6000	360	0.2	0.04	0.04
2	18	12000	840	1	0.07	0.06	10000	590	0.2	0.06	0.05	8000	420	0.2	0.05	0.04	5000	300	0.2	0.04	0.03
2	20	12000	840	1	0.05	0.06	10000	590	0.2	0.05	0.05	8000	420	0.2	0.04	0.04	5000	300	0.2	0.03	0.03
2	25	10000	700	1	0.03	0.06	9000	490	0.2	0.02	0.05	7000	350	0.2	0.02	0.04	5000	300	0.2	0.01	0.03
2	30	10000	700	1	0.03	0.04	9000	490	0.2	0.02	0.04	7000	350	0.2	0.02	0.03	5000	300	0.2	0.01	0.02
2	35	10000	700	1	0.02	0.04	9000	490	0.2	0.02	0.04	7000	350	0.2	0.014	0.03	5000	300	0.2	0.01	0.02
2	40	10000	700	1	0.02	0.04	9000	490	0.2	0.02	0.04	7000	350	0.2	0.014	0.03	5000	300	0.2	0.01	0.02
2	50	10000	700	1	0.015	0.02	9000	490	0.2	0.014	0.02	7000	350	0.2	0.011	0.014	5000	300	0.2	0.008	0.01
2	60	10000	700	1	0.01	0.02	9000	490	0.2	0.01	0.02	7000	350	0.2	0.007	0.014	5000	300	0.2	0.005	0.01
2.5	8	13000	1300	1.25	0.15	0.18	11000	910	0.25	0.14	0.16	9000	650	0.25	0.11	0.12	5000	400	0.25	0.08	0.09
2.5	10	13000	1300	1.25	0.12	0.18	11000	910	0.25	0.11	0.16	9000	650	0.25	0.08	0.12	5000	400	0.25	0.06	0.09
2.5	12	13000	1300	1.25	0.1	0.18	11000	910	0.25	0.09	0.16	9000	650	0.25	0.07	0.12	5000	400	0.25	0.05	0.09
2.5	14	13000	1300	1.25	0.07	0.1	11000	910	0.25	0.06	0.09	9000	650	0.25	0.05	0.07	5000	400	0.25	0.04	0.05
2.5	16	13000	1300	1.25	0.06	0.1	11000	910	0.25	0.05	0.09	9000	650	0.25	0.04	0.07	5000	400	0.25	0.03	0.05
2.5	18	13000	1300	1.25	0.05	0.1	11000	910	0.25	0.05	0.09	9000	650	0.25	0.04	0.07	5000	400	0.25	0.03	0.05
2.5	20	13000	1300	1.25	0.04	0.1	11000	910	0.25	0.04	0.09	9000	650	0.25	0.03	0.07	5000	400	0.25	0.02	0.05
2.5	25	10000	1000	1.25	0.03	0.08	9000	700	0.25	0.03	0.07	7000	500	0.25	0.02	0.05	4000	320	0.25	0.015	0.04
2.5	30	10000	1000	1.25	0.02	0.08	9000	700	0.25	0.02	0.07	7000	500	0.25	0.014	0.05	4000	320	0.25	0.01	0.04
2.5	40	8300	830	1.25	0.015	0.05	7000	580	0.25	0.014	0.05	6000	420	0.25	0.01	0.04	4000	320	0.25	0.008	0.03
2.5	50	8300	830	1.25	0.01	0.05	7000	580	0.25	0.01	0.05	6000	420	0.25	0.007	0.04	4000	320	0.25	0.005	0.03
3	8	11000	1760	1.5	0.15	0.3	9000	1230	0.3	0.14	0.27	8000	880	0.3	0.11	0.21	4000	450	0.3	0.08	0.15
3	10	11000	1760	1.5	0.13	0.21	9000	1230	0.3	0.12	0.19	8000	880	0.3	0.09	0.15	4000	450	0.3	0.07	0.11
3	12	11000	1760	1.5	0.12	0.21	9000	1230	0.3	0.11	0.19	8000	880	0.3	0.08	0.15	4000	450	0.3	0.06	0.11
3	14	11000	1760	1.5	0.11	0.21	9000	1230	0.3	0.1	0.19	8000	880	0.3	0.08	0.15	4000	450	0.3	0.06	0.11
3	16	11000	1760	1.5	0.1	0.12	9000	1230	0.3	0.09	0.11	8000	880	0.3	0.07	0.08	4000	450	0.3	0.05	0.06
3	18	11000	1760	1.5	0.08	0.12	9000	1230	0.3	0.07	0.11	8000	880	0.3	0.06	0.08	4000	450	0.3	0.04	0.06
3	20	11000	1760	1.5	0.07	0.12	9000	1230	0.3	0.06	0.11	8000	880	0.3	0.05	0.08	4000	450	0.3	0.04	0.06
3	25	8000	1280	1.5	0.06	0.09	7000	900	0.3	0.05	0.08	6000	640	0.3	0.04	0.06	3000	330	0.3	0.03	0.05
3	30	8000	1280	1.5	0.04	0.09	7000	900	0.3	0.04	0.08	6000	640	0.3	0.03	0.06	3000	330	0.3	0.02	0.05
3	40	6900	1100	1.5	0.02	0.09	6000	770	0.3	0.02	0.08	5000	550	0.3	0.014	0.06	3000	330	0.3	0.01	0.05
3	50	6900	1100	1.5	0.01	0.06	6000	770	0.3	0.01	0.05	5000	550	0.3	0.007	0.04	3000	330	0.3	0.005	0.03
4	12	8000	1440	2	0.15	0.4	7000	1010	0.4	0.14	0.36	6000	720	0.4	0.11	0.28	3000	420	0.4	0.08	0.2
4	20	8000	1440	2	0.1	0.28	7000	1010	0.4	0.09	0.25	6000	720	0.4	0.07	0.2	3000	420	0.4	0.05	0.14
4	25	8000	1440	2	0.07	0.16	7000	1010	0.4	0.06	0.14	6000	720	0.4	0.05	0.11	3000	420	0.4	0.04	0.08
4	30	8000	1440	2	0.05	0.16	7000	1010	0.4	0.05	0.14	6000	720	0.4	0.04	0.11	3000	420	0.4	0.03	0.08
4	35	6000	1080	2	0.04	0.12	5000	760	0.4	0.04	0.11	4000	540	0.4	0.03	0.08	2500	350	0.4	0.02	0.06
4	40	6000	1080	2	0.03	0.12	5000	760	0.4	0.03	0.11	4000	540	0.4	0.02	0.08	2500	350	0.4	0.015	0.06
4	45	6000	1080	2	0.02	0.12	5000	760	0.4	0.02	0.11	4000	540	0.4	0.014	0.08	2500	350	0.4	0.01	0.06
4	50	5200	940	2	0.015	0.12	4000	660	0.4	0.014	0.11	4000	470	0.4	0.01	0.08	2500	350	0.4	0.008	0.06
4	60	5200	940	2	0.01	0.08	4000	660	0.4	0.01	0.07	4000	470	0.4	0.007	0.06	2500	350	0.4	0.005	0.04
5	16	6400	1280	2.5	0.15	0.35	5000	900	0.5	0.14	0.32	4000	640	0.5	0.11	0.25	2000	360	0.5	0.08	0.18
5	25	6400	1280	2.5	0.1	0.35	5000	900	0.5	0.09	0.32	4000	640	0.5	0.07	0.25	2000	360	0.5	0.05	0.18
5	35	6400	1280	2.5	0.07	0.2	5000	900	0.5	0.06	0.18	4000	640	0.5	0.05	0.14	2000	360	0.5	0.04	0.1
5	50	4800	960	2.5	0.04	0.15	4000	670	0.5	0.04	0.14	3000	480	0.5	0.03	0.11	2000	360	0.5	0.02	0.08
5	60	4800	960	2.5	0.015	0.15	4000	670	0.5	0.014	0.14	3000	480	0.5	0.01	0.11	2000	360	0.5	0.008	0.08
6	20	5300	1170	3	0.15	0.42	5000	820	0.6	0.14	0.38	4000	590	0.6	0.11	0.29	2000	400	0.6	0.08	0.21
6	30	5300	1170	3	0.1	0.42	5000	820	0.6	0.09	0.38	4000	590	0.6	0.07	0.29	2000	400	0.6	0.05	0.21
6	40	5300	1170	3	0.07	0.24	5000	820	0.6	0.06	0.22	4000	590	0.6	0.05	0.17	2000	400	0.6	0.04	0.12
6	50	4000	880	3	0.04	0.18	3000	620	0.6	0.04	0.16	3000	440	0.6	0.03	0.13	2000	400	0.6	0.02	0.09
6	60	4000	880	3	0.015	0.18	3000	620	0.6	0.014	0.16	3000	440	0.6	0.01	0.13	2000	400	0.6	0.008	0.09

1. For radius processing, reduce the feed to 1/2 of the recommendation.
2. Insoluble cutting oil is recommended.
3. Use the shortest neck length possible in accordance with the depth of the grooves.
4. Because of high spindle speeds, run-out of the endmill when mounted should be less than 10 μm.

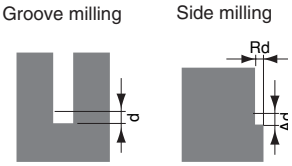
Recommended Conditions



■ GS MILL Long Neck 4 Flutes GSN4

Work Conditions		Carbon Steel, Alloy Steel (150～250HB)					Stainless Steel, Die Steel (25～35HRC)					Pre-hardened Steel (35～45HRC)					Hardened Steel (45～55HRC)				
Diameter D mm	Neck Length L_1 mm	S/Speed min^{-1}	Feedrate mm/min	Depth of Cut mm			S/Speed min^{-1}	Feedrate mm/min	Depth of Cut mm			S/Speed min^{-1}	Feedrate mm/min	Depth of Cut mm			S/Speed min^{-1}	Feedrate mm/min	Depth of Cut mm		
				Ad	Rd	d			Ad	Rd	d			Ad	Rd	d			Ad	Rd	d
1	4	32000	1920	0.5	0.08	0.07	27000	1340	0.1	0.07	0.06	22000	960	0.1	0.06	0.05	11000	450	0.1	0.04	0.04
1	6	32000	1920	0.5	0.06	0.04	27000	1340	0.1	0.05	0.04	22000	960	0.1	0.04	0.03	11000	450	0.1	0.03	0.02
1	8	32000	1920	0.5	0.05	0.04	27000	1340	0.1	0.05	0.04	22000	960	0.1	0.04	0.03	11000	450	0.1	0.03	0.02
1	10	26000	1560	0.5	0.04	0.03	22000	1090	0.1	0.04	0.03	18000	780	0.1	0.03	0.02	9000	370	0.1	0.02	0.015
1	12	26000	1560	0.5	0.03	0.03	22000	1090	0.1	0.03	0.03	18000	780	0.1	0.02	0.02	9000	370	0.1	0.015	0.015
1	16	19000	1140	0.5	0.03	0.02	16000	800	0.1	0.03	0.02	13000	570	0.1	0.02	0.014	9000	370	0.1	0.015	0.01
1	20	19000	1140	0.5	0.02	0.02	16000	800	0.1	0.02	0.02	13000	570	0.1	0.014	0.014	9000	370	0.1	0.01	0.01
1	25	19000	1140	0.5	0.015	0.01	16000	800	0.1	0.014	0.01	13000	570	0.1	0.01	0.007	9000	370	0.1	0.008	0.005
1	30	19000	1140	0.5	0.01	0.01	16000	800	0.1	0.01	0.01	13000	570	0.1	0.007	0.007	9000	370	0.1	0.005	0.005
1.2	6	26000	1760	0.6	0.12	0.08	22000	1230	0.12	0.11	0.08	18000	880	0.12	0.08	0.06	9000	440	0.12	0.06	0.04
1.2	8	26000	1760	0.6	0.06	0.05	22000	1230	0.12	0.05	0.04	18000	880	0.12	0.04	0.03	9000	440	0.12	0.03	0.02
1.2	10	22000	1490	0.6	0.05	0.05	19000	1040	0.12	0.05	0.04	15000	750	0.12	0.04	0.03	8000	390	0.12	0.03	0.02
1.2	12	22000	1490	0.6	0.04	0.04	19000	1040	0.12	0.04	0.03	15000	750	0.12	0.03	0.03	8000	390	0.12	0.02	0.02
1.2	16	16000	1080	0.6	0.02	0.04	14000	760	0.12	0.02	0.03	11000	540	0.12	0.014	0.03	8000	390	0.12	0.01	0.02
1.2	20	16000	1080	0.6	0.01	0.02	14000	760	0.12	0.01	0.02	11000	540	0.12	0.007	0.017	8000	390	0.12	0.005	0.01
1.5	6	21000	1700	0.75	0.12	0.11	18000	1190	0.15	0.11	0.09	15000	850	0.15	0.08	0.07	7000	450	0.15	0.06	0.05
1.5	8	21000	1700	0.75	0.1	0.06	18000	1190	0.15	0.09	0.05	15000	850	0.15	0.07	0.04	7000	450	0.15	0.05	0.03
1.5	10	21000	1700	0.75	0.08	0.06	18000	1190	0.15	0.07	0.05	15000	850	0.15	0.06	0.04	7000	450	0.15	0.04	0.03
1.5	12	21000	1700	0.75	0.07	0.06	18000	1190	0.15	0.06	0.05	15000	850	0.15	0.05	0.04	7000	450	0.15	0.04	0.03
1.5	14	17000	1380	0.75	0.05	0.05	14000	970	0.15	0.05	0.04	12000	690	0.15	0.04	0.03	6000	390	0.15	0.03	0.02
1.5	16	17000	1380	0.75	0.04	0.05	14000	970	0.15	0.04	0.04	12000	690	0.15	0.03	0.03	6000	390	0.15	0.02	0.02
1.5	18	17000	1380	0.75	0.03	0.05	14000	970	0.15	0.03	0.04	12000	690	0.15	0.02	0.03	6000	390	0.15	0.015	0.02
1.5	20	12800	1040	0.75	0.03	0.05	11000	730	0.15	0.03	0.04	9000	520	0.15	0.02	0.03	6000	390	0.15	0.015	0.02
1.5	25	12800	1040	0.75	0.02	0.03	11000	730	0.15	0.018	0.03	9000	520	0.15	0.014	0.02	6000	390	0.15	0.01	0.015
1.5	30	12800	1040	0.75	0.02	0.03	11000	730	0.15	0.018	0.03	9000	520	0.15	0.014	0.02	6000	390	0.15	0.01	0.015
1.5	38	12800	1040	0.75	0.02	0.02	11000	730	0.15	0.014	0.014	9000	520	0.15	0.01	0.01	6000	390	0.15	0.008	0.008
1.5	45	12800	1040	0.75	0.01	0.02	11000	730	0.15	0.01	0.014	9000	520	0.15	0.007	0.01	6000	390	0.15	0.005	0.008
2	6	16000	1680	1	0.15	0.2	14000	1180	0.2	0.14	0.18	11000	840	0.2	0.11	0.14	6000	540	0.2	0.08	0.1
2	8	16000	1680	1	0.12	0.14	14000	1180	0.2	0.11	0.13	11000	840	0.2	0.08	0.1	6000	540	0.2	0.06	0.07
2	10	16000	1680	1	0.11	0.14	14000	1180	0.2	0.1	0.13	11000	840	0.2	0.08	0.1	6000	540	0.2	0.06	0.07
2	12	16000	1680	1	0.1	0.08	14000	1180	0.2	0.09	0.07	11000	840	0.2	0.07	0.06	6000	540	0.2	0.05	0.04
2	14	16000	1680	1	0.08	0.08	14000	1180	0.2	0.07	0.07	11000	840	0.2	0.06	0.06	6000	540	0.2	0.04	0.04
2	16	16000	1680	1	0.08	0.08	14000	1180	0.2	0.07	0.07	11000	840	0.2	0.05	0.06	6000	540	0.2	0.04	0.04
2	18	12000	1260	1	0.07	0.06	10000	880	0.2	0.06	0.05	8000	630	0.2	0.05	0.04	5000	450	0.2	0.04	0.03
2	20	12000	1260	1	0.05	0.06	10000	880	0.2	0.05	0.05	8000	630	0.2	0.04	0.04	5000	450	0.2	0.03	0.03
2	25	10000	1050	1	0.03	0.06	9000	740	0.2	0.02	0.05	7000	530	0.2	0.018	0.04	5000	450	0.2	0.013	0.03
2	30	10000	1050	1	0.03	0.04	9000	740	0.2	0.02	0.04	7000	530	0.2	0.018	0.03	5000	450	0.2	0.013	0.02
2	35	10000	1050	1	0.02	0.04	9000	740	0.2	0.018	0.04	7000	530	0.2	0.014	0.03	5000	450	0.2	0.01	0.02
2	40	10000	1050	1	0.02	0.04	9000	740	0.2	0.018	0.04	7000	530	0.2	0.014	0.03	5000	450	0.2	0.01	0.02
2	50	10000	1050	1	0.015	0.02	9000	740	0.2	0.014	0.018	7000	530	0.2	0.01	0.014	5000	450	0.2	0.008	0.01
2	60	10000	1050	1	0.01	0.02	9000	740	0.2	0.01	0.018	7000	530	0.2	0.007	0.014	5000	450	0.2	0.005	0.01
2.5	8	13000	1950	1.25	0.15	0.18	11000	1370	0.25	0.14	0.16	9000	980	0.25	0.11	0.12	5000	600	0.25	0.08	0.09
2.5	10	13000	1950	1.25	0.12	0.18	11000	1370	0.25	0.11	0.16	9000	980	0.25	0.08	0.12	5000	600	0.25	0.06	0.09
2.5	12	13000	1950	1.25	0.1	0.18	11000	1370	0.25	0.09	0.16	9000	980	0.25	0.07	0.12	5000	600	0.25	0.05	0.09
2.5	14	13000	1950	1.25	0.07	0.1	11000	1370	0.25	0.06	0.09	9000	980	0.25	0.05	0.07	5000	600	0.25	0.04	0.05
2.5	16	13000	1950	1.25	0.06	0.1	11000	1370	0.25	0.05	0.09	9000	980	0.25	0.04	0.07	5000	600	0.25	0.03	0.05
2.5	18	13000	1950	1.25	0.05	0.1	11000	1370	0.25	0.05	0.09	9000	980	0.25	0.04	0.07	5000	600	0.25	0.03	0.05
2.5	20	13000	1950	1.25	0.04	0.1	11000	1370	0.25	0.04	0.09	9000	980	0.25	0.03	0.07	5000	600	0.25	0.02	0.05
2.5	25	10000	1500	1.25	0.03	0.08	9000	1050	0.25	0.03	0.07	7000	750	0.25	0.02	0.05	4000	480	0.25	0.015	0.04
2.5	30	10000	1500	1.25	0.02	0.08	9000	1050	0.25	0.018	0.07	7000	750	0.25	0.01	0.05	4000	480	0.25	0.01	0.04
2.5	40	8300	1250	1.25	0.015	0.05	7000	880	0.25	0.014	0.05	6000	630	0.25	0.01	0.04	4000	480	0.25	0.008	0.03
2.5	50	8300	1250	1.25	0.01	0.05	7000	880	0.25	0.01	0.05	6000	630	0.25	0.007	0.04	4000	480	0.25	0.005	0.03
3	8	11000	2640	1.5	0.15	0.3	9000	1850	0.3	0.14	0.27	8000	1320	0.3	0.11	0.21	4000	680	0.3	0.08	0.15
3	10	11000	2640	1.5	0.13	0.21	9000	1850	0.3	0.12	0.19	8000	1320	0.3	0.09	0.15	4000	680	0.3	0.07	0.11
3	12	11000	2640	1.5	0.12	0.21	9000	1850	0.3	0.11	0.19	8000	1320	0.3	0.08	0.15	4000	680	0.3	0.06	0.11
3	14	11000	2640	1.5	0.11	0.21	9000	1850	0.3	0.1	0.19	8000	1320	0.3	0.08	0.15	4000	680	0.3	0.06	0.11
3	16	11000	2640	1.5	0.1	0.12	9000	1850	0.3	0.09	0.11	8000	1320	0.3	0.07	0.08	4000	680	0.3	0.05	0.06
3	18	11000	2640	1.5	0.08	0.12	9000	1850	0.3	0.07	0.11	8000	1320	0.3	0.06	0.08	4000	680	0.3	0.04	0.06
3	20	11000	2640	1.5	0.07	0.12	9000	1850	0.3	0.06	0.11	8000	1320	0.3	0.05	0.08	4000	680	0.3	0.04	0.06
3	25	8000	1920	1.5	0.06	0.09	7000	1340	0.3	0.05	0.08	6000	960	0.3	0.04	0.06	3000	500	0.3	0.03	0.05
3	30	8000	1920	1.5	0.04	0.09	7000	1340	0.3	0.04	0.08	6000	960	0.3	0.03	0.06	3000	500	0.3	0.02	0.05
3	40	6900	1650	1.5	0.02	0.09	6000	1740	0.3	0.02	0.08	5000	1250	0.3	0.014	0.06	3000	500	0.3	0.01	0.05
3	50	6900	1650	1.5	0.01	0.06	6000	1740	0.3	0.01	0.05	5000	1250	0.3	0.007	0.04	3000	500	0.3	0.005	0.03
4	12	8000	2160	2	0.15	0.4	7000	2270	0.4	0.14	0.36	6000	1620	0.4	0.11	0.28	3000	630	0.4	0.08	0.2
4	20	8000	2160	2	0.1	0.28	7000	2270	0.4	0.09	0.25	6000	1620	0.4	0.07	0.2	3000	630	0.4	0.05	0.14

Recommended Conditions



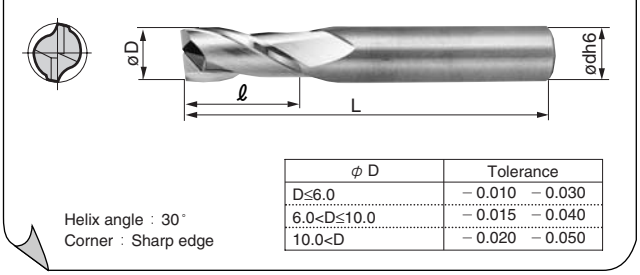
■ GS MILL Long Neck 4 Flutes GSN4

Work Conditions		Carbon Steel, Alloy Steel (150～250HB)					Stainless Steel, Die Steel (25～35HRC)					Pre-hardened Steel (35～45HRC)					Hardened Steel (45～55HRC)				
Diameter D mm	Neck Length L_1 mm	S/Speed min^{-1}	Feedrate mm/min	Depth of Cut mm			S/Speed min^{-1}	Feedrate mm/min	Depth of Cut mm			S/Speed min^{-1}	Feedrate mm/min	Depth of Cut mm			S/Speed min^{-1}	Feedrate mm/min	Depth of Cut mm		
				Ad	Rd	d			Ad	Rd	d			Ad	Rd	d			Ad	Rd	d
4	25	8000	2160	2	0.07	0.16	7000	2270	0.4	0.06	0.14	6000	1620	0.4	0.05	0.11	3000	630	0.4	0.04	0.08
4	30	8000	2160	2	0.05	0.16	7000	2270	0.4	0.05	0.14	6000	1620	0.4	0.04	0.11	3000	630	0.4	0.03	0.08
4	35	6000	1620	2	0.04	0.12	5000	1700	0.4	0.04	0.11	4000	1220	0.4	0.03	0.08	2500	530	0.4	0.02	0.06
4	40	6000	1620	2	0.03	0.12	5000	1700	0.4	0.03	0.11	4000	1220	0.4	0.02	0.08	2500	530	0.4	0.015	0.06
4	45	6000	1620	2	0.02	0.12	5000	1700	0.4	0.02	0.11	4000	1220	0.4	0.014	0.08	2500	530	0.4	0.01	0.06
4	50	5200	1410	2	0.015	0.12	4000	1490	0.4	0.014	0.11	4000	1070	0.4	0.01	0.08	2500	530	0.4	0.008	0.06
4	60	5200	1410	2	0.01	0.08	4000	1490	0.4	0.01	0.07	4000	1070	0.4	0.007	0.06	2500	530	0.4	0.005	0.04
5	16	6400	1920	2.5	0.15	0.35	5000	2010	0.5	0.14	0.32	4000	1440	0.5	0.11	0.25	2000	540	0.5	0.08	0.18
5	25	6400	1920	2.5	0.1	0.35	5000	2010	0.5	0.09	0.32	4000	1440	0.5	0.07	0.25	2000	540	0.5	0.05	0.18
5	35	6400	1920	2.5	0.07	0.2	5000	2010	0.5	0.06	0.18	4000	1440	0.5	0.05	0.14	2000	540	0.5	0.04	0.1
5	50	4800	1440	2.5	0.04	0.15	4000	1520	0.5	0.04	0.14	3000	1080	0.5	0.03	0.11	2000	540	0.5	0.02	0.08
5	60	4800	1440	2.5	0.015	0.15	4000	1520	0.5	0.014	0.14	3000	1080	0.5	0.01	0.11	2000	540	0.5	0.008	0.08
6	20	5300	1760	3	0.15	0.42	5000	1850	0.6	0.14	0.38	4000	1320	0.6	0.11	0.29	2000	600	0.6	0.08	0.21
6	30	5300	1760	3	0.1	0.42	5000	1850	0.6	0.09	0.38	4000	1320	0.6	0.07	0.29	2000	600	0.6	0.05	0.21
6	40	5300	1760	3	0.07	0.24	5000	1850	0.6	0.06	0.22	4000	1320	0.6	0.05	0.17	2000	600	0.6	0.04	0.12
6	50	4000	1320	3	0.04	0.18	3000	1380	0.6	0.04	0.16	3000	990	0.6	0.03	0.13	2000	600	0.6	0.02	0.09
6	60	4000	1320	3	0.015	0.18	3000	1380	0.6	0.014	0.16	3000	990	0.6	0.01	0.13	2000	600	0.6	0.008	0.09

1. For radius processing, reduce the feed to 1/2 of the recommendation.
2. Insoluble cutting oil is recommended.
3. Use the shortest neck length possible in accordance with the depth of the grooves.
4. Because of high spindle speeds, run-out of the endmill when mounted should be less than 10 μm.

SSM 2000 Type

2 teeth



φ D	Tolerance
D≤6.0	−0.010 −0.030
6.0<D≤10.0	−0.015 −0.040
10.0<D	−0.020 −0.050

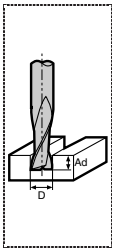
Helix angle : 30°
Corner : Sharp edge

■ Endmills Diameter : ø0.2～4.3mm (mm)

Cat. No.	Stock	øD	ℓ	L	ød
SSM 2002	●	0.2	0.5	40	3
SSM 2003	●	0.3	1	40	3
SSM 2004	●	0.4	1	40	3
SSM 2005	●	0.5	1.5	40	3
SSM 2006	●	0.6	1.5	40	3
SSM 2007	●	0.7	1.5	40	3
SSM 2008	●	0.8	2	40	3
SSM 2009	●	0.9	2	40	3
SSM 2010	●	1.0	3	40	4
SSM 2011	●	1.1	3	40	4
SSM 2012	●	1.2	3	40	4
SSM 2013	●	1.3	3	40	4
SSM 2014	●	1.4	3	40	4
SSM 2015	●	1.5	5	40	4
SSM 2016	●	1.6	5	40	4
SSM 2017	●	1.7	5	40	4
SSM 2018	●	1.8	5	40	4
SSM 2019	●	1.9	5	40	4
SSM 2020	●	2.0	6	40	4
SSM 2021	●	2.1	6	40	4
SSM 2022	●	2.2	6	40	4
SSM 2023	●	2.3	6	40	4
SSM 2024	●	2.4	6	40	4
SSM 2025	●	2.5	8	40	4
SSM 2026	●	2.6	8	40	4
SSM 2027	●	2.7	8	40	4
SSM 2028	●	2.8	8	40	4
SSM 2029	●	2.9	8	40	4
SSM 2030	●	3.0	8	45	6
SSM 2031	●	3.1	8	45	6
SSM 2032	●	3.2	8	45	6
SSM 2033	●	3.3	8	45	6
SSM 2034	●	3.4	8	45	6
SSM 2035	●	3.5	8	45	6
SSM 2036	●	3.6	10	45	6
SSM 2037	●	3.7	10	45	6
SSM 2038	●	3.8	10	45	6
SSM 2039	●	3.9	10	45	6
SSM 2040	●	4.0	10	45	6
SSM 2041	●	4.1	10	45	6
SSM 2042	●	4.2	10	45	6
SSM 2043	●	4.3	10	45	6

Recommended Conditions (Slotting) less than ø3 ; Ad=0.5 × øD
ø3 and above : Ad=1.0 × øD

øD \ Material		Carbon steel, Alloy steel (Below 30HRC)	Carbon steel, Alloy steel (Below 40HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron
0.2 ~ 0.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	~ 0.002	~ 0.002	~ 0.001	0.002 ~ 0.004
1.0 ~ 2.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.003 ~ 0.010	0.003 ~ 0.010	0.002 ~ 0.005	0.005 ~ 0.017
3.0 ~ 4.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.012 ~ 0.024	0.012 ~ 0.024	0.006 ~ 0.011	0.018 ~ 0.040



V=m/min f=mm/t
For small diameter endmills, if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

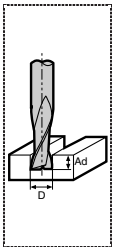
■ Endmills Diameter : ø4.4～8.5mm (mm)

Cat. No.	Stock	øD	ℓ	L	ød
SSM 2044	●	4.4	10	45	6
SSM 2045	●	4.5	10	45	6
SSM 2046	●	4.6	12	50	6
SSM 2047	●	4.7	12	50	6
SSM 2048	●	4.8	12	50	6
SSM 2049	●	4.9	12	50	6
SSM 2050	●	5.0	12	50	6
SSM 2051	●	5.1	12	50	6
SSM 2052	●	5.2	12	50	6
SSM 2053	●	5.3	12	50	6
SSM 2054	●	5.4	12	50	6
SSM 2055	●	5.5	12	50	6
SSM 2056	●	5.6	12	50	6
SSM 2057	●	5.7	12	50	6
SSM 2058	●	5.8	12	50	6
SSM 2059	●	5.9	12	50	6
SSM 2060	●	6.0	12	50	6
SSM 2061	●	6.1	12	50	8
SSM 2062	●	6.2	12	50	8
SSM 2063	●	6.3	12	50	8
SSM 2064	●	6.4	12	50	8
SSM 2065	●	6.5	12	50	8
SSM 2066	●	6.6	15	55	8
SSM 2067	●	6.7	15	55	8
SSM 2068	●	6.8	15	55	8
SSM 2069	●	6.9	15	55	8
SSM 2070	●	7.0	15	55	8
SSM 2071	●	7.1	15	55	8
SSM 2072	●	7.2	15	55	8
SSM 2073	●	7.3	15	55	8
SSM 2074	●	7.4	15	55	8
SSM 2075	●	7.5	15	55	8
SSM 2076	●	7.6	15	55	8
SSM 2077	●	7.7	15	55	8
SSM 2078	●	7.8	15	55	8
SSM 2079	●	7.9	15	55	8
SSM 2080	●	8.0	15	55	8
SSM 2081	●	8.1	15	55	10
SSM 2082	●	8.2	15	55	10
SSM 2083	●	8.3	15	55	10
SSM 2084	●	8.4	15	55	10
SSM 2085	●	8.5	15	55	10

Grade : A1

Recommended Conditions (Slotting) Ad=1.0 × øD

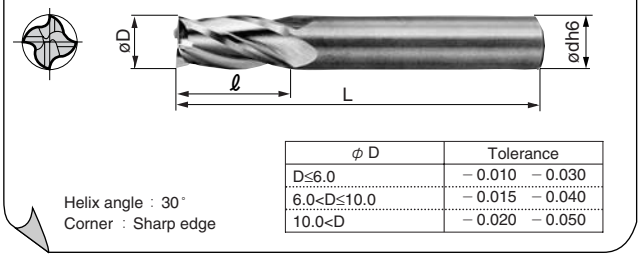
øD \ Material		Carbon steel, Alloy steel (Below 30HRC)	Carbon steel, Alloy steel (Below 40HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron
5 ~ 5.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.012 ~ 0.024	0.012 ~ 0.024	0.006 ~ 0.011	0.018 ~ 0.040
6 ~ 8.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.025 ~ 0.050	0.025 ~ 0.050	0.013 ~ 0.025	0.045 ~ 0.105



V=m/min f=mm/t

SSM 4000 Type

4 teeth



φ D	Tolerance
D≤6.0	−0.010 −0.030
6.0<D≤10.0	−0.015 −0.040
10.0<D	−0.020 −0.050

Helix angle : 30°
Corner : Sharp edge

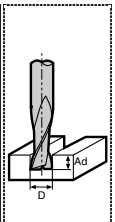
■ Endmills Diameter : ø8.6～30.0mm (mm)

Cat. No.	Stock	øD	ℓ	L	ød
SSM 2086	●	8.6	15	55	10
SSM 2087	●	8.7	15	55	10
SSM 2088	●	8.8	15	55	10
SSM 2089	●	8.9	15	55	10
SSM 2090	●	9.0	15	55	10
SSM 2091	●	9.1	15	55	10
SSM 2092	●	9.2	15	55	10
SSM 2093	●	9.3	15	55	10
SSM 2094	●	9.4	15	55	10
SSM 2095	●	9.5	15	55	10
SSM 2096	●	9.6	18	65	10
SSM 2097	●	9.7	18	65	10
SSM 2098	●	9.8	18	65	10
SSM 2099	●	9.9	18	65	10
SSM 2100	●	10.0	18	65	10
SSM 2105	●	10.5	18	70	12
SSM 2110	●	11.0	18	70	12
SSM 2115	●	11.5	18	70	12
SSM 2120	●	12.0	18	70	12
SSM 2125	●	12.5	20	80	16
SSM 2130	●	13.0	20	80	16
SSM 2135	●	13.5	20	80	16
SSM 2140	●	14.0	20	80	16
SSM 2145	●	14.5	25	80	16
SSM 2150	●	15.0	25	80	16
SSM 2155	●	15.5	35	90	16
SSM 2160	●	16.0	35	90	16
SSM 2165	●	16.5	35	90	20
SSM 2170	●	17.0	35	90	20
SSM 2175	●	17.5	40	105	20
SSM 2180	●	18.0	40	105	20
SSM 2185	●	18.5	40	105	20
SSM 2190	●	19.0	40	105	20
SSM 2195	●	19.5	40	105	20
SSM 2200	●	20.0	40	105	20
SSM 2210	●	21.0	40	105	25
SSM 2220	●	22.0	40	105	25
SSM 2230	●	23.0	45	115	25
SSM 2240	●	24.0	45	115	25
SSM 2250	●	25.0	50	120	25
SSM 2300	●	30.0	55	130	32

Grade : A1

Recommended Conditions (Slotting) Ad=1.0 × øD

øD		Material: Carbon steel, Alloy steel (Below 30HRC)	Carbon steel, Alloy steel (Below 40HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron
9 ~ 12.5	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.025 ~ 0.050	0.025 ~ 0.050	0.013 ~ 0.025	0.045 ~ 0.105
13 ~ 19.5	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.055 ~ 0.085	0.055 ~ 0.085	0.030 ~ 0.050	0.110 ~ 0.170
20 ~ 30	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.095 ~ 0.120	0.095 ~ 0.120	0.055 ~ 0.070	0.185 ~ 0.260



V=m/min f=mm/t

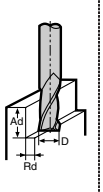
■ Endmills (mm)

Cat. No.	Stock	øD	ℓ	L	ød
SSM 4015	●	1.5	5	40	4
SSM 4020	●	2.0	6	40	4
SSM 4025	●	2.5	8	40	4
SSM 4030	●	3.0	8	45	6
SSM 4035	●	3.5	8	45	6
SSM 4040	●	4.0	10	45	6
SSM 4045	●	4.5	10	45	6
SSM 4050	●	5.0	12	50	6
SSM 4055	●	5.5	12	50	6
SSM 4060	●	6.0	12	50	6
SSM 4065	●	6.5	12	50	8
SSM 4070	●	7.0	15	55	8
SSM 4075	●	7.5	15	55	8
SSM 4080	●	8.0	15	55	8
SSM 4085	●	8.5	15	55	10
SSM 4090	●	9.0	15	55	10
SSM 4095	●	9.5	15	55	10
SSM 4100	●	10.0	18	65	10
SSM 4105	✻	10.5	18	65	12
SSM 4110	●	11.0	18	70	12
SSM 4120	●	12.0	18	70	12
SSM 4130	●	13.0	20	80	16
SSM 4140	●	14.0	20	80	16
SSM 4150	●	15.0	25	80	16
SSM 4160	●	16.0	35	90	16
SSM 4170	✻	17.0	35	90	20
SSM 4180	●	18.0	40	105	20
SSM 4190	✻	19.0	40	105	20
SSM 4200	●	20.0	40	105	20
SSM 4210	✻	21.0	40	105	25
SSM 4220	✻	22.0	40	105	25
SSM 4230	✻	23.0	45	115	25
SSM 4240	✻	24.0	45	115	25
SSM 4250	●	25.0	50	120	25

Grade : A1

Recommended Conditions (Shoulder processing)Ad=1.5 × øD, Rd=0.1 × øD,

øD		Material: Carbon steel, Alloy steel (Below 30HRC)	Carbon steel, Alloy steel (Below 40HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron
1.5 ~ 2.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.004 ~ 0.017	0.004 ~ 0.017	0.002 ~ 0.008	0.008 ~ 0.020
3 ~ 5.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.018 ~ 0.036	0.018 ~ 0.036	0.009 ~ 0.018	0.027 ~ 0.060
6 ~ 12.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.038 ~ 0.070	0.038 ~ 0.070	0.019 ~ 0.035	0.065 ~ 0.157
13 ~ 19.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.075 ~ 0.125	0.075 ~ 0.125	0.040 ~ 0.075	0.160 ~ 0.250
20 ~	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.135 ~ 0.170	0.135 ~ 0.170	0.085 ~ 0.110	0.257 ~ 0.390



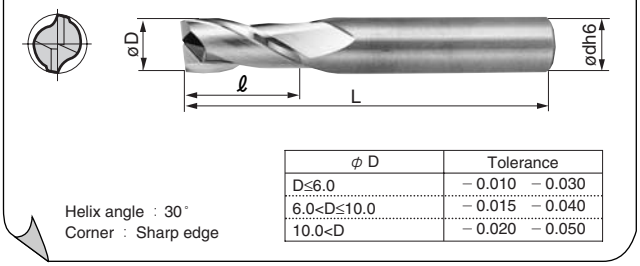
V=m/min f=mm/t
For small diameter endmills, if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

✻ mark: Semi-standard stock (Please confirm stock availability)

Solid Carbide Spiral Endmills (Quasi-JIS Standard)

JSM 2000 Type

2 teeth



φ D	Tolerance
D≤6.0	−0.010 −0.030
6.0<D≤10.0	−0.015 −0.040
10.0<D	−0.020 −0.050

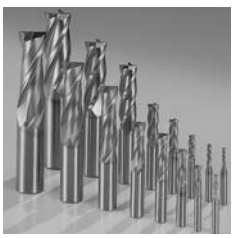
Helix angle : 30°
Corner : Sharp edge

■ Endmills (mm)

Cat. No.	Stock	øD	ℓ	L	ød
JSM 2030	●	3.0	10	45	6
JSM 2035	●	3.5	10	45	6
JSM 2040	●	4.0	12	45	6
JSM 2045	●	4.5	12	45	6
JSM 2050	●	5.0	15	50	6
JSM 2055	●	5.5	15	50	6
JSM 2060	●	6.0	15	50	6
JSM 2065	●	6.5	18	60	8
JSM 2070	●	7.0	18	60	8
JSM 2075	●	7.5	18	60	8
JSM 2080	●	8.0	18	60	8
JSM 2085	●	8.5	22	71	10
JSM 2090	●	9.0	22	71	10
JSM 2095	●	9.5	22	71	10
JSM 2100	●	10.0	22	71	10
JSM 2110	●	11.0	25	75	12
JSM 2120	●	12.0	25	75	12
JSM 2130	●	13.0	32	90	16
JSM 2140	●	14.0	32	90	16
JSM 2150	●	15.0	32	90	16

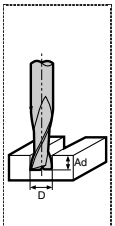
Grade : A1

● Excellent edge sharpness and good chip evacuation
● Excellent for mold processing



Recommended Conditions (Slotting)Ad=1.0 × øD

øD		Carbon steel, Alloy steel (Below 30HRC)	Carbon steel, Alloy steel (Below 40HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron
3 ~ 5.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.012 ~ 0.024	0.012 ~ 0.024	0.006 ~ 0.011	0.018 ~ 0.040
6 ~ 12.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.025 ~ 0.050	0.025 ~ 0.050	0.013 ~ 0.025	0.045 ~ 0.105
13 ~	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.055 ~ 0.085	0.055 ~ 0.085	0.030 ~ 0.050	0.110 ~ 0.170

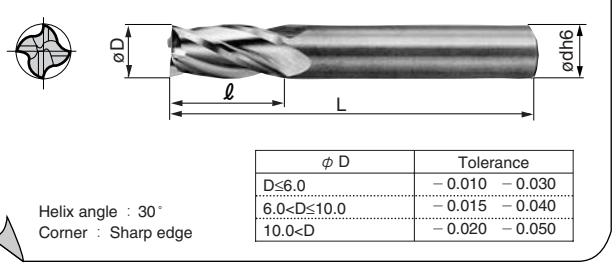


V=m/min f=mm/t

Solid Carbide Spiral Endmills (Quasi-JIS Standard)

JSM 4000 Type

4 teeth



φ D	Tolerance
D≤6.0	−0.010 −0.030
6.0<D≤10.0	−0.015 −0.040
10.0<D	−0.020 −0.050

Helix angle : 30°
Corner : Sharp edge

■ Endmills (mm)

Cat. No.	Stock	øD	ℓ	L	ød
JSM 4015	✻	1.5	5	40	4
JSM 4020	✻	2.0	6	40	4
JSM 4025	✻	2.5	8	40	4
JSM 4030	●	3.0	10	45	6
JSM 4035	●	3.5	10	45	6
JSM 4040	●	4.0	12	45	6
JSM 4045	●	4.5	12	45	6
JSM 4050	●	5.0	15	50	6
JSM 4055	●	5.5	15	50	6
JSM 4060	●	6.0	15	50	6
JSM 4065	●	6.5	18	60	8
JSM 4070	●	7.0	18	60	8
JSM 4075	●	7.5	18	60	8
JSM 4080	●	8.0	18	60	8
JSM 4085	●	8.5	22	71	10
JSM 4090	●	9.0	22	71	10
JSM 4095	●	9.5	22	71	10
JSM 4100	●	10.0	22	71	10
JSM 4110	●	11.0	25	75	12
JSM 4120	●	12.0	25	75	12
JSM 4130	●	13.0	32	90	16
JSM 4140	●	14.0	32	90	16
JSM 4150	●	15.0	32	90	16

Grade : A1

● Excellent for high efficiency machining

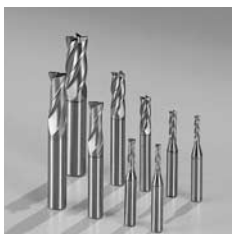
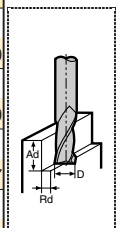


Photo shows JSM4000 type

Recommended Conditions (Shoulder processing)Ad=1.5 × øD, Rd=0.1 × øD

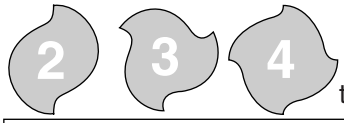
øD		Carbon steel, Alloy steel (Below 30HRC)	Carbon steel, Alloy steel (Below 40HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron
1.5 ~ 2.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.004 ~ 0.017	0.004 ~ 0.017	0.002 ~ 0.008	0.008 ~ 0.020
3 ~ 5.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.018 ~ 0.036	0.018 ~ 0.036	0.009 ~ 0.018	0.027 ~ 0.060
6 ~ 12.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.038 ~ 0.070	0.038 ~ 0.070	0.019 ~ 0.035	0.065 ~ 0.157
13 ~	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.075 ~ 0.125	0.075 ~ 0.125	0.040 ~ 0.075	0.160 ~ 0.250

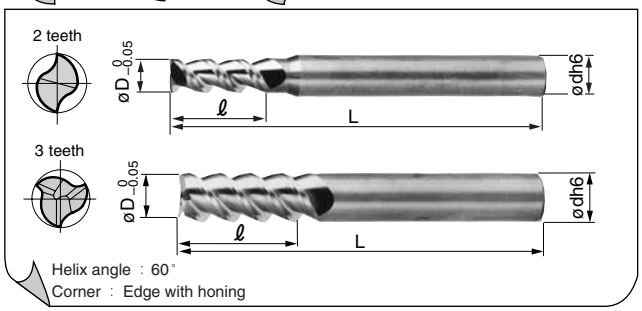


V=m/min f=mm/t
For small diameter endmills, if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

✻ mark: Semi-standard stock (Please confirm stock availability)

HSM 2000/3000/4000 Type





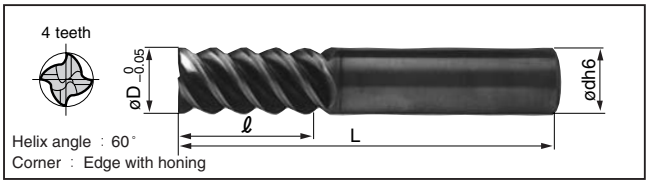
■ 2 teeth

(mm)

Cat. No.	Stock	øD	ℓ	L	ød
HSM 2020	●	2.0	6	40	4
HSM 2030	●	3.0	8	45	6
HSM 2040	●	4.0	10	45	6
HSM 2050	✻	5.0	12	50	6

■ 3 teeth

HSM 3050	●	5.0	12	50	6
HSM 3060	●	6.0	15	50	6
HSM 3070	●	7.0	18	60	8
HSM 3080	●	8.0	18	60	8
HSM 3090	●	9.0	20	65	10
HSM 3100	●	10.0	25	70	10
HSM 3110	●	11.0	25	75	12
HSM 3120	●	12.0	30	75	12
HSM 3130	●	13.0	30	80	16
HSM 3140	●	14.0	30	90	16
HSM 3150	●	15.0	30	95	16
HSM 3160	●	16.0	35	95	16
HSM 3180	●	18.0	40	110	20



■ 4 teeth

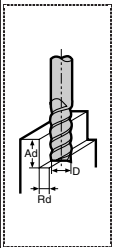
HSM 4200	●	20.0	40	110	20
HSM 4220	✻	22.0	40	110	25
HSM 4250	●	25.0	50	120	25
HSM 4260	✻	26.0	50	120	32
HSM 4280	✻	28.0	50	120	32
HSM 4300	●	30.0	55	130	32
HSM 4320	●	32.0	55	130	32

● Excellent for exotic alloy machining

Grade : A1

Recommended Conditions (Shoulder processing)Ad=1.5 × øD, Rd=0.1 × øD

øD		Carbon steel, Alloy steel (Below 30HRC)	Carbon steel, Alloy steel (Below 40HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron
2.0 ~ 2.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.009 ~ 0.024	0.009 ~ 0.024	0.004 ~ 0.011	0.018 ~ 0.040
3 ~ 5.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.040 ~ 0.050	0.040 ~ 0.050	0.020 ~ 0.025	0.060 ~ 0.070
6 ~ 12.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.055 ~ 0.110	0.055 ~ 0.110	0.028 ~ 0.055	0.080 ~ 0.220
13 ~ 19.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.120 ~ 0.180	0.120 ~ 0.180	0.060 ~ 0.090	0.250 ~ 0.350
20 ~	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.216 ~ 0.245	0.216 ~ 0.245	0.127 ~ 0.132	0.321 ~ 0.546

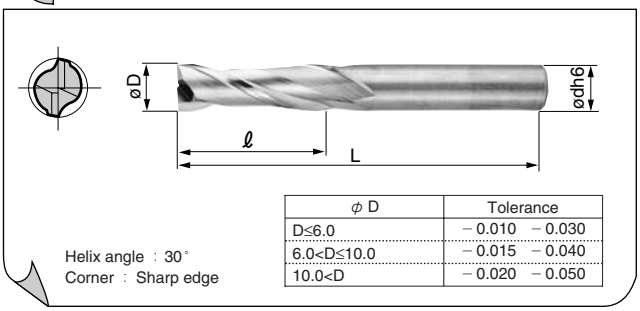


V=m/min f=mm/t

✻ mark: Semi-standard stock (Please confirm stock availability)

Long Solid Carbide Spiral Endmills
LSM 2000 Type

2 teeth



φ D	Tolerance
D≤6.0	−0.010 −0.030
6.0<D≤10.0	−0.015 −0.040
10.0<D	−0.020 −0.050

Helix angle : 30°
Corner : Sharp edge

■ Endmills (mm)

Cat. No.	Stock	øD	ℓ	L	ød
LSM 2030	●	3.0	12	50	6
LSM 2035	✻	3.5	12	50	6
LSM 2040	●	4.0	15	50	6
LSM 2045	✻	4.5	15	50	6
LSM 2050	●	5.0	18	55	6
LSM 2055	✻	5.5	18	55	6
LSM 2060	●	6.0	18	55	6
LSM 2065	✻	6.5	18	55	8
LSM 2070	●	7.0	25	65	8
LSM 2075	✻	7.5	25	65	8
LSM 2080	●	8.0	25	65	8
LSM 2085	✻	8.5	25	65	10
LSM 2090	●	9.0	25	65	10
LSM 2095	✻	9.5	25	65	10
LSM 2100	●	10.0	30	75	10
LSM 2105	✻	10.5	30	80	12
LSM 2110	●	11.0	30	80	12
LSM 2120	●	12.0	30	80	12
LSM 2130	●	13.0	35	95	16
LSM 2140	●	14.0	40	95	16
LSM 2150	●	15.0	40	95	16
LSM 2160	●	16.0	50	105	16
LSM 2170	✻	17.0	50	105	20
LSM 2180	●	18.0	50	115	20
LSM 2190	✻	19.0	55	120	20
LSM 2200	●	20.0	55	120	20
LSM 2210	✻	21.0	60	125	25
LSM 2220	✻	22.0	60	135	25
LSM 2230	✻	23.0	60	135	25
LSM 2240	✻	24.0	65	140	25
LSM 2250	●	25.0	65	140	25

Grade : A1

● SSM series long type
● For deep endmilling

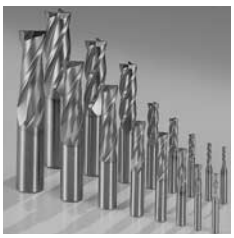
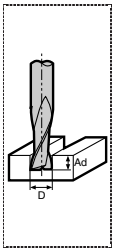


Photo shows LSM2000 type

Recommended Conditions (Slotting)Ad=1.0 × øD

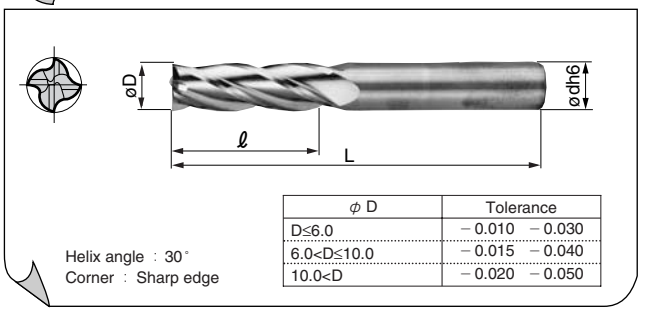
øD		Material: Carbon steel, Alloy steel (Below 30HRC)	Carbon steel, Alloy steel (Below 40HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron
3 ~ 5.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.009 ~ 0.018	0.009 ~ 0.018	0.005 ~ 0.008	0.014 ~ 0.030
6 ~ 12.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.019 ~ 0.038	0.019 ~ 0.038	0.009 ~ 0.019	0.034 ~ 0.079
13 ~ 19.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.041 ~ 0.064	0.041 ~ 0.064	0.023 ~ 0.038	0.083 ~ 0.128
20 ~	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.071 ~ 0.090	0.071 ~ 0.090	0.041 ~ 0.052	0.139 ~ 0.195



V=m/min f=mm/t

Long Solid Carbide Spiral Endmills
LSM 4000 Type

4 teeth



φ D	Tolerance
D≤6.0	−0.010 −0.030
6.0<D≤10.0	−0.015 −0.040
10.0<D	−0.020 −0.050

Helix angle : 30°
Corner : Sharp edge

■ Endmills (mm)

Cat. No.	Stock	øD	ℓ	L	ød
LSM 4030	●	3.0	12	50	6
LSM 4035	✻	3.5	12	50	6
LSM 4040	●	4.0	15	50	6
LSM 4045	✻	4.5	15	50	6
LSM 4050	●	5.0	18	55	6
LSM 4055	✻	5.5	18	55	6
LSM 4060	●	6.0	18	55	6
LSM 4065	✻	6.5	18	55	8
LSM 4070	●	7.0	25	65	8
LSM 4075	✻	7.5	25	65	8
LSM 4080	●	8.0	25	65	8
LSM 4085	✻	8.5	25	65	10
LSM 4090	●	9.0	25	65	10
LSM 4095	✻	9.5	25	65	10
LSM 4100	●	10.0	30	75	10
LSM 4105	✻	10.5	30	80	12
LSM 4110	●	11.0	30	80	12
LSM 4120	●	12.0	30	80	12
LSM 4130	●	13.0	35	95	16
LSM 4140	●	14.0	40	95	16
LSM 4150	●	15.0	40	95	16
LSM 4160	●	16.0	50	105	16
LSM 4170	✻	17.0	50	105	20
LSM 4180	●	18.0	50	115	20
LSM 4190	✻	19.0	55	120	20
LSM 4200	●	20.0	55	120	20
LSM 4210	✻	21.0	60	125	25
LSM 4220	✻	22.0	60	135	25
LSM 4230	✻	23.0	60	135	25
LSM 4240	✻	24.0	65	140	25
LSM 4250	●	25.0	65	140	25

Grade : A1

● SSM series long type
● For deep endmilling

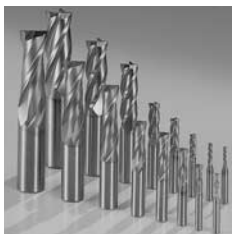
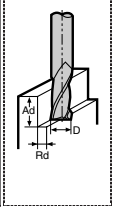


Photo shows LSM4000 type

Recommended Conditions (Shoulder processing)Ad=1.5 × øD, Rd=0.1 × øD

øD		Material: Carbon steel, Alloy steel (Below 30HRC)	Carbon steel, Alloy steel (Below 40HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron
3 ~ 5.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.014 ~ 0.027	0.014 ~ 0.027	0.007 ~ 0.014	0.020 ~ 0.045
6 ~ 12.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.028 ~ 0.053	0.028 ~ 0.053	0.014 ~ 0.026	0.048 ~ 0.118
13 ~ 19.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.056 ~ 0.094	0.056 ~ 0.094	0.030 ~ 0.056	0.120 ~ 0.188
20 ~	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.101 ~ 0.127	0.101 ~ 0.127	0.064 ~ 0.082	0.193 ~ 0.292



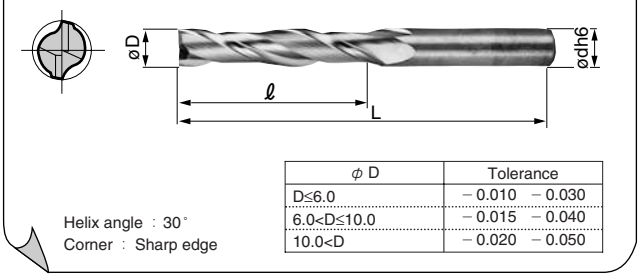
V=m/min f=mm/t

✻ mark: Semi-standard stock (Please confirm stock availability)

Extra Long Solid Carbide Spiral Endmills

ELSM 2000 Type

2 teeth



φ D	Tolerance
D≤6.0	−0.010 −0.030
6.0<D≤10.0	−0.015 −0.040
10.0<D	−0.020 −0.050

Helix angle : 30°
Corner : Sharp edge

■ Endmills (mm)

Cat. No.	Stock	øD	ℓ	L	ød
ELSM 2030	●	3.0	20	55	6
ELSM 2040	●	4.0	25	60	6
ELSM 2050	●	5.0	30	65	6
ELSM 2060	●	6.0	30	65	6
ELSM 2070	✻	7.0	40	85	8
ELSM 2080	●	8.0	40	85	8
ELSM 2090	✻	9.0	40	85	10
ELSM 2100	●	10.0	50	100	10
ELSM 2110	✻	11.0	50	100	12
ELSM 2120	●	12.0	50	100	12
ELSM 2130	✻	13.0	70	140	16
ELSM 2140	●	14.0	70	140	16
ELSM 2150	●	15.0	70	140	16
ELSM 2160	●	16.0	70	140	16
ELSM 2180	●	18.0	80	160	20
ELSM 2200	●	20.0	85	165	20
ELSM 2220	✻	22.0	95	180	25
ELSM 2250	●	25.0	100	185	25

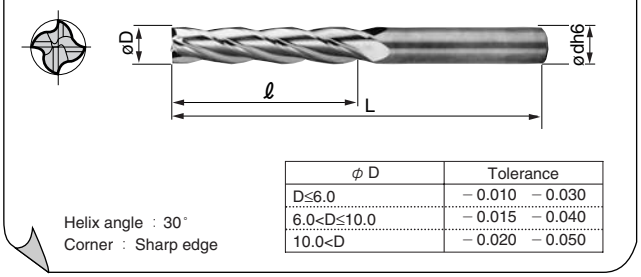
Grade : A1

● SSM series extra long type
● Longest flute length in the SSM series, excellent for high precision deep step milling

Extra Long Solid Carbide Spiral Endmills

ELSM4000 Type

4 teeth



φ D	Tolerance
D≤6.0	−0.010 −0.030
6.0<D≤10.0	−0.015 −0.040
10.0<D	−0.020 −0.050

Helix angle : 30°
Corner : Sharp edge

■ Endmills (mm)

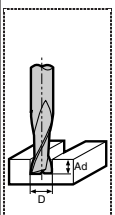
Cat. No.	Stock	øD	ℓ	L	ød
ELSM 4030	●	3.0	20	55	6
ELSM 4040	●	4.0	25	60	6
ELSM 4050	●	5.0	30	65	6
ELSM 4060	●	6.0	30	65	6
ELSM 4070	✻	7.0	40	85	8
ELSM 4080	●	8.0	40	85	8
ELSM 4090	✻	9.0	40	85	10
ELSM 4100	●	10.0	50	100	10
ELSM 4110	✻	11.0	50	100	12
ELSM 4120	●	12.0	50	100	12
ELSM 4130	✻	13.0	70	140	16
ELSM 4140	●	14.0	70	140	16
ELSM 4150	●	15.0	70	140	16
ELSM 4160	●	16.0	70	140	16
ELSM 4170	✻	17.0	80	160	20
ELSM 4180	●	18.0	80	160	20
ELSM 4190	✻	19.0	85	165	20
ELSM 4200	●	20.0	85	165	20
ELSM 4210	✻	21.0	95	180	25
ELSM 4220	✻	22.0	95	180	25
ELSM 4230	✻	23.0	95	180	25
ELSM 4240	✻	24.0	100	185	25
ELSM 4250	●	25.0	100	185	25

Grade : A1

● SSM series extra long type
● Longest flute length in the SSM series, excellent for high precision deep step milling

Recommended Conditions (Slotting)Ad=1.0 × øD

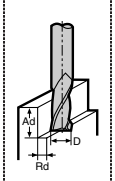
øD		Material: Carbon steel, Alloy steel (Below 30HRC)	Carbon steel, Alloy steel (Below 40HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron
3 ~ 5.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.006 ~ 0.012	0.006 ~ 0.012	0.003 ~ 0.006	0.009 ~ 0.020
6 ~ 12.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.013 ~ 0.025	0.013 ~ 0.025	0.006 ~ 0.013	0.023 ~ 0.053
13 ~ 19.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.028 ~ 0.043	0.028 ~ 0.043	0.015 ~ 0.025	0.055 ~ 0.085
20 ~	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.048 ~ 0.060	0.048 ~ 0.060	0.027 ~ 0.035	0.092 ~ 0.130



V=m/min f=mm/t

Recommended Conditions (Shoulder processing)Ad=1.5 × øD

øD		Material: Carbon steel, Alloy steel (Below 30HRC)	Carbon steel, Alloy steel (Below 40HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron
3 ~ 5.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.009 ~ 0.018	0.009 ~ 0.018	0.005 ~ 0.009	0.014 ~ 0.030
6 ~ 12.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.019 ~ 0.035	0.019 ~ 0.035	0.010 ~ 0.018	0.033 ~ 0.079
13 ~ 19.9	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.038 ~ 0.063	0.038 ~ 0.063	0.020 ~ 0.038	0.080 ~ 0.125
20 ~	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.067 ~ 0.085	0.067 ~ 0.085	0.042 ~ 0.055	0.128 ~ 0.195



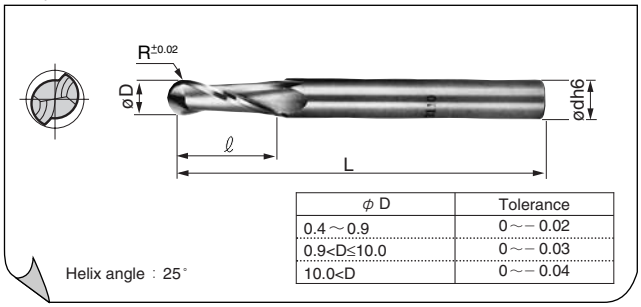
V=m/min f=mm/t

✻ mark: Semi-standard stock (Please confirm stock availability)

Short Flute Solid Spiral Ball Endmills

S-SSB 2000 Type

2 teeth



ϕ D	Tolerance
0.4～0.9	0～－0.02
0.9<D≤10.0	0～－0.03
10.0<D	0～－0.04

Helix angle : 25°

■ Endmills (mm)

Cat. No.	Stock	R	øD	ℓ	L	ød
S-SSB 2004	●	0.2	0.4	0.4	40	3
S-SSB 2005	●	0.25	0.5	0.5	40	3
S-SSB 2006	●	0.3	0.6	0.6	40	3
S-SSB 2007	●	0.35	0.7	0.7	40	3
S-SSB 2008	●	0.4	0.8	0.8	40	3
S-SSB 2009	●	0.45	0.9	0.9	40	3
S-SSB 2010	●	0.5	1.0	1.5	50	3
S-SSB 2011	●	0.55	1.1	1.65	50	3
S-SSB 2012	●	0.6	1.2	1.8	50	3
S-SSB 2013	●	0.65	1.3	1.95	50	3
S-SSB 2014	●	0.7	1.4	2.1	50	3
S-SSB 2015	●	0.75	1.5	2.25	50	3
S-SSB 2016	●	0.8	1.6	2.4	50	3
S-SSB 2017	●	0.85	1.7	2.55	50	3
S-SSB 2018	●	0.9	1.8	2.7	50	3
S-SSB 2019	●	0.95	1.9	2.85	50	3
S-SSB 2020	●	1.0	2.0	3.0	60	4
S-SSB 2025	●	1.25	2.5	3.5	60	4
S-SSB 2030	●	1.5	3.0	4.5	60	4
S-SSB 2035	●	1.75	3.5	5.0	60	4
S-SSB 2040	●	2.0	4.0	6.0	70	4
S-SSB 2050	●	2.5	5.0	7.0	80	6
S-SSB 2060	●	3.0	6.0	8.0	80	6
S-SSB 2070	●	3.5	7.0	10.0	90	8
S-SSB 2080	●	4.0	8.0	12.0	90	8
S-SSB 2090	●	4.5	9.0	15.0	100	10
S-SSB 2100	●	5.0	10.0	15.0	100	10
S-SSB 2120	●	6.0	12.0	15.0	110	12

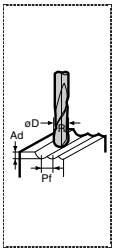
Grade : A1

- SSB series short flute length type
- Cutting length is shorter than SSB type, for shallow radius machining

Recommended Conditions

Ad=0.3 × øD(Below R1.0 ; 0.2 × øD)
Pf=Max0.7 × øD(Below R1.0 ; 0.6 × øD)

Material / Radius		Carbon steel, Alloy steel (Below 30HRC)	Carbon steel, Alloy steel (Below 40HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron
~ R0.5	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.002 ~ 0.005	0.002 ~ 0.005	0.001 ~ 0.003	0.004 ~ 0.008
R0.5 ~ R1.25	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.004 ~ 0.010	0.004 ~ 0.010	0.002 ~ 0.005	0.008 ~ 0.015
R1.5 ~ R2.5	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.013 ~ 0.025	0.013 ~ 0.025	0.007 ~ 0.013	0.017 ~ 0.042
R3.0 ~ R6.0	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.030 ~ 0.050	0.030 ~ 0.050	0.017 ~ 0.033	0.056 ~ 0.136

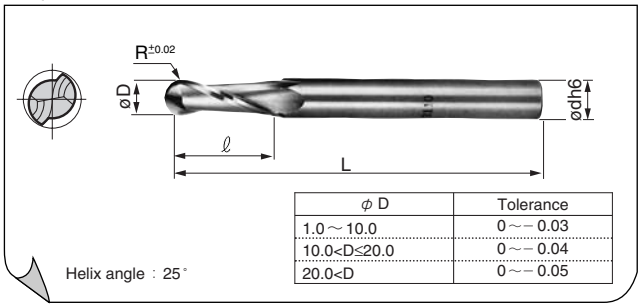


V=m/min f=mm/t
For small diameter endmills, if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

Solid Spiral Ball Endmills

SSB 2000 Type

2 teeth



ϕ D	Tolerance
1.0～10.0	0～－0.03
10.0<D≤20.0	0～－0.04
20.0<D	0～－0.05

Helix angle : 25°

■ Endmills (mm)

Cat. No.	Stock	R	øD	ℓ	L	ød
SSB 2010	●	0.5	1.0	3	50	4
SSB 2015		0.75	1.5	5	50	4
SSB 2020	●	1.0	2.0	6	50	4
SSB 2025		1.25	2.5	8	50	4
SSB 2030	●	1.5	3.0	9	60	6
SSB 2035		1.75	3.5	11	60	6
SSB 2040	●	2.0	4.0	12	70	6
SSB 2050	●	2.5	5.0	15	80	6
SSB 2060	●	3.0	6.0	15	80	6
SSB 2070		3.5	7.0	20	90	8
SSB 2080	●	4.0	8.0	20	90	8
SSB 2090		4.5	9.0	25	100	10
SSB 2100	●	5.0	10.0	25	100	10
SSB 2110		5.5	11.0	30	110	12
SSB 2120	●	6.0	12.0	30	110	12
SSB 2130		6.5	13.0	35	120	16
SSB 2140	●	7.0	14.0	35	120	16
SSB 2150		7.5	15.0	40	120	16
SSB 2160	●	8.0	16.0	40	120	16
SSB 2170		8.5	17.0	40	130	20
SSB 2180	●	9.0	18.0	40	130	20
SSB 2190		9.5	19.0	40	130	20
SSB 2200	●	10.0	20.0	45	130	20
SSB 2250	●	12.5	25.0	55	140	25
SSB 2300		15.0	30.0	60	160	25

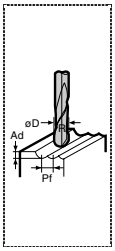
Grade : A1

- With a spiral cutting lip, the endmill is excellent for high efficiency copy milling

Recommended Conditions

Ad=0.3 × øD(Below R1.0 ; 0.2 × øD)
Pf=Max0.7 × øD(Below R1.0 ; 0.6 × øD)

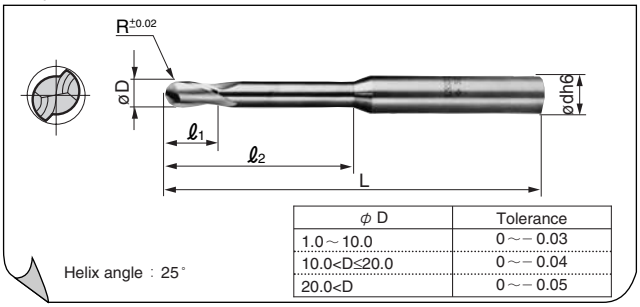
Material / Radius		Carbon steel, Alloy steel (Below 30HRC)	Carbon steel, Alloy steel (Below 40HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron
R0.5 ~ R1.25	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.004 ~ 0.010	0.004 ~ 0.010	0.002 ~ 0.005	0.008 ~ 0.015
R1.5 ~ R2.5	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.013 ~ 0.025	0.013 ~ 0.025	0.007 ~ 0.013	0.017 ~ 0.042
R3.0 ~ R6.0	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.030 ~ 0.050	0.030 ~ 0.050	0.017 ~ 0.033	0.056 ~ 0.136
R6.5 ~ R9.5	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.070 ~ 0.100	0.070 ~ 0.100	0.040 ~ 0.057	0.167 ~ 0.238
R10 ~	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
	f	0.118 ~ 0.167	0.118 ~ 0.167	0.085 ~ 0.095	0.250 ~ 0.350



V=m/min f=mm/t
For small diameter endmills, if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

LSSB 2000 Type

2 teeth



φ D	Tolerance
1.0～10.0	0～－0.03
10.0<D≤20.0	0～－0.04
20.0<D	0～－0.05

Helix angle : 25°

■ Endmills

(mm)

Cat. No.	Stock	R	øD	ℓ_1	ℓ_2	L	ød
LSSB 2010	●	0.5	1.0	3	6	80	4
LSSB 2020	●	1.0	2.0	4	8	80	4
LSSB 2030	●	1.5	3.0	4	35	100	6
LSSB 2040	●	2.0	4.0	6	35	100	6
LSSB 2050	●	2.5	5.0	7	40	110	8
LSSB 2060	●	3.0	6.0	8	45	110	8
LSSB 2070		3.5	7.0	10	45	120	10
LSSB 2080	●	4.0	8.0	12	55	120	10
LSSB 2090		4.5	9.0	15	65	140	12
LSSB 2100	●	5.0	10.0	15	65	140	12
LSSB 2110		5.5	11.0	20	75	150	16
LSSB 2120	●	6.0	12.0	28	75	150	16
LSSB 2140	●	7.0	14.0	32	75	150	16
LSSB 2160	●	8.0	16.0	36	–	150	16
LSSB 2180	●	9.0	18.0	40	75	150	20
LSSB 2200	●	10.0	20.0	46	–	160	20

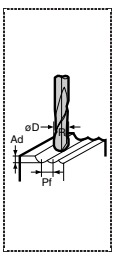
Grade : A1

● SSB series long type
● Longer flute length than SSB type

Recommended Conditions

Ad=0.3 × øD(Below R1.0 ; 0.2 × øD)
Pf=Max0.7 × øD(Below R1.0 ; 0.6 × øD)

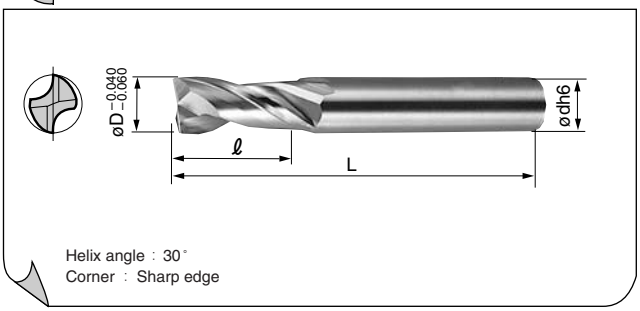
Material / Radius		Carbon steel, Alloy steel (Below 30HRC)	Carbon steel, Alloy steel (Below 40HRC)	Carbon steel, Alloy steel (Below 45HRC)	Cast iron
R0.5 ~	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
R1.25	f	0.003 ~ 0.008	0.003 ~ 0.008	0.002 ~ 0.004	0.006 ~ 0.011
R1.5 ~	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
R2.5	f	0.010 ~ 0.019	0.010 ~ 0.019	0.005 ~ 0.010	0.013 ~ 0.032
R3.0 ~	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
R6.0	f	0.023 ~ 0.038	0.023 ~ 0.038	0.013 ~ 0.025	0.042 ~ 0.102
R6.5 ~	V	40-**50**-60	30-**40**-50	20-**30**-40	40-**50**-60
R10.0	f	0.053 ~ 0.075	0.053 ~ 0.075	0.030 ~ 0.043	0.125 ~ 0.179



V=m/min f=mm/t
For small diameter endmills, if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

ASM 2000 Type

2 teeth



Helix angle : 30°
Corner : Sharp edge

■ Endmills (mm)

Cat. No.	Stock	øD	ℓ	L	ød
ASM 2020	●	2.0	6	40	4
ASM 2030	●	3.0	10	45	6
ASM 2040	●	4.0	12	45	6
ASM 2050	●	5.0	15	50	6
ASM 2060	●	6.0	15	50	6
ASM 2080	●	8.0	18	60	8
ASM 2100	●	10.0	22	71	10
ASM 2120	●	12.0	25	75	12
ASM 2140	●	14.0	32	90	16
ASM 2150	●	15.0	32	90	16
ASM 2160	●	16.0	32	90	16

Grade : H1

- ● Square type endmill for Aluminum machining
- ● Excellent flute design greatly improves chip
- ● Excellent for Aluminum and Copper machining

■ Application

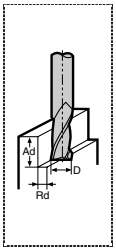
	Al-alloy & Copper
Application	Finish ~ Light

■ Shape

- ● Unique flute design promotes good chip evacuation
- ● Large secondary relief pocket
- ● Plunging is possible with good chisel edge design

Recommended Conditions (Shoulder processing) Ad=1.5 × øD, Rd=0.2 × øD

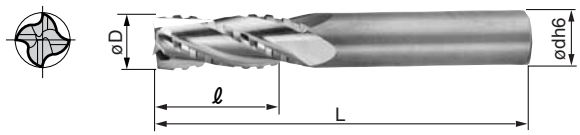
øD		Al-alloy	Cast iron
2.0 ~ 2.9	V	100-**200**-300	100-**120**-150
	f	0.004 ~ 0.017	0.008 ~ 0.020
3 ~ 5	V	100-**200**-300	100-**120**-150
	f	0.018 ~ 0.036	0.027 ~ 0.060
6 ~ 12	V	100-**200**-300	100-**120**-150
	f	0.038 ~ 0.070	0.065 ~ 0.157
14 ~ 16	V	100-**200**-300	100-**120**-150
	f	0.075 ~ 0.125	0.160 ~ 0.250



V=m/min f=mm/t
For small diameter endmills, if the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

RSM 4000 Type

4 teeth



φ D	Tolerance
D≤6.0	− 0.010 − 0.030
6.0<D≤10.0	− 0.015 − 0.040
10.0<D	− 0.020 − 0.050

Helix angle : 30°
Corner : Edge with honing

■ Endmills (mm)

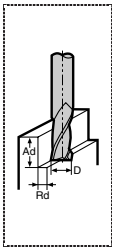
Cat. No.	Stock	øD	ℓ	L	ød
RSM 4060	●	6.0	18	55	6
RSM 4070	✻	7.0	25	65	8
RSM 4080	●	8.0	25	65	8
RSM 4090	✻	9.0	25	65	10
RSM 4100	●	10.0	30	75	10
RSM 4110	✻	11.0	30	80	12
RSM 4120	●	12.0	30	80	12
RSM 4130	✻	13.0	35	95	16
RSM 4140	●	14.0	40	95	16
RSM 4150	●	15.0	40	95	16
RSM 4160	●	16.0	50	105	16
RSM 4170	✻	17.0	50	105	20
RSM 4180	●	18.0	50	115	20
RSM 4190	✻	19.0	55	120	20
RSM 4200	●	20.0	55	120	20
RSM 4240	✻	24.0	65	140	25
RSM 4250	●	25.0	65	140	25
RSM 4300	✻	30.0	75	160	32

Grade : A1

- ● Cutting edge with nicked design provides high efficiency milling with good chip control
- ● Anti-chattering effect with low cutting force

Recommended Conditions (Shoulder processing) Ad=1.5 × øD, Rd=0.3 × øD

øD		Carbon steel, Alloy steel (Below 25HRC)	Carbon steel, Alloy steel (Below 40HRC)	Cast iron
6 ~ 14	V	40-**50**-60	30-**40**-50	40-**50**-60
	f	0.010 ~ 0.030	0.005 ~ 0.025	0.030 ~ 0.050
15 ~ 25	V	40-**50**-60	30-**40**-50	40-**50**-60
	f	0.030 ~ 0.050	0.020 ~ 0.040	0.060 ~ 0.080

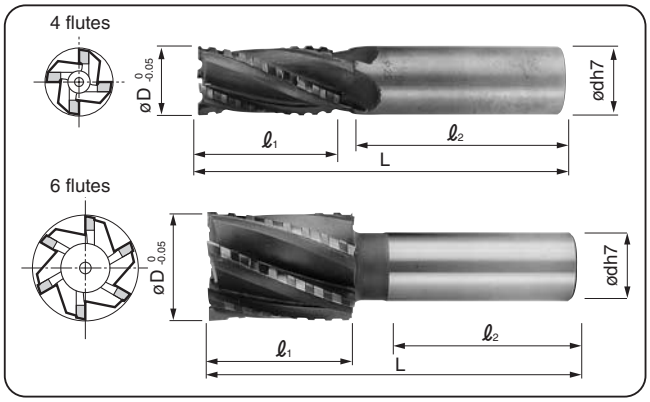


V=m/min f=mm/t

✻ mark: Semi-standard stock (Please confirm stock availability)

Roughing Brazed Endmills
RMES Type

4 teeth 6 teeth



■ 4 Flutes

Code	Stock	Dimensions (mm)				
		øD	ød	ℓ1	ℓ2	L
RMES 4140		14	16	40	60	110
RMES 4150		15	16	40	60	110
RMES 4160	●	16	16	40	60	110
RMES 4170		17	16	40	60	110
RMES 4180	●	18	20	50	70	132
RMES 4190		19	20	50	70	132
RMES 4200	●	20	20	50	70	132
RMES 4210		21	20	50	70	132
RMES 4220		22	20	50	70	132
RMES 4230		23	25	60	70	145
RMES 4240		24	25	60	70	145
RMES 4250	●	25	25	60	70	145
RMES 4260		26	25	60	70	145
RMES 4270		27	25	60	70	145
RMES 4280		28	25	60	70	145
RMES 4290		29	32	70	85	170
RMES 4300	●	30	32	70	85	170
RMES 4310		31	32	70	85	170
RMES 4320	●	32	32	70	85	170
RMES 4330		33	32	70	85	170
RMES 4340		34	32	80	85	180
RMES 4350		35	32	80	85	180
RMES 4360		36	32	80	85	180
RMES 4370		37	32	80	85	180
RMES 4380	✻	38	32	80	85	180
RMES 4390		39	32	100	85	200
RMES 4400	●	40	32	100	85	200
RMES 4400-42	✻	40	42	100	100	215

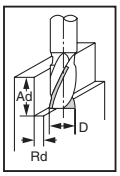
■ 6 Flutes

RMES 6450		45	32	120	85	222
RMES 6450-42	✻	45	42	120	100	237
RMES 6500		50	32	120	85	222
RMES 6500-42	✻	50	42	120	100	237

Grade : A1

■ Recommended Conditions

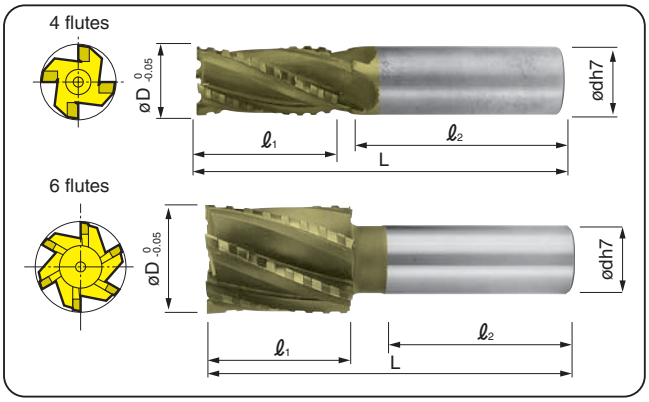
Material / øD		Carbon steel (S40C ~ S55C)	Alloy steel (Below 40HRC)	Cast iron
14~19	V	30-50-70	20-35-50	40-50-60
	f	0.01~0.03	0.01~0.03	0.03~0.05
20~32	V	30-50-70	20-35-50	40-50-60
	f	0.02~0.04	0.02~0.04	0.04~0.06
35~50	V	30-50-70	20-35-50	40-50-60
	f	0.03~0.05	0.03~0.05	0.05~0.07



〔V=m/min, f=mm/t〕〔min-standard-max〕

Roughing Coated Brazed Endmills
RMES-C Type

4 teeth 6 teeth



■ 4 Flutes

Code	Stock	Dimensions (mm)				
		øD	ød	ℓ1	ℓ2	L
RMES 4140C		14	16	40	60	110
RMES 4150C		15	16	40	60	110
RMES 4160C	●	16	16	40	60	110
RMES 4170C		17	16	40	60	110
RMES 4180C		18	20	50	70	132
RMES 4190C		19	20	50	70	132
RMES 4200C	●	20	20	50	70	132
RMES 4210C		21	20	50	70	132
RMES 4220C		22	20	50	70	132
RMES 4230C		23	25	60	70	145
RMES 4240C		24	25	60	70	145
RMES 4250C	●	25	25	60	70	145
RMES 4260C		26	25	60	70	145
RMES 4270C		27	25	60	70	145
RMES 4280C		28	25	60	70	145
RMES 4290C		29	32	70	85	170
RMES 4300C	●	30	32	70	85	170
RMES 4310C		31	32	70	85	170
RMES 4320C		32	32	70	85	170
RMES 4330C		33	32	70	85	170
RMES 4340C		34	32	80	85	180
RMES 4350C		35	32	80	85	180
RMES 4360C		36	32	80	85	180
RMES 4370C		37	32	80	85	180
RMES 4380C		38	32	80	85	180
RMES 4390C		39	32	100	85	200
RMES 4400C	●	40	32	100	85	200
RMES 4400C-42		40	42	100	100	215

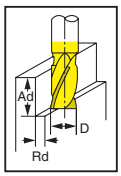
■ 6 Flutes

RMES 6450C		45	32	120	85	222
RMES 6450C-42		45	42	120	100	237
RMES 6500C		50	32	120	85	222
RMES 6500C-42		50	42	120	100	237

Grade : GAC50

■ Recommended Conditions

Material / øD		Carbon steel (S40C ~ S55C)	Alloy steel (Below 40HRC)	Cast iron
14~19	V	30-65-100	20-50-80	40-60-80
	f	0.01~0.03	0.01~0.03	0.03~0.05
20~32	V	30-65-100	20-50-80	40-60-80
	f	0.02~0.04	0.02~0.04	0.04~0.06
35~50	V	30-65-100	20-50-80	40-60-80
	f	0.03~0.05	0.03~0.05	0.05~0.07

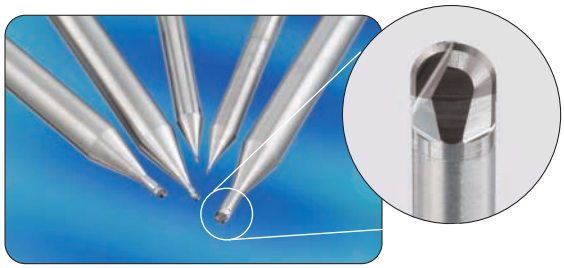


〔V=m/min, f=mm/t〕〔min-standard-max〕

✻ mark: Semi-standard stock (Please confirm stock availability)

SUMIBORON
MOLD FINISH MASTER BNBP Type

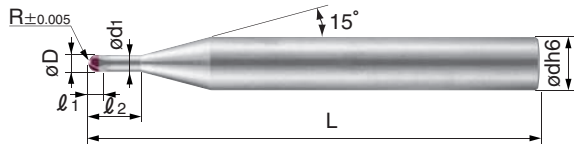
MOLD FINISH MASTER
SUMIBORON MOLD FINISH MASTER



■ General Features

- ●Achieving longer tool life in high speed, high precision machining of Pre-hardened and Hardened Steel (~HRC70)!
- ●Utilizing SUMIBORON BN350 for excellent chipping resistance!
- ● High precision, radial cutting edge profile accuracy of ± 0.005mm!
- ●Excellent surface finish! Polishing process greatly reduced, compared with carbide endmills

■ Endmills



※Endmill Identification

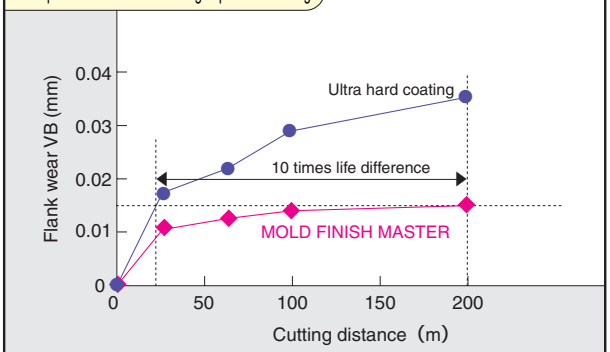
BNBP 2 R030-015 4

- BNBP: MOLD FINISH MASTER
- 2: Number of Flutes
- R030-015: Radius of Ballnose (R)
- 4: Length from Neck to Tip (ℓ2), Diameter (φd)

	Catalogue No.	Stock	Dimensions (mm)						
		BN350	R	øD	L	ød1	ød	ℓ1	ℓ2
Shank ø4	**BNBP2R020-0124**	●	0.2	0.4	50	0.37	4	0.3	1.2
	BNBP2R030-0154	●	0.3	0.6	50	0.57	4	0.4	1.5
	BNBP2R050-0254	●	0.5	1.0	50	0.97	4	0.6	2.5
	BNBP2R075-0404	●	0.75	1.5	50	1.47	4	0.9	4.0
	BNBP2R100-0554	●	1.0	2.0	50	1.97	4	1.4	5.5
Shank ø6	**BNBP2R020-0126**	●	0.2	0.4	50	0.37	6	0.3	1.2
	BNBP2R030-0156	●	0.3	0.6	50	0.57	6	0.4	1.5
	BNBP2R050-0256	●	0.5	1.0	50	0.97	6	0.6	2.5
	BNBP2R075-0406	●	0.75	1.5	50	1.47	6	0.9	4.0
	BNBP2R100-0556	●	1.0	2.0	50	1.97	6	1.4	5.5

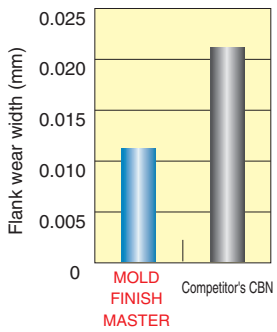
■ Cutting performance

Comparison of flank wear in high speed machining

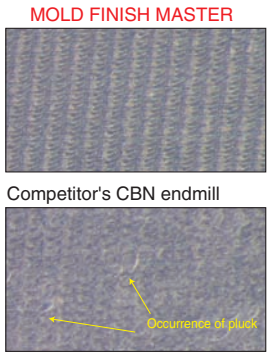


R1.0 Endmill, Work Material : SKD11 (HRC60), N=40,000min⁻¹, f=0.05mm/t (F=4,000mm/min), Ad=0.05mm, Rf=0.05mm, Oil mist

Wear amount at the ballnose tip



Machining surface



R1.0 Endmill, Work Material:SKD11(60HRC), Cutting length:100m, N=20,000min⁻¹ f=0.05mm/t (F=2,000mm/min), Ad=0.05mm, Rd=0.05mm, Air blow

■ Recommended Conditions

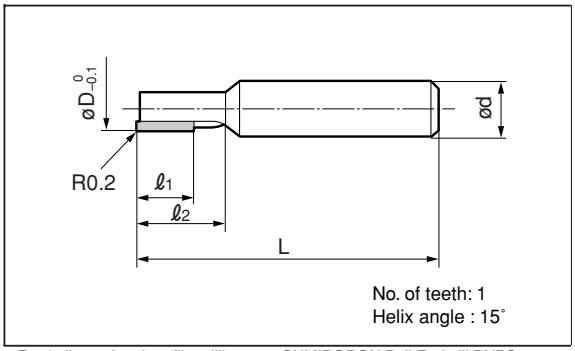
Work / Cond. / Dia. (mm)	STAVAX, NAK80, SKD61 (~52HRC)				SKD11 (~62HRC)				SKH (~70HRC)			
	S/Speed (min⁻¹)	f (mm/rev)	Depth of Cut Ad (mm)	Depth of Cut Rd (mm)	S/Speed (min⁻¹)	f (mm/rev)	Depth of Cut Ad (mm)	Depth of Cut Rd (mm)	S/Speed (min⁻¹)	f (mm/rev)	Depth of Cut Ad (mm)	Depth of Cut Rd (mm)
R0.2	20,000~50,000	0.02	0.03	0.03	20,000~50,000	0.02	0.01	0.02	20,000~50,000	0.015	0.01	0.02
R0.3	20,000~50,000	0.02	0.03	0.03	20,000~50,000	0.02	0.01	0.02	20,000~50,000	0.015	0.01	0.02
R0.5	20,000~50,000	0.03	0.05	0.05	20,000~50,000	0.03	0.03	0.04	20,000~50,000	0.02	0.02	0.03
R0.75	20,000~50,000	0.04	0.08	0.1	20,000~50,000	0.04	0.05	0.05	20,000~50,000	0.03	0.02	0.05
R1.0	20,000~50,000	0.05	0.1	0.1	17,000~50,000	0.05	0.05	0.05	17,000~50,000	0.03	0.03	0.05

■ Caution in use

(1) Use a machine with high rigidity for stable cutting.
(2) Air blow and oil mist are recommended.
(3) Make overhang of tool as short as possible.

SUMIBORON
Helical Master BNES Type

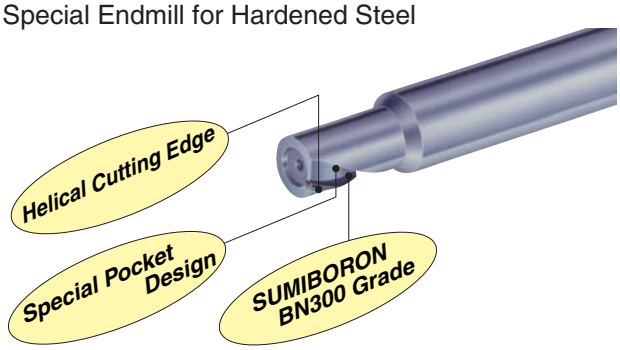
■ Endmills



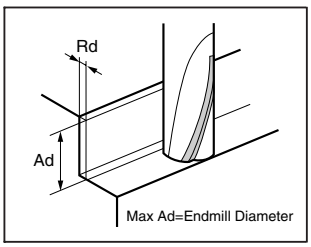
● For 3-dimensional profile milling, use SUMIBORON Ball Endmill BNBS type.

Catalogue No.	Stock	Dimensions (mm)				
	BN350	øD	ℓ1	ℓ2	L	ød
BNES1060	●	6.0	7.0	11	60	10
BNES1080	●	8.0	10.0	14	70	10
BNES1100	●	10.0	12.0	17	75	12
BNES1120	●	12.0	14.0	20	80	12
BNES1140	●	14.0	16.0	21.5	80	16
BNES1160	●	16.0	18.0	24	80	16

● Special Endmill for Hardened Steel



■ Recommended Conditions



- Use a rigid machine and select a high cutting speed with low feedrate
- Use dry cutting conditions.
- Make overhang as short as possible and down-cut.

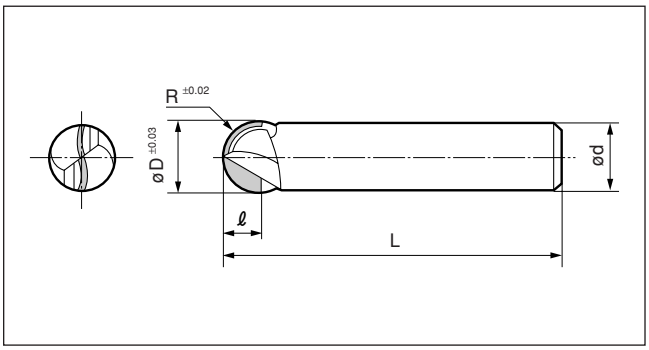
Hardness of work / Conditions / Endmill (mm)	50～57HRC V : 100～170m/min		
	N (min^{-1})	F (mm/min)	Depth (Rd) (mm)
ø6~8	4,000~9,000	240~540	~0.1
ø10~12	2,700~5,400	180~360	~0.15
ø14~16	2,000~3,800	140~260	~0.2

Hardness of work / Conditions / Endmill (mm)	58～65HRC V : 80～150m/min		
	N (min^{-1})	F (mm/min)	Depth (Rd) (mm)
ø6~8	3,200~8,000	150~370	~0.08
ø10~12	2,100~4,800	120~370	~0.12
ø14~16	1,600~3,400	110~230	~0.15

See L63 for detail

SUMIBORON Ball Endmill
BNBS Type

■ Endmills



Catalogue No.	Stock	Dimensions (mm)				
	BN350	R	øD	ℓ	L	ød
BNBS 2020S	●	1.0	2.0	1.5	50	4
BNBS 2030S	●	1.5	3.0	2.0	60	6
BNBS 2040S	●	2.0	4.0	3.0	70	6
BNBS 2060S	●	3.0	6.0	4.5	80	6
BNBS 2080S	●	4.0	8.0	5.5	90	8
BNBS 2100S	●	5.0	10.0	6.5	100	10
BNBS 2120S	●	6.0	12.0	7.5	110	12
BNBS 2140S		7.0	14.0	8.5	120	16
BNBS 2160S		8.0	16.0	9.5	120	16
BNBS 2180S		9.0	18.0	10.5	130	20
BNBS 2200S		10.0	20.0	11.5	130	20

● Combination of Special Grade and Spiral Cutting Edge Design

- The combination of special SUMIBORON grade with unique tool design is a break-through for high efficiency and smooth end-milling of hardened steels.

■ Recommended Conditions

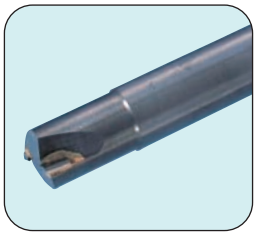
Work Material / Conditions / Endmill ø (mm)	Hardened Steel			
	50~57HRC		58~65HRC	
	V (m/min)	f (mm/rev)	V (m/min)	f (mm/rev)
2~6	80~250	0.01~0.03	80~200	0.01~0.02
6~10		0.02~0.05		0.02~0.04
10~20		0.04~0.08		0.03~0.06

■ Important Notes

(1) Use a rigid machine and select a high cutting speed with low feedrate.
(2) Use dry cutting conditions.
(3) Make overhang as short as possible.
(4) If work hardness is lower than HRC50, try a coated or uncoated carbide endmill instead. (→ J31)

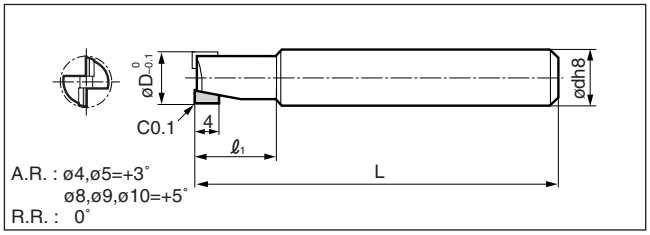
See L65 for detail

SUMIDIA Endmills
DFE Type



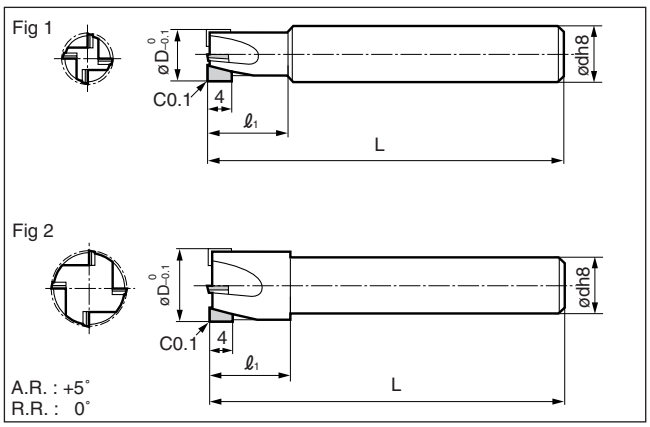
- High rake cutting edge with DA2200 grade.
- For face milling of Al-alloy, such as computer parts.

■ Endmills (2 Flutes)



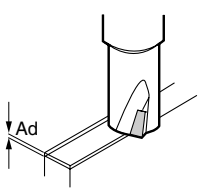
Cat. No.	Stock	Dimensions (mm)			
	DA2200	øD	ℓ1	L	ød
DFE 2040S	●	4.0	15	50	6
DFE 2050S	●	5.0	15	50	6
DFE 2080S	●	8.0	15	60	10
DFE 2090S	●	9.0	15	70	10
DFE 2100S	●	10.0	15	70	10

■ Endmills (4 Flutes)



Cat. No.	Stock	Dimensions (mm)				Shape
	DA2200	øD	ℓ1	L	ød	
DFE 4090S	●	9.0	15	70	10	Fig 1
DFE 4100S	●	10.0	15	70	10	Fig 1
DFE 4130GS	●	13.0	15	70	10	Fig 2

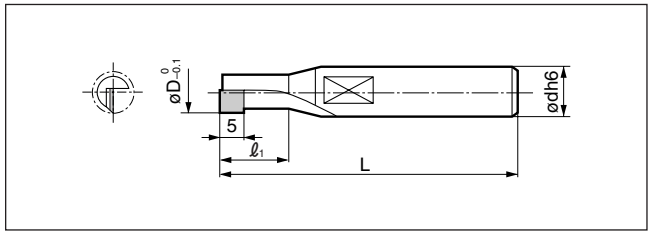
■ Recommended Conditions

Tooling	Work Material	Condition	
	Aluminium Alloy Copper Alloy	Cutting Speed V=(m/min)	200 - **500** - 800
		Feed f=(mm/t)	0.02 - **0.05** - 0.1
		Depth of cut Ad(mm)	0.05 - **0.4** - 0.7

SUMIDIA Endmills
DAE Type

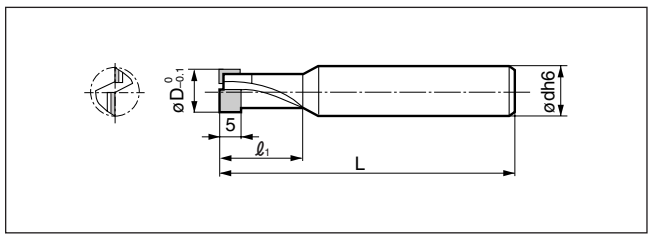
- Long tool life with excellent surface finish
- Finishing of Aluminum and Copper alloys
- Machining of reinforced plastics such as GFRP and CFRP

■ Endmills (1 Flute)



Cat. No.	Stock	Dimensions (mm)			
	DA200	øD	ℓ1	L	ød
DAE 1040	●	4.0	10	45	6
DAE 1050	●	5.0	12	50	6

■ Endmills (2 Flutes)



Cat. No.	Stock	Dimensions (mm)			
	DA200	øD	ℓ1	L	ød
DAE 2060	●	6.0	20	50	6
DAE 2070	●	7.0	20	60	8
DAE 2080	●	8.0	20	60	8
DAE 2090	●	9.0	25	71	10
DAE 2100	●	10.0	25	71	10
DAE 2110	●	11.0	25	75	12
DAE 2120	●	12.0	25	75	12

■ Recommended Conditions

Work Material	Condition	Endmill diameter (mm)				
		4	6	8	10	12
Aluminium Alloy Copper Alloy	Cutting Speed V=(m/min)	30 ~ 120		60 ~ 300		
	Spindle Speed N(min^{-1})	2,000 ~ 10,000		2,000 ~ 12,000		
	Feed f=(mm/t)	0.02 ~ 0.05		0.02 ~ 0.07		