

S-Star Endmill

Endmill for Stainless steel machining

- Stable machinability minimizing unexpected chipping from optimal cutting edge design for Stainless steel cutting
- High performance in Stainless steel series, Titanium and Nickel cutting from applying new coating with high oxidation resistance and hardness



S-Star Endmill

Stainless steel is widely used not only in daily life but also in various industries because it has high corrosion resistance and smooth surface. Stainless steel reduces tool life as it has characteristics like high work hardening, high shear resistance and high tendency of chip's welding on a tool. Therefore, it is recommended to use exclusive tools for effective Stainless steel machining.

S-Star Endmill dramatically increased wear resistance and welding resistance than existing tool through applying high toughness substrate and new coating layer with wear resistance, oxidation resistance and high hardness. In addition, the optimal cutting edge minimizes cutting load and chattering for Stainless steel cutting and reduces fracture due to unexpected chipping.

KORLOY recommends S-Star Endmill not only for Stainless steel cutting but general cuttings with Titanium, Nickel, Inconel and Hard-To-Cut materials for your high productivity.

» **Good chipping resistance**

- Strong cutting edge and high toughness substrate

» **Higher welding resistance and wear resistance**

- AlCrN series coating layer

» **Lower cutting load and better chip evacuation**

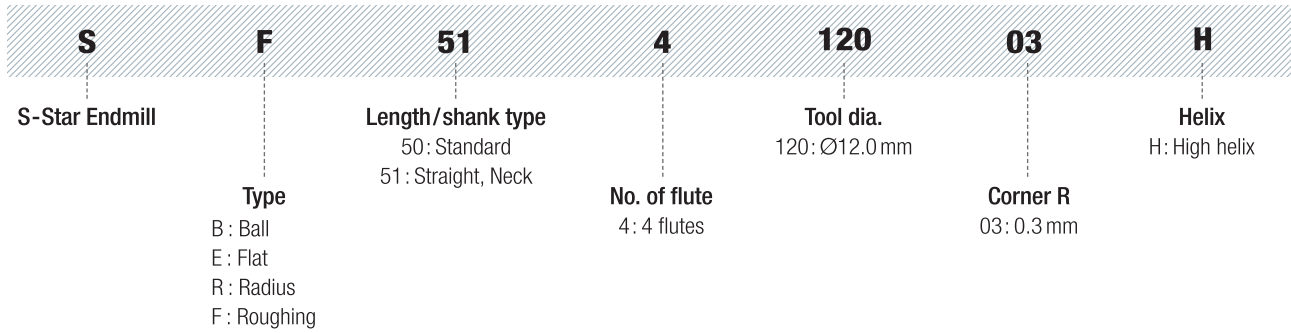
- Uneven flute spacing and R-type gash shape
- High rake angle and streamlined chip pocket

» **Good surface finish**

- Added finishing flute



Code system



Features



Applying high toughness substrate

- Chipping resistance and stable cutting from applying high toughness substrate



Applying different width and size of AlCrN based layer

- Applying multi layers
- Increased lubrication due to containing Cr
- Ensured stability against frictional heat
- Secured wear resistance from thicker coating layer

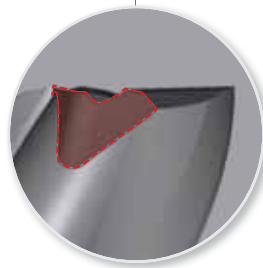
Cutting edge treatment

- Improved chipping resistance in the beginning of cutting
- Better wear resistance and stable cutting
- High quality of product from cutting edge treatment stabilization



Additional finishing edge

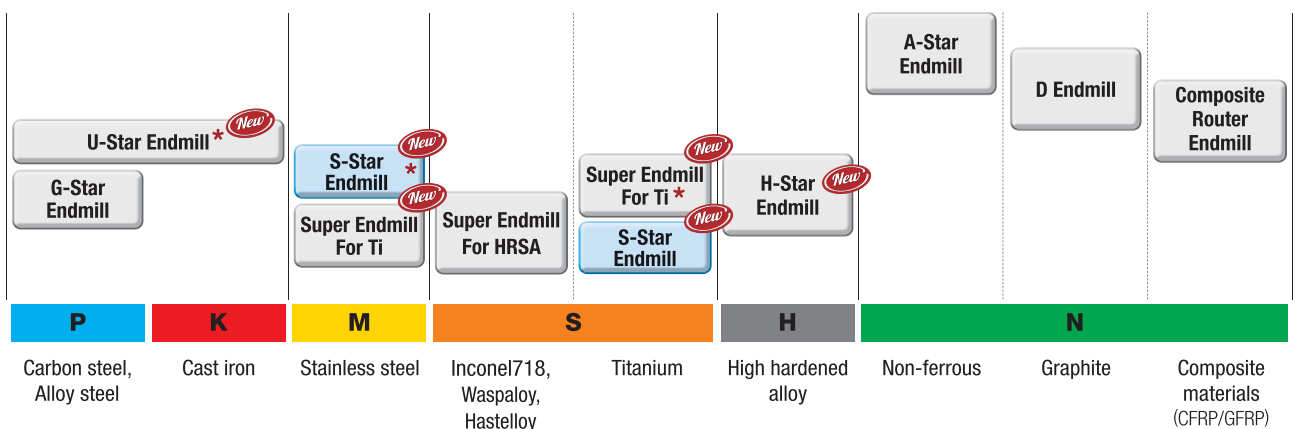
- Enhanced surface finish due to increased 1st O.D grinding roughness
- High quality cutting edge and good welding resistance













Uneven flute spacing / R gash

- High chip evacuation through R gash shape
- Stability in shouldering machining

Tool selection guide



Line-up

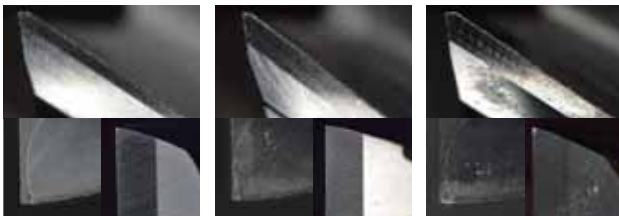
Type	Designation	Picture	Product name	No. of flute	Size (Ø)	
					Min.	Max.
Flat	SE502		2 flutes flat Endmill	2	1	20
	SE503		3 flutes flat Endmill	3	1	20
	SE504		4 flutes flat Endmill	4	1	20
	SE506		6 flutes flat Endmill	6	6	20
Radius	SR504		4 flutes radius Endmill	4	1	20
	SR505		5 flutes nick type radius Endmill	5	6	20
	SR507		7 flutes nick type radius Endmill	7	6	20
Ball	SB502		2 flutes ball Endmill	2	1	12
	SB504		4 flutes ball Endmill	4	3	20
Roughing	SF513H SF514H SF515H		3~5 flutes roughing Endmill	3~5	3	20

Application examples

Stainless steel (X5CrNiMo17-12-2)

Cutting Condition $vc(m/min) = 60$, $fz(mm/t) = 0.03$, $ap(mm) = 9.0$, $ae(mm) = 0.6$, wet(emulsion)

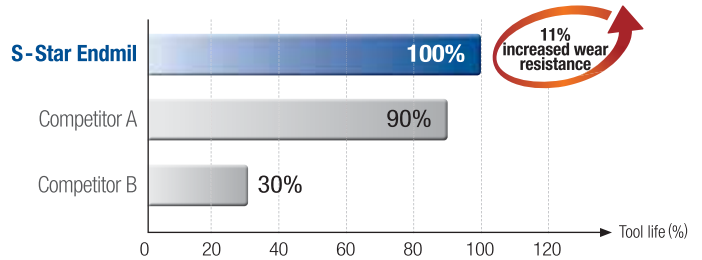
Tool SE504060 (Diameter = Ø6mm)



[S-Star Endmil]

[Competitor A]

[Competitor B]



Titanium (Ti-6Al-4V)

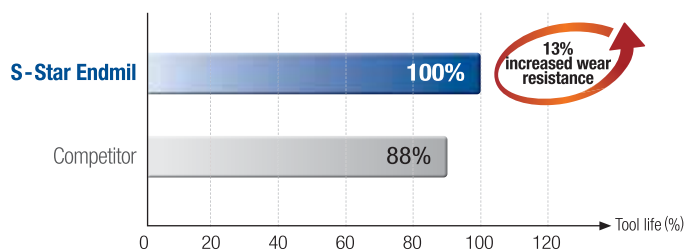
Cutting Condition $vc(m/min) = 65$, $fz(mm/t) = 0.07$, $ap(mm) = 0.6$, wet(emulsion)

Tool SR50403003 (Diameter = Ø3mm)



[S-Star Endmil]

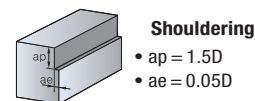
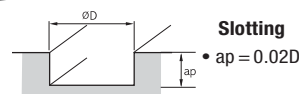
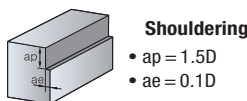
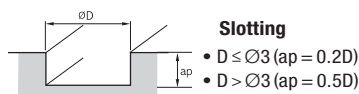
[Competitor]



Recommended cutting conditions _ SE502(Flat)

Workpiece Condition Diameter (∅)	Carbon steel, Alloy steel, Tool steel						Stainless steel				Titanium alloy		Inconel alloy	
	~HRC20		~HRC30		HRC30~45		300 Series		400 Series		RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)
	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)				
1	31,800	570	30,100	570	28,700	570	22,300	450	31,800	640	22,300	520	9,600	190
1.2	26,500	480	25,100	480	23,900	480	18,600	370	26,500	530	18,600	430	8,000	160
1.5	21,200	380	20,100	380	19,100	380	14,900	300	21,200	420	14,900	340	6,400	130
2	15,900	430	15,000	430	14,300	430	11,100	270	15,900	380	11,100	260	4,800	100
2.5	12,700	410	12,000	410	11,500	410	8,900	250	12,700	360	8,900	310	3,800	110
3	11,700	420	11,100	420	10,600	420	8,500	340	11,700	470	8,500	290	4,200	130
4	8,800	480	8,400	480	8,000	480	6,400	380	8,800	530	6,400	300	3,200	130
5	7,000	510	6,700	510	6,400	510	5,100	410	7,000	560	5,100	290	2,500	130
6	5,800	520	5,600	530	5,300	530	4,200	420	5,800	580	4,200	290	2,100	130
8	4,400	520	4,200	520	4,000	520	3,200	420	4,400	570	3,200	260	1,600	110
10	3,500	440	3,300	440	3,200	450	2,500	350	3,500	490	2,500	250	1,300	110
12	2,900	420	2,800	430	2,700	430	2,100	340	2,900	460	2,100	240	1,100	110
14	2,500	370	2,400	380	2,300	380	1,800	200	2,500	280	1,800	250	900	110
16	2,200	340	2,100	340	2,000	340	1,600	270	2,200	370	1,600	260	800	110
18	1,900	310	1,900	320	1,800	320	1,400	270	1,900	360	1,400	240	700	110
20	1,800	320	1,700	320	1,600	320	1,300	260	1,800	360	1,300	240	600	100

<Application tip for depth of cut>

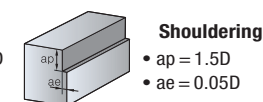
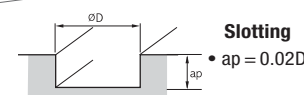
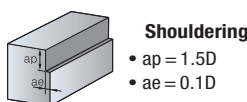
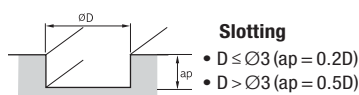


The data on the chart above is the shouldering cutting condition. In slotting, set the RPM and feed to 70% of the condition shown above.

Recommended cutting conditions _ SE503(Flat)

Workpiece Condition Diameter (∅)	Carbon steel, Alloy steel, Tool steel						Stainless steel				Titanium alloy		Inconel alloy	
	~HRC20		~HRC30		HRC30~45		300 Series		400 Series		RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)
	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)				
1	35,000	950	33,400	950	31,800	950	22,300	670	31,800	950	22,300	770	9,600	290
1.2	29,200	790	27,900	800	26,500	800	18,600	560	26,500	800	18,600	640	8,000	240
1.5	23,400	630	22,300	640	21,200	640	14,900	450	21,200	640	14,900	520	6,400	190
2	17,500	710	16,700	710	15,900	720	11,100	400	15,900	570	11,100	380	4,800	140
2.5	14,000	680	13,400	690	12,700	690	8,900	370	12,700	530	8,900	460	3,800	170
3	12,700	690	12,300	700	11,700	700	8,500	510	11,700	700	8,500	440	4,200	190
4	9,600	780	9,200	790	8,800	790	6,400	580	8,800	790	6,400	440	3,200	190
5	7,600	820	7,400	840	7,000	840	5,100	610	7,000	840	5,100	440	2,500	190
6	6,400	870	6,100	870	5,800	870	4,200	630	5,800	870	4,200	440	2,100	190
8	4,800	840	4,600	850	4,400	860	3,200	620	4,400	860	3,200	390	1,600	170
10	3,800	720	3,700	740	3,500	740	2,500	530	3,500	740	2,500	370	1,300	170
12	3,200	690	3,100	710	2,900	700	2,100	500	2,900	700	2,100	360	1,100	170
14	2,700	610	2,600	620	2,500	620	1,800	300	2,500	410	1,800	370	900	160
16	2,400	550	2,300	560	2,200	560	1,600	410	2,200	560	1,600	390	800	170
18	2,100	510	2,000	510	1,900	510	1,400	400	1,900	540	1,400	360	700	160
20	1,900	510	1,800	510	1,800	540	1,300	390	1,800	540	1,300	360	600	140

<Application tip for depth of cut>

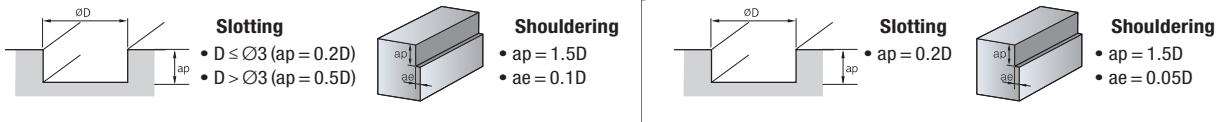


The data on the chart above is the shouldering cutting condition. In slotting, set the RPM and feed to 70% of the condition shown above.

Recommended cutting conditions _ SE504(Flat) / SR504(Radius)

Workpiece Condition	Carbon steel, Alloy steel, Tool steel						Stainless steel				Titanium alloy		Inconel alloy	
	~HRC20		~HRC30		HRC30~45		300 Series		400 Series		RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)
	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)				
1	35,000	1,260	33,400	1,270	31,800	1,270	22,300	890	31,800	1,270	22,300	1,030	9,600	380
1.2	29,200	1,050	27,900	1,060	26,500	1,060	18,600	740	26,500	1,060	18,600	860	8,000	320
1.5	23,400	840	22,300	850	21,200	850	14,900	600	21,200	850	14,900	690	6,400	260
2	17,500	950	16,700	950	15,900	950	11,100	530	15,900	760	11,100	510	4,800	190
2.5	14,000	910	13,400	920	12,700	910	8,900	500	12,700	710	8,900	620	3,800	230
3	12,700	920	12,300	930	11,700	940	8,500	680	11,700	940	8,500	590	4,200	250
4	9,600	1,040	9,200	1,050	8,800	1,060	6,400	770	8,800	1,060	6,400	590	3,200	260
5	7,600	1,100	7,400	1,120	7,000	1,120	5,100	820	7,000	1,120	5,100	590	2,500	250
6	6,400	1,160	6,100	1,160	5,800	1,160	4,200	840	5,800	1,160	4,200	580	2,100	250
8	4,800	1,130	4,600	1,140	4,400	1,140	3,200	830	4,400	1,140	3,200	520	1,600	220
10	3,800	960	3,700	980	3,500	980	2,500	700	3,500	980	2,500	500	1,300	220
12	3,200	920	3,100	940	2,900	930	2,100	670	2,900	930	2,100	490	1,100	220
14	2,700	810	2,600	820	2,500	830	1,800	400	2,500	550	1,800	500	900	220
16	2,400	740	2,300	740	2,200	750	1,600	540	2,200	750	1,600	520	800	220
18	2,100	680	2,000	680	1,900	680	1,400	530	1,900	720	1,400	490	700	210
20	1,900	690	1,800	680	1,800	720	1,300	520	1,800	720	1,300	480	600	190

<Application tip for depth of cut>



The data on the chart above is the shouldering cutting condition. In slotting, set the RPM and feed to 70% of the condition shown above.

Recommended cutting conditions _ SE506(Flat)

Workpiece Condition	Carbon steel, Alloy steel, Tool steel						Stainless steel				Titanium alloy		Inconel alloy	
	~HRC20		~HRC30		HRC30~45		300 Series		400 Series		RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)
	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)				
6	6,400	1,730	6,100	1,740	5,800	1,160	4,200	840	5,800	1,160	4,200	580	2,100	250
8	4,800	1,690	4,600	1,700	4,400	1,140	3,200	830	4,400	1,140	3,200	520	1,600	220
10	3,800	1,440	3,700	1,480	3,500	980	2,500	700	3,500	980	2,500	500	1,300	220
12	3,200	1,390	3,100	1,410	2,900	930	2,100	670	2,900	930	2,100	490	1,100	220
16	2,400	1,100	2,300	1,110	2,200	750	1,600	540	2,200	750	1,600	520	800	220
20	1,900	1,030	1,800	1,030	1,800	720	1,300	520	1,800	720	1,300	480	600	190

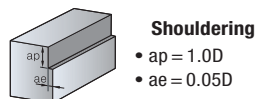
<Application tip for depth of cut>



Recommended cutting conditions _ SR505/SR507 (Radius)

Workpiece Condition	Carbon steel, Alloy steel, Tool steel						Stainless steel				Titanium alloy			
	~HRC20		~HRC30		HRC30~45		300 Series		400 Series		RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)
	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)				
6	6,400	1,370	6,100	1,450	5,800	1,450	4,200	1,050	5,800	1,450	4,200	730	2,100	320
8	4,800	1,330	4,600	1,420	4,400	1,430	3,200	1,040	4,400	1,430	3,200	650	1,600	280
10	3,800	1,140	3,700	1,230	3,500	1,230	2,500	880	3,500	1,230	2,500	620	1,300	280
12	3,200	1,090	3,100	1,180	2,900	1,160	2,100	840	2,900	1,160	2,100	610	1,100	280
16	2,400	870	2,300	930	2,200	940	1,600	680	2,200	940	1,600	650	800	280
20	1,900	810	1,800	860	1,800	900	1,300	650	1,800	900	1,300	600	600	240

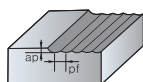
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Recommended cutting conditions _ SB502(Ball)

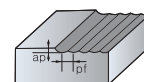
Workpiece	Carbon steel, Alloy steel, Tool steel						Stainless steel				Titanium alloy		Inconel alloy	
	~HRC20		~HRC30		HRC30~45		300 Series		400 Series					
	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)
2	27,100	1,850	25,500	1,940	23,900	1,910	15,900	950	23,900	1,430	20,700	480	9,600	190
4	17,500	1,200	16,700	1,270	15,900	1,270	11,900	830	14,300	1,000	11,900	550	6,400	260
6	11,700	1,000	11,100	1,050	10,600	1,060	8,000	700	9,600	840	8,000	550	4,200	250
8	8,800	900	8,400	960	8,000	960	6,000	700	7,200	840	6,000	490	3,200	220
10	7,000	840	6,700	890	6,400	900	4,800	650	5,700	780	4,800	480	2,500	220
12	5,800	790	5,600	850	5,300	850	4,000	650	4,800	780	4,000	460	2,100	210

<Application tip for depth of cut>



Shouldering

- ap = 0.1D
- pf = 0.2D



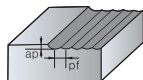
Shouldering

- ap = 0.05D
- pf = 0.1D

Recommended cutting conditions _ SB504(Ball)

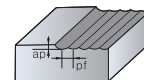
Workpiece	Carbon steel, Alloy steel, Tool steel						Stainless steel				Titanium alloy		Inconel alloy	
	~HRC20		~HRC30		HRC30~45		300 Series		400 Series					
	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)
3	21,200	2,900	20,200	3,070	19,100	3,060	15,900	1,910	19,100	2,290	15,900	1,100	8,500	510
4	17,500	2,630	16,700	2,790	15,900	2,800	11,900	1,670	14,300	2,000	11,900	1,100	6,400	510
5	14,000	2,390	13,400	2,550	12,700	2,540	9,600	1,500	11,500	1,790	9,600	1,110	5,100	510
6	11,700	2,000	11,100	2,110	10,600	2,120	8,000	1,410	9,600	1,690	8,000	1,110	4,200	500
8	8,800	1,810	8,400	1,920	8,000	1,920	6,000	1,390	7,200	1,670	6,000	970	3,200	450
10	7,000	1,680	6,700	1,780	6,400	1,790	4,800	1,310	5,700	1,550	4,800	950	2,500	430
12	5,800	1,690	5,600	1,810	5,300	1,800	4,000	1,300	4,800	1,560	4,000	920	2,100	420
16	4,400	1,350	4,200	1,440	4,000	1,440	3,000	1,020	3,600	1,220	3,000	970	1,600	450
20	3,500	1,140	3,300	1,190	3,200	1,220	2,400	860	2,900	1,040	2,400	890	1,300	420

<Application tip for depth of cut>



Shouldering

- ap = 0.1D
- pf = 0.2D



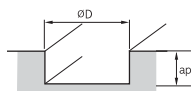
Shouldering

- ap = 0.05D
- pf = 0.1D

Recommended cutting conditions _ SF51H(Roughing)

Workpiece	Stainless steel			
	300 Series		400 Series	
	RPM n (min ⁻¹)	Feed vf (mm/min)	RPM n (min ⁻¹)	Feed vf (mm/min)
3	5,300	360	6,400	440
4	4,800	350	5,700	410
5	4,800	360	5,700	430
6	4,500	360	5,400	430
7	3,900	360	4,600	420
8	3,400	340	4,100	410
9	3,000	320	3,600	390
10	2,700	320	3,200	380
12	2,300	290	2,700	330
14	1,900	240	2,300	290
16	1,700	220	2,000	260
20	1,400	190	1,600	220

<Application tip for depth of cut>



Slotting

- D3~D5 = 0.3D
- D6~D10 = 0.25D
- D12~D16 = 0.15D
- D18~D20 = 0.1D

If chattering is occurred even though workpiece is rigidly clamped, lower RPM and feed at the same rate shown in the chart above.

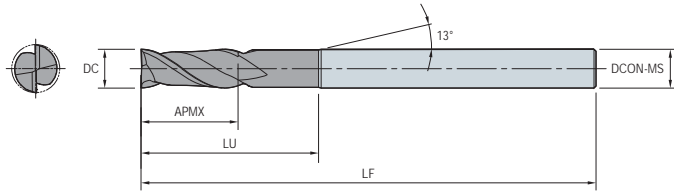
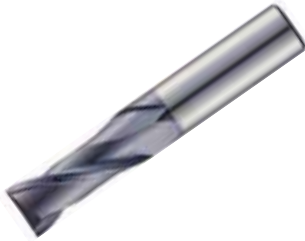
Notice

- Please adjust the recommended cutting conditions properly, according to the condition of your machines, the target shapes, and your purpose for machining.
- Please set the machine with high rigidity and check the workpiece's clamping status.
- Please select proper coolant oil for workpiece materials and check if the pressure and amount of coolant oil is adequate for machining.
- In case of chattering, reduce RPM and feed rate by the same ratio.

SE502(Flat)



DC	Tolerance
Ø1 ~ Ø5	0.000 ~ -0.015
Ø6	0.000 ~ -0.020
Ø8 ~ Ø20	0.000 ~ -0.030



(mm)

Designation		DC	APMX	LU	LF	DCON-MS
STANDARD	WELDON SHANK					
SE502010	SE502010F	1	2.5	7.5	50	6
SE502012	SE502012F	1.2	3	8	50	6
SE502015	SE502015F	1.5	4	9	50	6
SE502020	SE502020F	2	6	11	50	6
SE502025	SE502025F	2.5	7	12	50	6
SE502030	SE502030F	3	8	13	55	6
SE502040	SE502040F	4	10	15	55	6
SE502050	SE502050F	5	15	20	55	6
SE502060	SE502060F	6	15	22	60	6
SE502080	SE502080F	8	20	32	70	8
SE502100	SE502100F	10	25	33	75	10
SE502120	SE502120F	12	30	35	80	12
SE502140	SE502140F	14	35	42	90	16
SE502160	SE502160F	16	42	52	100	16
SE502180	-	18	45	-	100	16
SE502200	SE502200F	20	48	50	100	20

• Applicable Workpiece

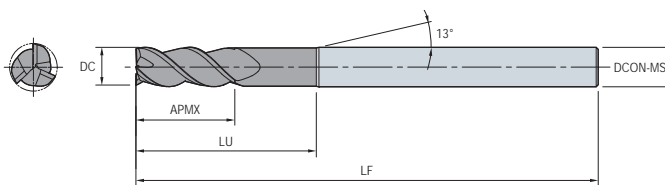
: Excellent : Good

Carbon Steel (~ HB225)	Alloy steel (HB225 ~ 325)	Pre-hardened steel (HrC30 ~ 50)	Hardened steel		Cast iron ~ FCD500	Aluminum	Stainless steel	Ti-Alloy	Ni-Alloy
			SKD61 (~ HRC55)	SKD11 (HRC55 ~)					

SE503 (Flat)



DC	Tolerance
Ø1 ~ Ø5	0.000 ~ -0.015
Ø6	0.000 ~ -0.020
Ø8 ~ Ø20	0.000 ~ -0.030



(mm)

Designation		DC	APMX	LU	LF	DCON-MS
STANDARD	WELDON SHANK					
SE503010010	SE503010F	1	2.5	7.5	50	6
SE503012	SE503012F	1.2	3	8	50	6
SE503015	SE503015F	1.5	4	9	50	6
SE503020	SE503020F	2	6	11	50	6
SE503025	SE503025F	2.5	7	12	50	6
SE503030	SE503030F	3	8	13	55	6
SE50303010	SE50303010F	3	10	15	60	6
SE503040	SE503040F	4	10	15	55	6
SE50304012	SE50304012F	4	12	17	60	6
SE503050	SE503050F	5	13	18	55	6
SE503060	SE503060F	6	15	22	60	6
SE50306020	SE50306020F	6	20	27	65	6
SE503080	SE503080F	8	20	32	70	8
SE50308030	SE50308030F	8	30	42	80	8
SE503100	SE503100F	10	25	33	75	10
SE50310035	SE50310035F	10	35	43	85	10
SE503120	SE503120F	12	30	35	80	12
SE50312040	SE50312040F	12	40	45	90	12
SE503140	SE503140F	14	35	42	90	16
SE503160	SE503160F	16	42	52	100	16
SE503180	-	18	45	-	100	16
SE503200	SE503200F	20	48	50	100	20

• Applicable Workpiece

: Excellent : Good

Carbon Steel (~ HB225)	Alloy steel (HB225 ~ 325)	Pre-hardened steel (HRC30 ~ 50)	Hardened steel		Cast iron ~ FCD500	Aluminum	Stainless steel	Ti-Alloy	Ni-Alloy
			SKD61 (~ HRC55)	SKD11 (HRC55 ~)					

SE504(Flat)

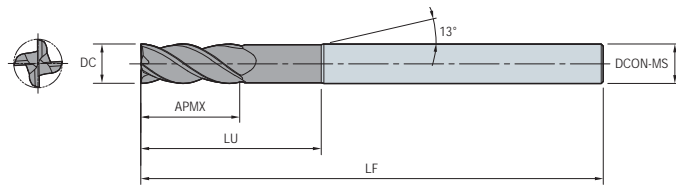


H-A
35°/37°

h5
shank

Grade
PC325

DC	Tolerance
Ø1 - Ø5.5	0.000 - -0.015
Ø6 - Ø7	0.000 - -0.020
Ø8 - Ø20	0.000 - -0.030



(mm)

Designation		DC	APMX	LU	LF	DCON-MS
STANDARD	WELDON SHANK					
SE504010	SE504010F	1	2.5	7.5	50	6
SE504012	SE504012F	1.2	3	8	50	6
SE504015	SE504015F	1.5	4	9	50	6
SE504020	SE504020F	2	6	11	50	6
SE504025	SE504025F	2.5	7	12	50	6
SE504030	SE504030F	3	8	13	55	6
SE50403010	SE50403010F	3	10	15	60	6
SE504035	SE504035F	3.5	10	15	55	6
SE504040	SE504040F	4	10	15	55	6
SE50404012	SE50404012F	4	12	17	60	6
SE504045	SE504045F	4.5	12	17	55	6
SE504050	SE504050F	5	15	20	55	6
SE504055	SE504055F	5.5	15	20	60	6
SE504060	SE504060F	6	15	22	60	6
SE50406020	SE50406020F	6	20	27	65	6
SE504065	SE504065F	6.5	15	22	60	8
SE504070	SE504070F	7	20	42	80	8
SE504080	SE504080F	8	20	32	70	8
SE50408025	SE50408025F	8	25	32	70	8
SE50408030	SE50408030F	8	30	42	80	8
SE504085	SE504085F	8.5	20	28	70	10
SE504090	SE504090F	9	25	38	80	10
SE504100	SE504100F	10	25	33	75	10
SE50410035	SE50410035F	10	35	43	85	10
SE504120	SE504120F	12	30	35	80	12
SE50412040	SE50412040F	12	40	45	90	12
SE504140	SE504140F	14	35	42	90	16
SE504160	SE504160F	16	42	52	100	16
SE504180	-	18	45	-	100	16
SE504200	SE504200F	20	48	50	100	20

• Applicable Workpiece

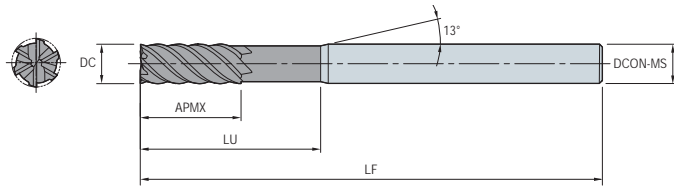
: Excellent : Good

Carbon Steel (~ HB225)	Alloy steel (HB225 ~ 325)	Pre-hardened steel (HrC30 ~ 50)	Hardened steel		Cast iron ~ FCD500	Aluminum	Stainless steel	Ti-Alloy	Ni-Alloy
			SKD61 (~ HRC55)	SKD11 (HRC55 ~)					

SE506(Flat)



DC	Tolerance
Ø6	0.000 ~ -0.020
Ø8 ~ Ø20	0.000 ~ -0.030



(mm)

Designation		DC	APMX	LU	LF	DCON-MS
STANDARD	WELDON SHANK					
SE506060	SE506060F	6	15	22	60	6
SE506080	SE506080F	8	20	32	70	8
SE506100	SE506100F	10	25	33	75	10
SE506120	SE506120F	12	30	35	80	12
SE506160	SE506160F	16	42	52	100	16
SE506200	SE506200F	20	48	50	100	20

• Applicable Workpiece

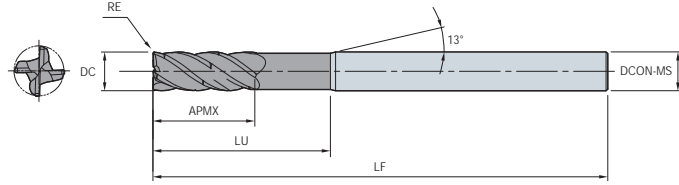
: Excellent : Good

Carbon Steel (~ HB225)	Alloy steel (HB225 ~ 325)	Pre-hardened steel (HrC30 ~ 50)	Hardened steel		Cast iron ~ FCD500	Aluminum	Stainless steel	Ti-Alloy	Ni-Alloy
			SKD61 (~ HRC55)	SKD11 (HRC55 ~)					

SR504 (Radius)



DC	Tolerance
Ø1 - Ø5	0.000 - -0.015
Ø6 - Ø7	0.000 - -0.020
Ø8 - Ø20	0.000 - -0.030



(mm)

Designation		DC	APMX	LU	LF	DC:ON-MS	RE
STANDARD	WELDON SHANK						
SR50401001	SR50401001F	1	2.5	7.5	50	6	0.1
SR50401002	SR50401002F	1	2.5	7.5	50	6	0.2
SR50401201	SR50401201F	1.2	3	8	50	6	0.1
SR50401501	SR50401501F	1.5	4	9	50	6	0.1
SR50401502	SR50401502F	1.5	4	9	50	6	0.2
SR50402001	SR50402001F	2	6	11	50	6	0.1
SR50402002	SR50402002F	2	6	11	50	6	0.2
SR50402502	SR50402502F	2.5	7	12	50	6	0.2
SR50403002	SR50403002F	3	8	13	55	6	0.2
SR50403003	SR50403003F	3	8	13	55	6	0.3
SR50403005	SR50403005F	3	8	13	55	6	0.5
SR50404002	SR50404002F	4	10	15	55	6	0.2
SR50404003	SR50404003F	4	10	15	55	6	0.3
SR50404005	SR50404005F	4	10	15	55	6	0.5
SR50405002	SR50405002F	5	15	20	55	6	0.2
SR50405003	SR50405003F	5	15	20	55	6	0.3
SR50405005	SR50405005F	5	15	20	55	6	0.5
SR50406003	SR50406003F	6	15	22	60	6	0.3
SR50406005	SR50406005F	6	15	22	60	6	0.5
SR50406010	SR50406010F	6	15	22	60	6	1
SR50407003	SR50407003F	7	15	22	60	8	0.3
SR50408002	SR50408002F	8	20	32	70	8	0.2
SR50408003	SR50408003F	8	20	32	70	8	0.3
SR50408005	SR50408005F	8	20	32	70	8	0.5
SR50408010	SR50408010F	8	20	32	70	8	1
SR50410003	SR50410003F	10	25	33	75	10	0.3
SR50410005	SR50410005F	10	25	33	75	10	0.5
SR50410010	SR50410010F	10	25	33	75	10	1
SR50410015	SR50410015F	10	25	33	75	10	1.5
SR50410020	SR50410020F	10	25	33	75	10	2
SR50410030	SR50410030F	10	25	33	75	10	3
SR50412003	SR50412003F	12	30	35	80	12	0.3

• Applicable Workpiece

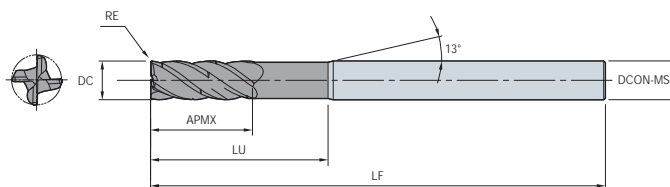
: Excellent : Good

Carbon Steel (~ HB225)	Alloy steel (HB225 ~ 325)	Pre-hardened steel (HrC30 ~ 50)	Hardened steel		Cast iron ~ FCD500	Aluminum	Stainless steel	Ti-Alloy	Ni-Alloy
			SKD61 (~ HRC55)	SKD11 (HRC55 ~)					

SR504(Radius)



DC	Tolerance
Ø1 - Ø5	0.000 ~ -0.015
Ø6 - Ø7	0.000 ~ -0.020
Ø8 - Ø20	0.000 ~ -0.030



(mm)

Designation		DC	APMX	LU	LF	DCON-MS	RE
STANDARD	WELDON SHANK						
SR50412005	SR50412005F	12	30	35	80	12	0.5
SR50412010	SR50412010F	12	30	35	80	12	1
SR50412015	SR50412015F	12	30	35	80	12	1.5
SR50412020	SR50412020F	12	30	35	80	12	2
SR50412030	SR50412030F	12	30	35	80	12	3
SR50412040	SR50412040F	12	30	35	80	12	4
SR50414005	SR50414005F	14	35	42	90	16	0.5
SR50414010	SR50414010F	14	35	42	90	16	1
SR50414020	SR50414020F	14	35	42	90	16	2
SR50414030	SR50414030F	14	35	42	90	16	3
SR50414040	SR50414040F	14	35	42	90	16	4
SR50416005	SR50416005F	16	42	52	100	16	0.5
SR50416010	SR50416010F	16	42	52	100	16	1
SR50416020	SR50416020F	16	42	52	100	16	2
SR50416030	SR50416030F	16	42	52	100	16	3
SR50416040	SR50416040F	16	42	52	100	16	4
SR50416050	SR50416050F	16	42	52	100	16	5
SR50418005	-	18	45	-	100	16	0.5
SR50420005	SR50420005F	20	48	50	100	20	0.5
SR50420010	SR50420010F	20	48	50	100	20	1
SR50420020	SR50420020F	20	48	50	100	20	2
SR50420030	SR50420030F	20	48	50	100	20	3
SR50420040	SR50420040F	20	48	50	100	20	4
SR50420050	SR50420050F	20	48	50	100	20	5

• Applicable Workpiece

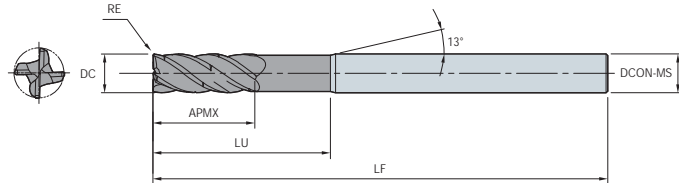
: Excellent : Good

Carbon Steel (~ HB225)	Alloy steel (HB225 ~ 325)	Pre-hardened steel (HrC30 ~ 50)	Hardened steel		Cast iron ~ FCD500	Aluminum	Stainless steel	Ti-Alloy	Ni-Alloy
			SKD61 (~ HRC55)	SKD11 (HRC55 ~)					

SR505 (Nick type radius)



DC	Tolerance
Ø6	0.000 ~ -0.020
Ø8 ~ Ø20	0.000 ~ -0.030



(mm)

Designation		DC	APMX	LU	LF	DC ON-MS	RE
STANDARD	WELDON SHANK						
SR50506005	SR50506005F	6	15	22	60	6	0.5
SR5050602405	SR5050602405F	6	24	32	70	6	0.5
SR50508005	SR50508005F	8	20	32	70	8	0.5
SR5050803205	SR5050803205F	8	32	52	90	8	0.5
SR50510005	SR50510005F	10	25	33	75	10	0.5
SR5051004005	SR5051004005F	10	40	58	100	10	0.5
SR50512005	SR50512005F	12	30	35	80	12	0.5
SR50512010	SR50512010F	12	30	35	80	12	1
SR50512020	SR50512020F	12	30	35	80	12	2
SR50512030	SR50512030F	12	30	35	80	12	3
SR5051204805	SR5051204805F	12	48	63	110	12	0.5
SR50516005	SR50516005F	16	42	52	100	16	0.5
SR50516010	SR50516010F	16	42	52	100	16	1
SR50516020	SR50516020F	16	42	52	100	16	2
SR50516030	SR50516030F	16	42	52	100	16	3
SR50516040	SR50516040F	16	42	52	100	16	4
SR5051606505	SR5051606505F	16	65	80	130	16	0.5
SR50520005	SR50520005F	20	48	58	110	20	0.5
SR5052006505	SR5052006505F	20	65	78	130	20	0.5

• Applicable Workpiece

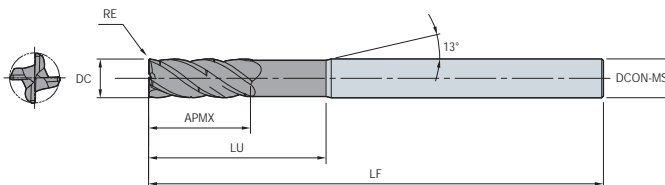
: Excellent : Good

Carbon Steel (~ HB225)	Alloy steel (HB225 ~ 325)	Pre-hardened steel (HrC30 ~ 50)	Hardened steel		Cast iron ~ FCD500	Aluminum	Stainless steel	Ti-Alloy	Ni-Alloy
			SKD61 (~ HrC55)	SKD11 (HrC55 ~)					

SR507 (Nick type radius)



DC	Tolerance
Ø6	0.000 ~ -0.020
Ø8 ~ Ø20	0.000 ~ -0.030



(mm)

Designation		DC	APMX	LU	LF	DCON-MS	RE
STANDARD	WELDON SHANK						
SR50706005	SR50706005F	6	15	22	60	6	0.5
SR5070602405	SR5070602405F	6	24	32	70	6	0.5
SR50708005	SR50708005F	8	20	32	70	8	0.5
SR5070803205	SR5070803205F	8	32	52	90	8	0.5
SR50710005	SR50710005F	10	25	33	75	10	0.5
SR5071004005	SR5071004005F	10	40	58	100	10	0.5
SR50712005	SR50712005F	12	30	35	80	12	0.5
SR50712010	SR50712010F	12	30	35	80	12	1
SR50712020	SR50712020F	12	30	35	80	12	2
SR50712030	SR50712030F	12	30	35	80	12	3
SR50712040	SR50712040F	12	30	35	80	12	4
SR5071204805	SR5071204805F	12	48	63	110	12	0.5
SR50716005	SR50716005F	16	42	52	100	16	0.5
SR50716010	SR50716010F	16	42	52	100	16	1
SR50716020	SR50716020F	16	42	52	100	16	2
SR50716030	SR50716030F	16	42	52	100	16	3
SR50716040	SR50716040F	16	42	52	100	16	4
SR50716050	SR50716050F	16	42	52	100	16	5
SR5071606505	SR5071606505F	16	65	80	130	16	0.5
SR50720005	SR50720005F	20	48	58	110	20	0.5
SR5072006505	SR5072006505F	20	65	78	130	20	0.5

• Applicable Workpiece

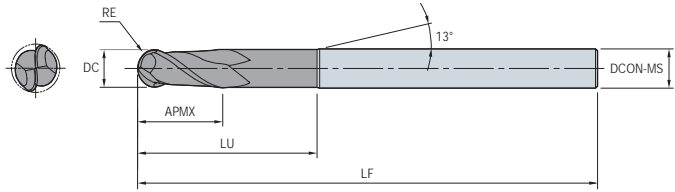
: Excellent : Good

Carbon Steel (~ HB225)	Alloy steel (HB225 ~ 325)	Pre-hardened steel (HrC30 ~ 50)	Hardened steel		Cast iron ~ FCD500	Aluminum	Stainless steel	Ti-Alloy	Ni-Alloy
			SKD61 (~ HrC55)	SKD11 (HrC55 ~)					

SB502(Ball)



DC	Tolerance
Ø1 ~ Ø5	0.000 ~ -0.015
Ø6	0.000 ~ -0.020
Ø8 ~ Ø12	0.000 ~ -0.030



(mm)

Designation		DC	APMX	LU	LF	DC.ON-MS	RE
STANDARD	WELDON SHANK						
SB502010	SB502010F	1	3	8	50	6	0.5
SB502020	SB502020F	2	6	11	50	6	1
SB502030	SB502030F	3	8	13	50	6	1.5
SB502030L	SB502030LF	3	8	13	70	6	1.5
SB502040	SB502040F	4	10	15	50	6	2
SB502040L	SB502040LF	4	10	15	70	6	2
SB502050	SB502050F	5	13	18	50	6	2.5
SB502050L	SB502050LF	5	13	18	80	6	2.5
SB502060	SB502060F	6	13	20	50	6	3
SB502060L	SB502060LF	6	13	52	90	6	3
SB502080	SB502080F	8	19	24	60	8	4
SB502080L	SB502080LF	8	19	62	100	8	4
SB502100	SB502100F	10	22	30	70	10	5
SB502100L	SB502100LF	10	22	58	100	10	5
SB502120	SB502120F	12	26	30	75	12	6
SB502120L	SB502120LF	12	26	63	110	12	6

• Applicable Workpiece

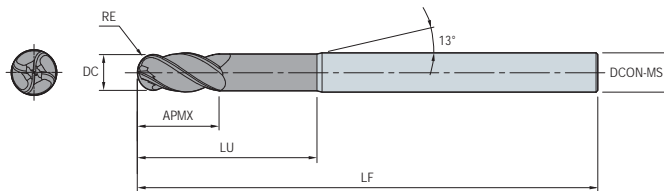
: Excellent : Good

Carbon Steel (~ HB225)	Alloy steel (HB225 ~ 325)	Pre-hardened steel (HRC30 ~ 50)	Hardened steel		Cast iron ~ FCD500	Aluminum	Stainless steel	Ti-Alloy	Ni-Alloy
			SKD61 (~ HRC55)	SKD11 (HRC55 ~)					

SB504 (Ball)



DC	Tolerance
Ø3 ~ Ø5	0.000 ~ -0.015
Ø6	0.000 ~ -0.020
Ø8 ~ Ø20	0.000 ~ -0.030



(mm)

Designation		DC	APMX	LU	LF	DC ON-MS	RE
STANDARD	WELDON SHANK						
SB504030	SB504030F	3	8	13	60	6	1.5
SB504040	SB504040F	4	8	13	70	6	2
SB504050	SB504050F	5	12	17	80	6	2.5
SB504060	SB504060F	6	12	52	90	6	3
SB504080	SB504080F	8	16	62	100	8	4
SB504100	SB504100F	10	20	58	100	10	5
SB504120	SB504120F	12	25	53	100	12	6
SB504160	SB504160F	16	30	50	100	16	8
SB504200	SB504200F	20	38	48	100	20	10

• Applicable Workpiece

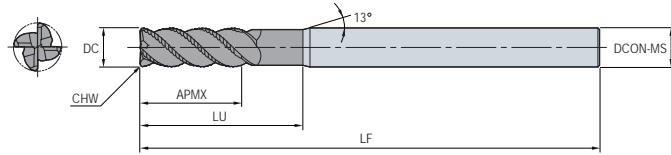
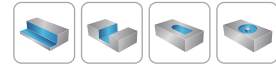
: Excellent : Good

Carbon Steel (~ HB225)	Alloy steel (HB225 ~ 325)	Pre-hardened steel (HrC30 ~ 50)	Hardened steel		Cast iron ~ FCD500	Aluminum	Stainless steel	Ti-Alloy	Ni-Alloy
			SKD61 (~ HRC55)	SKD11 (HRC55 ~)					

SF513/514/515 (Roughing)



DC	Tolerance
Ø3 ~ Ø20	0.000 ~ -0.050



(mm)

Designation		DC	APMX	LU	LF	DC ON-MS	CHW
STANDARD	WELDON SHANK						
SF51303002H	SF51303002HF	3	8	13	50	6	3
SF51304002H	SF51304002HF	4	10	15	50	6	3
SF51405002H	SF51405002HF	5	13	18	50	6	4
SF51406002H	SF51406002HF	6	13	22	60	6	4
SF51406002NH	SF51406002NHF	6	10	22	60	6	4
SF51407002H	SF51407002HF	7	18	32	70	8	4
SF51408002H	SF51408002HF	8	19	32	70	8	4
SF51408002NH	SF51408002NHF	8	12	32	70	8	4
SF51409003H	SF51409003HF	9	20	28	70	10	4
SF51410003H	SF51410003HF	10	22	33	75	10	4
SF51410003NH	SF51410003NHF	10	15	33	75	10	4
SF51411003H	SF51411003HF	11	25	33	80	12	4
SF51412003H	SF51412003HF	12	26	35	80	12	4
SF51412003NH	SF51412003NHF	12	20	35	80	12	4
SF51506002H	SF51506002HF	6	13	22	60	6	5
SF51508002H	SF51508002HF	8	19	27	65	8	5
SF51510003H	SF51510003HF	10	22	30	70	10	5
SF51512003H	SF51512003HF	12	26	35	80	12	5
SF51514005H	SF51514005HF	14	28	40	90	16	5
SF51516005H	SF51516005HF	16	32	50	100	16	5
SF5151600542H	SF5151600542HF	16	42	52	100	16	5
SF51520005H	SF51520005HF	20	38	48	100	20	5
SF5152000545H	SF5152000545HF	20	45	50	100	20	5

• Applicable Workpiece

: Excellent : Good

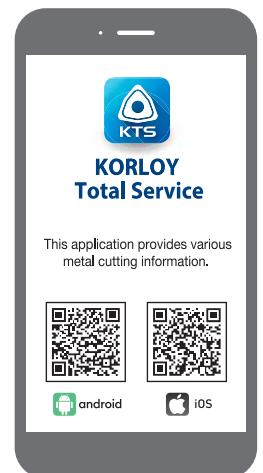
Carbon Steel (~ HB225)	Alloy steel (HB225 ~ 325)	Pre-hardened steel (HRC30 ~ 50)	Hardened steel		Cast iron ~ FCD500	Aluminum	Stainless steel	Ti-Alloy	Ni-Alloy
			SKD61 (~ HRC55)	SKD11 (HRC55 ~)					

For the safe metalcutting

- Use safety supplies such as protective gloves to prevent possible injury while touching the edge of tools.
- Use safety glasses or safety cover to hedge possible dangers. Inappropriate usage or excessive cutting condition may lead tool's breakage or even the fragment's scattering.
- Clamp the workpiece tightly enough to prevent its movement while its machining.
- Properly manage the tool change phase because the inordinately used tool can be easily broken under the excessive cutting load or severe wear, and it may threaten the operator's safety.
- Use safety cover because chips evacuated during cutting are hot and sharp and may cause burns and cuts. To remove chips safely, stop machining, put on protective gloves, and use a hook or other tools.
- Prepare for fire prevention measures as the use of the non-water soluble cutting oil may cause fire.
- Use safety cover and other safety supplies because the spare parts or the inserts can be pulled out due to centrifugal force while high speed machining.



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