

HARD 1 RADIUS

SFSR Type

HARD **1** RADIUS

Feature 1

Highly Rigid Design for High Efficiency Machining

Feature 2

Suppress Vibration with Variable Helix Angle & Unequal Spacing Teeth Geometry

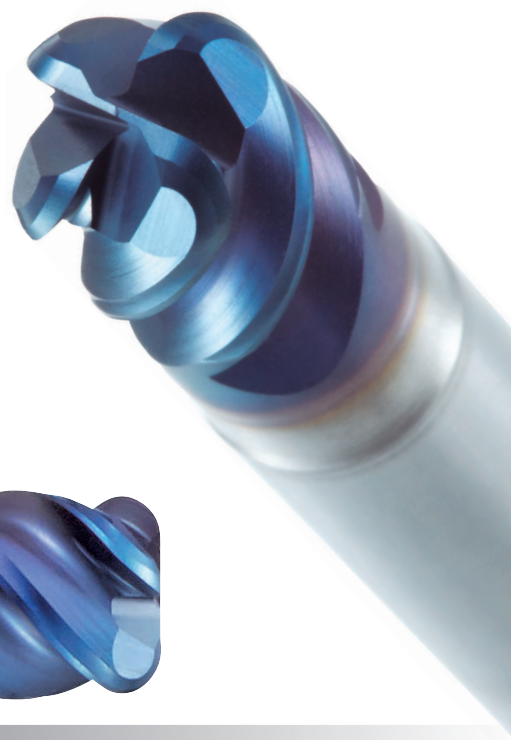
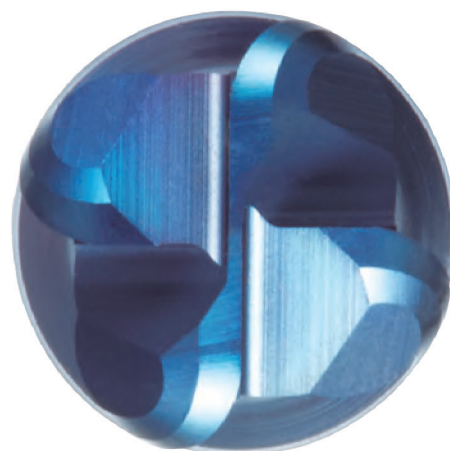
Feature 3

Special design on center of cutting edge improves cutting performance

Feature 4

Applicable for High Spindle Machine & Shrink Fit Holder
Shank diameter tolerance: h5

Feature 5

Excellent tool life for Hardened Materials with Newly developed grade "DH110"**New PVD coating <DH coating>**

● Properties of DIJET PVD coating

	DH coating	DV coating	DZ coating(TiAlN)
Hardness(Hv)	3,500~3,700	3,300~3,500	2,800~2,900
Oxidation temperature (°C)	1,100~1,200	1,000~1,100	700~800
Coefficient of friction	0.5	0.65	0.6

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SFSR
TYPE

For General steel to Hardened steel

● Helix angle 50°-52°



Roughing

Semi-finishing

Finishing



Fig.1

$\phi D_c < \phi D_s$

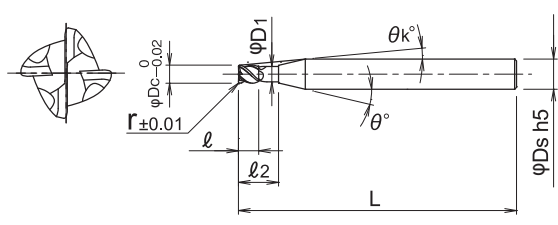
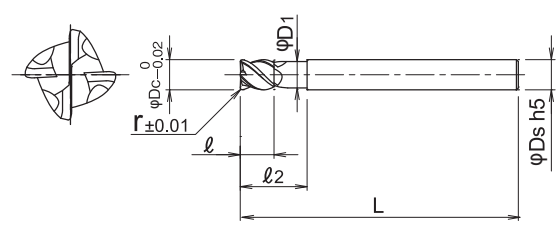


Fig.2

$\phi D_c = \phi D_s$



Cat.No.	Stock	Dimensions (mm)									Fig.	
		r	φDc	ℓ	ℓ2	L	φD1	θ	θk	φDs		
SFSR4020S04-R05	●	0.5	2	2	4	40	1.9	20°	9.1°	4	1	
SFSR4020S06-R05	●								12.6°	6		
SFSR4030S04-R08	●	0.8	3	3	6		2.9		4.4°	4		
SFSR4030S06-R08	●								9.2°	6		
SFSR4040S04-R10	●	1	4	4	8	3.8	—	—	4	2		
SFSR4040S06-R10	●						20°	5.9°	6	1		
SFSR4050S06-R12	●	1.2	5	5	10	4.8		2.9°				
SFSR4060S06-R10	●	1	6	6	12	50	5.8	—	—	8	2	
SFSR4060S06-R15	●	1.5										
SFSR4080S08-R10	●	1	8	8	16	60	7.8					10
SFSR4080S08-R20	●	2										
SFSR4100S10-R20	●	3	10	10	20		9.8					
SFSR4100S10-R30	●	2										
SFSR4120S12-R20	●	2	12	12	24	11.8	12					
SFSR4120S12-R30	●	3										

HARD 1 RADIUS

SFSR Type

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TYPE

For General steel to Hardened steel

- Helix angle 50°-52°
- Corner radius accuracy : ± 0.005



Roughing

Semi-finishing

Finishing



Fig.1

$\phi D_c < \phi D_s$

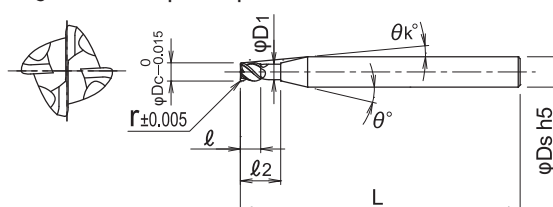
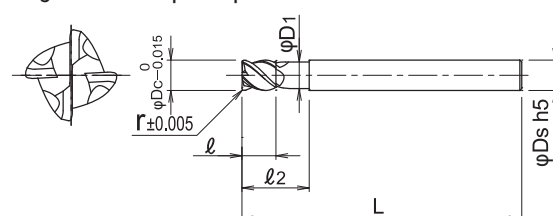


Fig.2

$\phi D_c = \phi D_s$



Cat.No.	Stock	Dimensions (mm)									Fig.						
		r	φDc	ℓ	ℓ2	L	φD1	θ	θk	φDs							
SFSR4020S06-R05-06	●	0.5	2	2	6	60	1.9	20°	10.27°	6	1						
SFSR4030S06-R08-09	●	0.8	3	3	9		2.9		6.91°								
SFSR4040S06-R10-12	●	1	4	4	12		3.8		4.15°								
SFSR4050S06-R12-15	●	1.2	5	5	15		4.7		1.88°								
SFSR4060S06-R05-18	●	0.5	6	6	18	5.7	—	—	—	6	2						
SFSR4060S06-R05-30	●				30							90					
SFSR4060S06-R10-18	●	1			18							60					
SFSR4060S06-R10-30	●				30							90					
SFSR4060S06-R15-18	●	1.5			18	60											
SFSR4060S06-R15-30	●				30	90											
SFSR4080S08-R05-24	●	0.5	8	8	24	7.6						—	—	—	8	2	
SFSR4080S08-R05-40	●				40												100
SFSR4080S08-R10-24	●	1			24												75
SFSR4080S08-R10-40	●				40												100
SFSR4080S08-R20-24	●	2			24	75											
SFSR4080S08-R20-40	●				40	100											
SFSR4100S10-R05-30	●	0.5	10	10	30	9.5	—	—	—	10	2						
SFSR4100S10-R05-50	●				50												110
SFSR4100S10-R10-30	●	1			30												80
SFSR4100S10-R10-50	●				50												110
SFSR4100S10-R20-30	●	2			30												80
SFSR4100S10-R20-50	●				50												110
SFSR4100S10-R30-30	●	3			30							80					
SFSR4100S10-R30-50	●				50							110					
SFSR4120S12-R05-36	●	0.5	12	12	36	11.5				—		—	—	12	2		
SFSR4120S12-R05-60	●				60											120	
SFSR4120S12-R10-36	●	1			36											100	
SFSR4120S12-R10-60	●				60											120	
SFSR4120S12-R20-36	●	2			36		100										
SFSR4120S12-R20-60	●				60		120										
SFSR4120S12-R30-36	●	3			36		100										
SFSR4120S12-R30-60	●				60		120										

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For General steel to Hardened steel

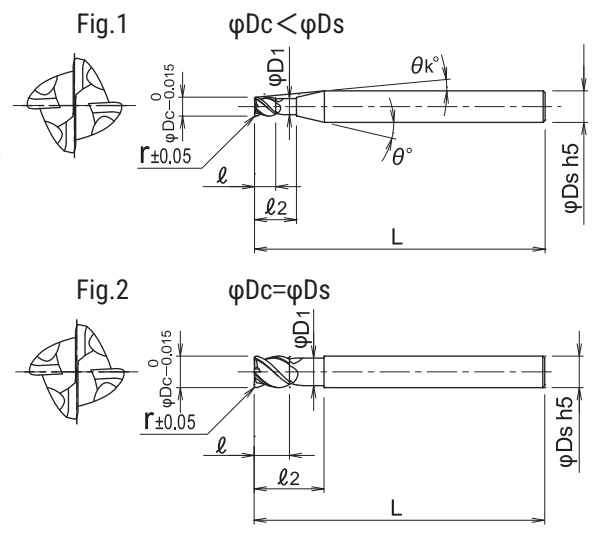
- Helix angle 50°-52°
- Corner radius R0.2



Roughing

Semi-finishing

Finishing



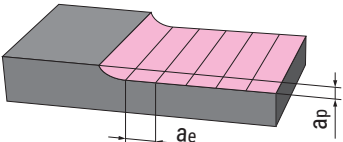
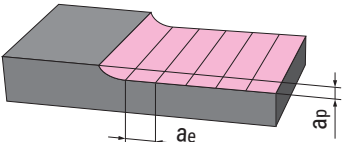
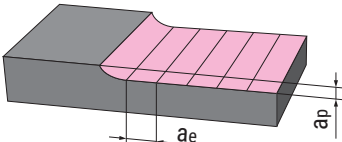
Cat.No.	Stock	Dimensions (mm)									Fig.
		r	ϕD_c	ℓ	ℓ_2	L	ϕD_1	θ	θ_k	ϕD_s	
SFSR4020S06-R02-06	●	0.2	2	2	6	60	1.9	20°	10.03°	6	1
SFSR4030S06-R02-09	●		3	3	9		2.9		6.62°		
SFSR4040S06-R02-12	●		4	4	12		3.8		3.93°		
SFSR4050S06-R02-15	●		5	5	15		4.7		1.77°		
SFSR4060S06-R02-18	●		6	6	18	75	5.7	-	-	8	2
SFSR4080S08-R02-24	●		8	8	24		7.6				
SFSR4100S10-R02-30	●		10	10	30		9.5				
SFSR4120S12-R02-36	●		12	12	36		11.5				

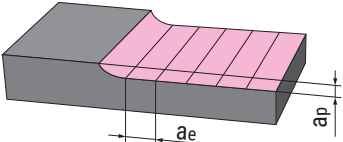
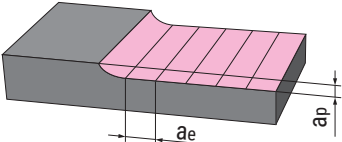
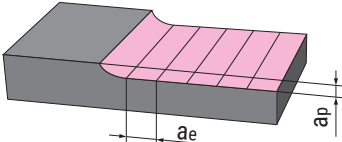
HARD 1 RADIUS

SFSR Type

■ SFSR type Recommended cutting conditions

● Face milling - Roughing

Material	Carbon steel (S50C, S55C) below 250HB		Alloy steel, Tool steel, Mold steel (SKD, SKH, NAK) below 45HRC		Stainless steel (SUS304)	
Type of machining	 $ap \leq 0.3\text{mm}$ (ϕDc 2 - 0.15mm) $ae \leq 0.33Dc$		 $ap \leq 0.3\text{mm}$ (ϕDc 2 - 0.15mm) $ae \leq 0.33Dc$		 $ap \leq 0.15\text{mm}$ $ae \leq 0.33Dc$	
ϕDc (mm)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)
2	24,000	7,000	24,000	7,000	25,000	2,500
3	17,000	7,000	17,000	7,000	17,000	3,000
4	13,000	8,000	13,000	8,000	13,000	3,500
5	10,000	9,000	10,000	9,000	10,500	4,000
6	8,500	10,000	8,500	10,000	8,600	4,200
8	6,500	10,000	6,500	10,000	6,500	4,200
10	5,200	10,000	5,200	10,000	4,500	4,200
12	4,300	10,000	4,300	10,000	3,000	4,200

Material	Hardened steel (SKD61, DAC, DHA) 42~52HRC		Hardened steel (SKD11, SKH51, SLD) 55~62HRC		Hardened steel (SKH, HAP) 63~70HRC	
Type of machining	 $ap \leq 0.15\text{mm}$ $ae \leq 0.33Dc$		 $ap \leq 0.15\text{mm}$ $ae \leq 0.33Dc$		 $ap \leq 0.15\text{mm}$ $ae \leq 0.33Dc$	
ϕDc (mm)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)
2	16,000	2,300	9,000	1,700	3,000	600
3	12,500	3,000	7,300	1,900	3,000	750
4	11,000	3,500	6,500	2,100	3,000	1,000
5	9,500	4,800	6,200	2,300	3,000	1,200
6	8,000	5,500	6,000	2,500	3,200	1,400
8	6,000	6,000	4,300	2,300	2,500	1,500
10	4,800	6,000	3,300	2,500	2,000	1,600
12	4,000	7,500	2,500	2,500	1,500	1,700

Note

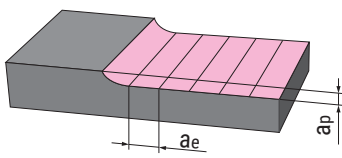
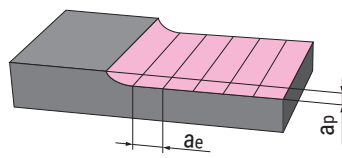
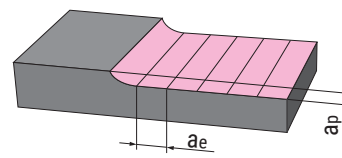
1. These cutting conditions are for general guidance.
2. The figures should be adjusted according to machining shape, purpose and rigidity of machine and work clamping.
3. If rpm available is lower than that recommended, reduce the feed rate proportionately.
4. Recommend to down cut with air blow or mist coolant.
5. Wet cutting is recommended for stainless steel.

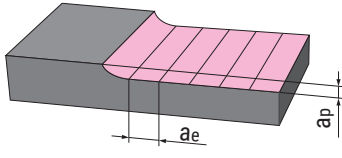
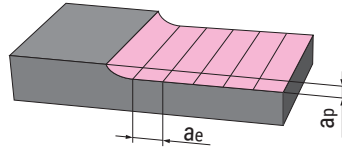
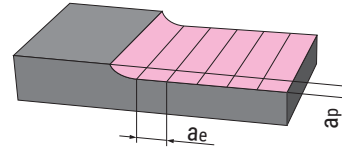
HARD 1 RADIUS

SFSR Type

■ SFSR type Recommended cutting conditions

● Face milling - Finishing

Material	Carbon steel (S50C, S55C) below 250HB		Alloy steel, Tool steel, Mold steel (SKD, SKH, NAK) below 45HRC		Stainless steel (SUS304)	
Type of machining	 $a_p \leq 0.15\text{mm}$ $a_e \leq 0.1D_c$		 $a_p \leq 0.15\text{mm}$ $a_e \leq 0.1D_c$		 $a_p \leq 0.15\text{mm}$ $a_e \leq 0.1D_c$	
ϕD_c (mm)	n (min ⁻¹)	V_f (mm/min)	n (min ⁻¹)	V_f (mm/min)	n (min ⁻¹)	V_f (mm/min)
2	30,000	2,000	30,000	2,000	30,000	2,000
3	20,000	2,000	20,000	2,000	20,000	2,000
4	15,000	2,000	15,000	2,000	15,000	2,000
5	12,000	2,000	12,000	2,000	12,000	2,000
6	10,000	2,000	10,000	2,000	10,000	2,000
8	7,500	2,000	7,500	2,000	7,500	2,000
10	6,000	1,900	6,000	1,900	5,000	1,500
12	5,000	1,800	5,000	1,800	3,000	1,000

Material	Hardened steel (SKD61, DAC, DHA) 42~52HRC		Hardened steel (SKD11, SKH51, SLD) 55~62HRC		Hardened steel (SKH, HAP) 63~70HRC	
Type of machining	 $a_p \leq 0.1\text{mm}$ $a_e \leq 0.1D_c$		 $a_p \leq 0.1\text{mm}$ $a_e \leq 0.1D_c$		 $a_p \leq 0.05\text{mm}$ $a_e \leq 0.1D_c$	
ϕD_c (mm)	n (min ⁻¹)	V_f (mm/min)	n (min ⁻¹)	V_f (mm/min)	n (min ⁻¹)	V_f (mm/min)
2	20,000	1,300	13,000	900	9,000	400
3	14,000	1,100	9,000	700	6,000	350
4	11,000	950	7,000	550	4,700	300
5	9,500	900	5,700	550	3,800	300
6	8,000	800	4,700	450	3,200	250
8	6,000	700	3,500	400	2,500	250
10	5,000	650	2,800	350	2,000	200
12	4,000	650	2,400	350	1,600	200

Note

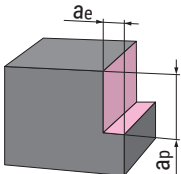
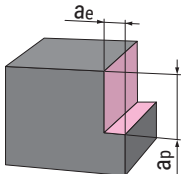
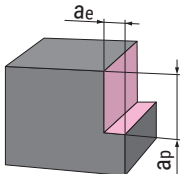
1. These cutting conditions are for general guidance.
2. The figures should be adjusted according to machining shape, purpose and rigidity of machine and work clamping.
3. If rpm available is lower than that recommended, reduce the feed rate proportionately.
4. Recommend to down cut with air blow or mist coolant.
5. Wet cutting is recommended for stainless steel.

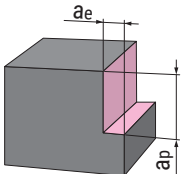
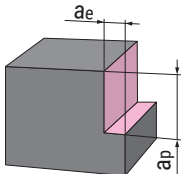
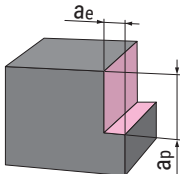
HARD 1 RADIUS

SFSR Type

■ SFSR type Recommended cutting conditions

● Side milling - Roughing

Material	Carbon steel (S50C, S55C) below 250HB		Alloy steel, Tool steel, Mold steel (SKD, SKH, NAK) below 45HRC		Stainless steel (SUS304)	
Type of machining	 $a_p \leq 0.6D_c$ $a_e \leq 0.08D_c$		 $a_p \leq 0.6D_c$ $a_e \leq 0.08D_c$		 $a_p \leq 0.6D_c$ $a_e \leq 0.04D_c$	
ϕD_c (mm)	n (min ⁻¹)	V_f (mm/min)	n (min ⁻¹)	V_f (mm/min)	n (min ⁻¹)	V_f (mm/min)
2	24,000	950	24,000	950	3,200	2,500
3	24,000	1,300	24,000	1,300	2,700	2,200
4	18,000	1,800	18,000	1,800	2,300	2,000
5	15,000	2,000	15,000	2,000	2,000	1,900
6	12,000	2,200	12,000	2,200	1,800	1,800
8	10,000	2,200	10,000	2,200	1,300	1,300
10	8,000	2,200	8,000	2,200	1,000	1,000
12	6,500	1,900	6,500	1,900	800	800

Material	Hardened steel (SKD61, DAC, DHA) 42~52HRC		Hardened steel (SKD11, SKH51, SLD) 55~62HRC		Hardened steel (SKH, HAP) 63~70HRC	
Type of machining	 $a_p \leq 0.6D_c$ $a_e \leq 0.08D_c$		 $a_p \leq 0.6D_c$ $a_e \leq 0.08D_c$		 $a_p \leq 0.6D_c$ $a_e \leq 0.08D_c$	
ϕD_c (mm)	n (min ⁻¹)	V_f (mm/min)	n (min ⁻¹)	V_f (mm/min)	n (min ⁻¹)	V_f (mm/min)
2	13,000	1,000	12,000	1,000	6,400	600
3	13,000	1,300	11,000	1,200	6,000	600
4	11,000	1,500	9,000	1,200	5,100	550
5	9,000	1,600	7,200	1,200	4,200	550
6	7,500	1,800	6,000	1,200	3,500	650
8	5,500	2,200	4,500	1,200	2,500	650
10	4,500	2,500	3,600	1,400	2,000	600
12	3,800	3,000	3,000	1,400	1,700	600

Note

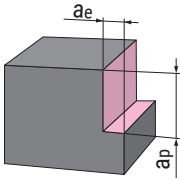
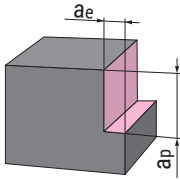
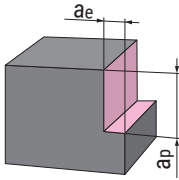
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2. The figures should be adjusted according to machining shape, purpose and rigidity of machine and work clamping.
3. If rpm available is lower than that recommended, reduce the feed rate proportionately.
4. Recommend to down cut with air blow or mist coolant.
5. Wet cutting is recommended for stainless steel.

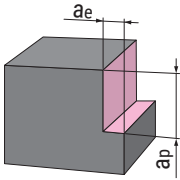
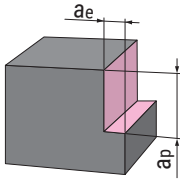
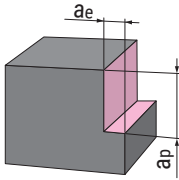
HARD 1 RADIUS

SFSR Type

■ SFSR type Recommended cutting conditions

● Side milling - Finishing

Material	Carbon steel (S50C, S55C) below 250HB		Alloy steel, Tool steel, Mold steel (SKD, SKH, NAK) below 45HRC		Stainless steel (SUS304)	
Type of machining	 $a_p \leq 0.3\text{mm}$ $a_e \leq 0.1\text{mm}$		 $a_p \leq 0.3\text{mm}$ $a_e \leq 0.1\text{mm}$		 $a_p \leq 0.3\text{mm}$ $a_e \leq 0.1\text{mm}$	
ϕDc (mm)	n (min ⁻¹)	V_f (mm/min)	n (min ⁻¹)	V_f (mm/min)	n (min ⁻¹)	V_f (mm/min)
2	40,000	4,500	40,000	4,500	40,000	7,500
3	29,000	4,000	29,000	4,000	28,000	5,500
4	22,000	4,000	22,000	4,000	21,000	4,500
5	18,000	4,000	18,000	4,000	17,000	4,000
6	15,000	3,700	15,000	3,700	14,000	3,500
8	11,000	2,800	11,000	2,800	11,000	3,000
10	8,900	2,600	8,900	2,600	9,000	2,600
12	7,400	2,300	7,400	2,300	7,500	2,200

Material	Hardened steel (SKD61, DAC, DHA) 42~52HRC		Hardened steel (SKD11, SKH51, SLD) 55~62HRC		Hardened steel (SKH, HAP) 63~70HRC	
Type of machining	 $a_p \leq 0.3\text{mm}$ $a_e \leq 0.1\text{mm}$		 $a_p \leq 0.2\text{mm}$ $a_e \leq 0.1\text{mm}$		 $a_p \leq 0.1\text{mm}$ $a_e \leq 0.1\text{mm}$	
ϕDc (mm)	n (min ⁻¹)	V_f (mm/min)	n (min ⁻¹)	V_f (mm/min)	n (min ⁻¹)	V_f (mm/min)
2	40,000	2,500	30,000	2,000	23,000	550
3	26,500	2,000	20,000	1,500	15,000	450
4	20,000	1,800	15,000	1,200	12,000	400
5	16,000	1,500	12,000	1,100	9,500	380
6	13,500	1,300	10,000	900	8,000	350
8	10,000	1,000	7,500	700	6,000	280
10	8,000	800	6,000	600	5,000	280
12	6,500	700	5,000	500	4,000	280

Note

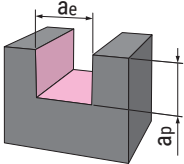
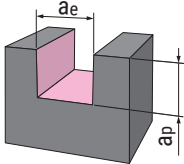
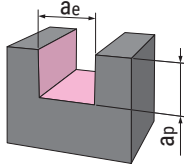
1. These cutting conditions are for general guidance.
2. The figures should be adjusted according to machining shape, purpose and rigidity of machine and work clamping.
3. If rpm available is lower than that recommended, reduce the feed rate proportionately.
4. Recommend to down cut with air blow or mist coolant.
5. Wet cutting is recommended for stainless steel.

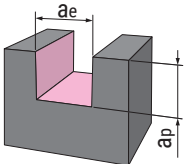
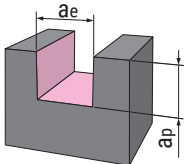
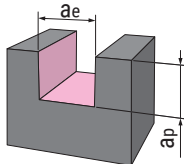
HARD 1 RADIUS

SFSR Type

■ SFSR type Recommended cutting conditions

● Slot milling

Material	Carbon steel (S50C, S55C) below 250HB		Alloy steel, Tool steel, Mold steel (SKD, SKH, NAK) below 45HRC		Stainless steel (SUS304)	
Type of machining	 $a_p \leq 0.3D_c$ $a_e = D_c$		 $a_p \leq 0.3D_c$ $a_e = D_c$		 $a_p \leq 0.25D_c$ $a_e = D_c$	
ϕD_c (mm)	n (min ⁻¹)	V_f (mm/min)	n (min ⁻¹)	V_f (mm/min)	n (min ⁻¹)	V_f (mm/min)
2	11,000	650	11,000	650	2,500	190
3	9,500	750	9,500	750	2,300	180
4	8,500	800	8,500	800	2,000	170
5	7,600	1,000	7,600	1,000	1,800	160
6	6,600	1,100	6,600	1,100	1,500	150
8	5,000	1,200	5,000	1,200	1,100	130
10	4,000	1,200	4,000	1,200	850	130
12	3,300	1,300	3,300	1,300	700	130

Material	Hardened steel (SKD61, DAC, DHA) 42~52HRC		Hardened steel (SKD11, SKH51, SLD) 55~62HRC		Hardened steel (SKH, HAP) 63~70HRC	
Type of machining	 $a_p \leq 0.3D_c$ $a_e = D_c$		 $a_p \leq 0.3D_c$ $a_e = D_c$		 $a_p \leq 0.3D_c$ $a_e = D_c$	
ϕD_c (mm)	n (min ⁻¹)	V_f (mm/min)	n (min ⁻¹)	V_f (mm/min)	n (min ⁻¹)	V_f (mm/min)
2	9,000	400	5,500	240	5,500	230
3	8,000	500	5,000	300	4,800	270
4	7,500	550	4,200	350	4,000	320
5	6,800	650	3,900	400	3,800	400
6	5,800	700	3,500	500	3,200	480
8	4,300	750	2,700	550	2,300	450
10	3,400	900	2,200	620	1,800	470
12	2,800	1,000	1,800	700	1,500	530

Note

1. These cutting conditions are for general guidance.
2. The figures should be adjusted according to machining shape, purpose and rigidity of machine and work clamping.
3. If rpm available is lower than that recommended, reduce the feed rate proportionately.
4. Recommend to down cut with air blow or mist coolant.
5. Wet cutting is recommended for stainless steel.
6. Recommended ramping angle is up to 45° for cutting general steel.
In case of Stainless steel & Hardened steel, recommended ramping angle is up to 5° only.