切削條件表

Cutting Condition Table

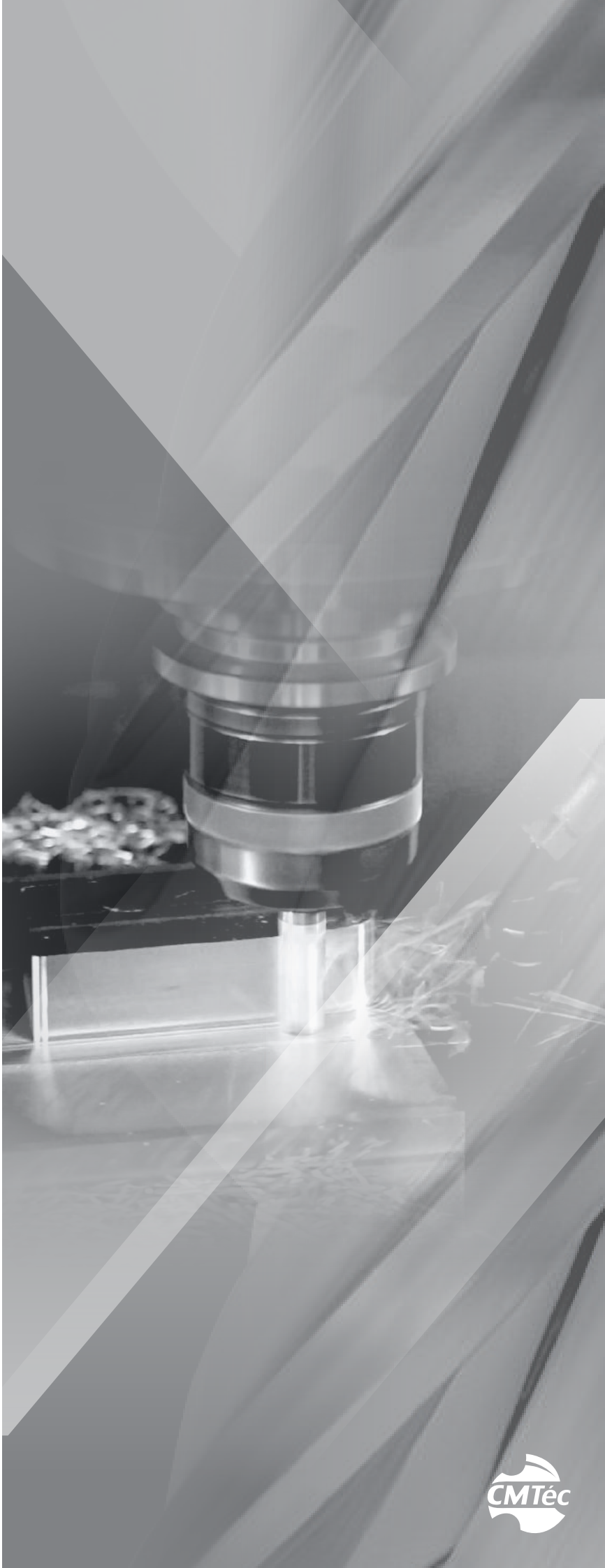


Table 01 S220 鎢鋼銑刀- 2 / 3刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

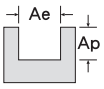
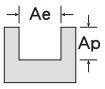
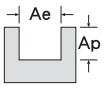
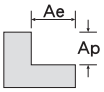
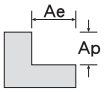
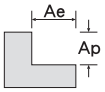
加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		HRC45~55		HRC55~63		—		HRC<30	
切削速度 Vc	68m/min		54m/min		45m/min		27m/min		20m/min		54m/min		79m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
1mm	20,000	120	17,100	100	14,400	65	8,000	50	6,000	35	17,100	100	25,200	270
2mm	10,800	155	8,640	120	7,200	85	4,320	65	3,240	45	8,640	120	12,600	290
3mm	7,560	155	5,760	135	4,680	90	3,000	65	2,230	45	5,760	135	8,640	290
4mm	5,400	165	4,320	135	3,600	100	2,160	65	1,620	50	4,320	135	6,480	290
5mm	4,500	180	3,420	135	2,880	100	1,800	75	1,350	55	3,420	135	5,040	325
6mm	3,600	180	2,880	135	2,340	100	1,440	75	1,080	55	2,880	135	4,320	360
8mm	2,700	180	2,160	155	1,800	110	1,080	75	810	55	2,160	155	3,240	360
10mm	2,160	180	1,710	155	1,440	120	870	75	650	55	1,710	155	2,520	380
12mm	1,800	180	1,440	155	1,200	120	720	75	540	55	1,440	155	2,160	400
14mm	1,800	200	1,360	170	1,140	130	720	80	540	60	1,360	170	2,000	440
16mm	1,560	220	2,100	180	1,000	140	630	90	470	65	2,100	180	1,800	480
18mm	1,560	220	1,060	180	880	140	630	90	470	65	1,060	180	1,600	480
20mm	1,200	220	960	180	800	140	480	90	360	65	960	180	1,400	480
切削量 Cutting Amount (mm)	Ap=0.5D (D<3, Ap≦0.25D) 						Ap=0.1D (D<3, Ap≦0.05D) 				Ap=0.5D (D<3, Ap≦0.25D) 			

Table 02 S220 鎢鋼銑刀- 3 / 4刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

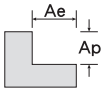
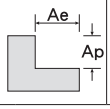
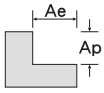
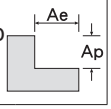
加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		HRC45~55		HRC55~63		—		HRC<30	
切削速度 Vc	68m/min		54m/min		45m/min		27m/min		20m/min		54m/min		79m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	7,560	490	5,760	345	4,680	165	3,020	200	2,300	150	5,760	345	8,640	900
4mm	5,400	490	4,320	345	3,600	165	2,160	200	1,620	150	4,320	345	6,480	1,080
5mm	4,500	490	3,420	345	2,880	165	1,800	200	1,350	150	3,420	345	5,040	1,080
6mm	3,600	490	2,880	345	2,340	165	1,440	200	1,080	150	2,880	345	4,320	1,080
8mm	2,700	490	2,160	345	1,800	175	1,080	200	810	150	2,160	345	3,240	1,080
10mm	2,160	505	1,710	360	1,440	175	860	210	650	155	1,710	360	2,520	1,170
12mm	1,800	505	1,440	360	1,200	175	720	210	540	155	1,440	360	2,160	1,260
14mm	1,800	560	1,360	400	1,140	190	720	230	540	170	1,360	400	2,000	1,400
16mm	1,560	600	1,200	420	1,000	200	620	240	470	180	1,200	420	1,800	1,500
18mm	1,400	600	1,060	420	880	200	560	240	420	180	1,060	420	1,600	1,500
20mm	1,200	600	960	420	800	200	480	240	360	180	960	420	1,490	1,400
切削量 Cutting Amount (mm)	Ap=1.5D Ae≦0.1D 						Ap=1.5D Ae≦0.05D 				Ap=1.5D Ae≦0.1D 			

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

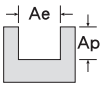
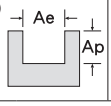
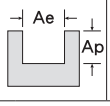
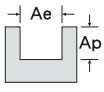
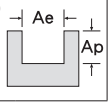
Table 03 M520 極細鎢鋼不等距雙心徑型銑刀- 3刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

側銑加工 Side Milling

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		不銹鋼 Stainless Steels		鈦合金 Titanium Alloys		鎳基合金 Ni-Based Alloys	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SUS304		Ti-6Al-4V		Inconel 718	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		—		HRC<30		HRC<30	
切削速度 Vc	130m/min		120m/min		110m/min		70m/min		60m/min		20m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
2mm	21,170	720	19,500	530	13,370	470	11,140	250	10,020	230	3,340	100
3mm	14,110	840	13,000	620	8,920	550	7,430	290	6,690	270	2,230	110
4mm	10,580	840	9,750	620	6,690	550	5,570	290	5,010	270	1,670	110
5mm	8,470	840	7,800	620	5,350	550	4,460	290	4,010	270	1,340	110
6mm	7,060	840	6,500	620	4,460	550	3,720	290	3,340	270	1,110	110
8mm	5,290	1,200	4,870	890	3,350	790	2,790	420	2,510	380	830	160
10mm	4,240	1,200	3,900	890	2,670	790	2,230	420	2,000	380	670	160
12mm	3,530	1,200	3,250	890	2,230	790	1,860	420	1,670	380	560	160
14mm	3,020	1,200	2,790	890	1,910	790	1,590	420	1,440	380	480	160
16mm	2,650	900	2,440	670	1,670	590	1,390	320	1,250	290	420	120
20mm	2,110	900	1,950	670	1,340	590	1,110	320	1,000	290	340	120
25mm	1,690	900	1,560	670	1,070	590	890	320	810	290	270	120
切削量 Cutting Amount (mm)	Ap=1D Ae=0.4D 						Ap=1D Ae=0.4D 		Ap=1D Ae=0.4D 		Ap=0.5D Ae=0.15D 	

溝銑加工 Slot Milling

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		不銹鋼 Stainless Steels		鈦合金 Titanium Alloys		鎳基合金 Ni-Based Alloys	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SUS304		Ti-6Al-4V		Inconel 718	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		—		HRC<30		HRC<30	
切削速度 Vc	110m/min		100m/min		80m/min		56m/min		50m/min		17.5m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
2mm	19,100	250	15,600	230	13,370	170	8,910	160	7,800	140	2,790	30
3mm	12,740	290	10,400	270	8,910	200	6,260	190	5,200	160	1,860	35
4mm	9,550	290	7,800	270	6,690	200	4,460	190	3,900	160	1,390	35
5mm	7,640	290	6,240	270	5,350	200	3,560	190	3,120	160	1,110	35
6mm	6,370	290	5,200	270	4,460	200	2,970	190	2,600	160	930	35
8mm	4,780	420	3,900	390	3,340	290	2,230	270	1,950	230	690	50
10mm	3,820	420	3,120	390	2,670	290	1,790	270	1,560	230	560	50
12mm	3,180	420	2,600	390	2,230	290	1,480	270	1,300	230	460	50
14mm	2,730	420	2,230	390	1,910	290	1,270	270	1,110	230	400	50
16mm	2,380	320	1,950	290	1,670	220	1,110	200	970	170	350	40
20mm	1,910	320	1,560	290	1,340	220	890	200	780	170	280	40
25mm	1,530	320	1,250	290	1,070	220	710	200	620	170	220	40
切削量 Cutting Amount (mm)	Ap=1D 				Ap=0.8D 		Ap=0.8D 		Ap=0.5D 		Ap=0.3D 	

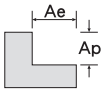
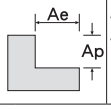
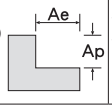
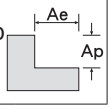
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

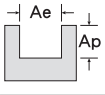
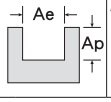
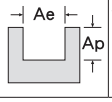
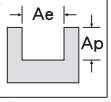
Table 04 M520 極細鎢鋼不等距雙心徑型銑刀- 4刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

側銑加工 Side Milling

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		不銹鋼 Stainless Steels		鈦合金 Titanium Alloys		鎳基合金 Ni-Based Alloys	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SUS304		Ti-6Al-4V		Inconel 718	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		—		HRC<30		HRC<30	
切削速度 Vc	130m/min		120m/min		110m/min		70m/min		60m/min		20m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	14,110	820	13,000	880	11,140	630	7,430	390	6,690	360	2,230	150
4mm	10,580	820	9,750	880	8,360	630	5,570	390	5,010	360	1,670	150
5mm	8,470	820	7,800	880	6,690	630	4,460	390	4,010	360	1,340	150
6mm	7,060	820	6,500	880	5,570	630	3,720	390	3,340	360	1,110	150
8mm	5,290	1,370	4,870	1,260	4,180	900	2,790	560	2,510	510	830	210
10mm	4,240	1,370	3,900	1,260	3,340	900	2,230	560	2,000	510	670	210
12mm	3,530	1,370	3,250	1,260	2,790	900	1,860	560	1,670	510	560	210
16mm	2,650	1,030	2,440	950	2,090	680	1,390	420	1,250	380	420	160
20mm	2,110	1,030	1,950	950	1,670	680	1,110	420	1,000	380	340	160
25mm	1,690	1,030	1,560	950	1,340	680	890	420	810	380	270	160
切削量 Cutting Amount (mm)	Ap=1D Ae=0.4D 						Ap=1D Ae=0.4D 		Ap=1D Ae=0.4D 		Ap=0.5D Ae=0.15D 	

溝銑加工 Slot Milling

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy SteelsL		合金鋼 Alloy Steels		不銹鋼 Stainless Steels		鈦合金 Titanium Alloys		鎳基合金 Ni-Based Alloys	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SUS304		Ti-6Al-4V		Inconel 718	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		—		HRC<30		HRC<30	
切削速度 Vc	110m/min		100m/min		80m/min		56m/min		60m/min		20m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	11,140	340	10,400	320	8,910	230	5,940	200	5,200	150	1,860	40
4mm	8,360	340	7,800	320	6,690	230	4,460	200	3,900	150	1,390	40
5mm	6,690	340	6,240	320	5,350	230	3,560	200	3,120	150	1,110	40
6mm	5,570	340	5,200	320	4,460	230	2,970	200	2,600	150	930	40
8mm	4,180	480	3,900	450	3,340	320	2,230	290	1,950	250	690	70
10mm	3,340	480	3,120	450	2,670	320	1,790	290	1,560	250	560	70
12mm	2,790	480	2,600	450	2,230	320	1,480	290	1,300	250	460	70
16mm	2,090	360	2,080	340	1,670	240	1,110	220	970	190	350	50
20mm	1,670	360	1,560	340	1,340	240	890	220	780	190	280	50
25mm	1,340	360	1,250	340	1,070	240	710	220	620	190	220	50
切削量 Cutting Amount (mm)	Ap=1D 						Ap=0.8D 		Ap=1D 		Ap=0.5D 	

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 05 S220 鎢鋼球刀- 2 / 4刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		HRC45~55		HRC55~63		—		HRC<30	
切削速度 Vc	80m/min		70m/min		60m/min		50m/min		35m/min		55m/min		80m/min	
半徑 R	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
0.5R	25,480	620	22,290	500	19,110	320	15,920	170	11,150	110	17,520	230	25,480	620
1.0R	12,740	620	11,150	500	9,550	320	7,960	170	5,570	110	8,760	230	12,740	750
2.0R	6,370	620	5,570	500	4,780	360	3,980	220	2,790	140	4,380	300	6,370	750
3.0R	4,250	690	3,720	540	3,190	380	2,650	240	1,860	150	2,920	310	4,250	840
4.0R	3,190	840	2,790	630	2,390	450	1,990	260	1,390	170	2,190	370	3,190	1,040
5.0R	2,550	770	2,230	600	1,910	420	1,590	270	1,120	170	1,750	340	2,550	960
6.0R	2,120	710	1,860	560	1,590	390	1,330	250	930	160	1,460	340	2,120	880
8.0R	1,590	670	1,390	520	1,190	380	1,000	220	700	150	1,100	300	1,590	840
10.0R	1,270	620	1,120	460	960	360	800	200	560	140	880	300	1,270	750
切削量 Cutting Amount (mm)	Ap=0.05D Ae=0.1D													

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 06 S220 鎢鋼球刀- 3刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		HRC45~55		HRC55~63		—		HRC<30	
切削速度 Vc	80m/min		70m/min		60m/min		50m/min		35m/min		55m/min		80m/min	
半徑 R	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
0.5R	25,480	680	22,290	550	19,110	350	15,920	180	11,150	120	17,520	250	25,480	680
1.0R	12,740	680	11,150	550	9,550	350	7,960	180	5,570	120	8,760	250	12,740	830
2.0R	6,370	680	5,570	550	4,780	400	3,980	240	2,790	150	4,380	330	6,370	830
3.0R	4,250	760	3,720	590	3,190	420	2,650	260	1,860	170	2,920	340	4,250	920
4.0R	3,190	920	2,790	690	2,390	500	1,990	290	1,390	190	2,190	410	3,190	1,140
5.0R	2,550	850	2,230	660	1,910	460	1,590	300	1,120	190	1,750	370	2,550	1,060
6.0R	2,120	890	1,860	620	1,590	430	1,330	280	930	180	1,460	370	2,120	970
8.0R	1,590	740	1,390	570	1,190	420	1,000	240	700	170	1,100	330	1,590	920
10.0R	1,270	680	1,120	510	960	400	800	220	560	150	880	330	1,270	830
切削量 Cutting Amount (mm)	Ap=0.05D Ae=0.1D													

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 07 S220 鎢鋼圓鼻銑刀- 2刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

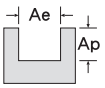
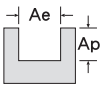
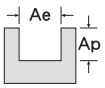
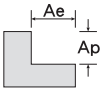
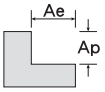
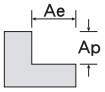
加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		HRC45~55		HRC55~63		—		HRC<30	
切削速度 Vc	95m/min		75m/min		63m/min		38m/min		28m/min		75m/min		110m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
1mm	22,400	140	19,150	110	16,130	70	8,960	60	6,720	40	19,150	110	28,220	300
2mm	12,100	180	9,680	140	8,060	100	4,840	70	3,630	50	9,680	140	14,110	330
3mm	8,460	180	6,450	150	5,240	100	3,360	70	2,500	50	6,450	150	9,680	330
4mm	6,050	180	4,840	150	4,030	110	2,420	70	1,820	60	4,840	150	7,260	330
5mm	5,040	200	3,830	150	3,220	110	2,020	80	1,510	60	3,830	150	5,650	360
6mm	4,030	200	3,220	150	2,620	110	1,620	80	1,210	60	3,220	150	4,840	400
8mm	3,020	200	2,420	180	2,020	120	1,210	80	900	60	2,420	180	3,630	400
10mm	2,420	200	1,910	180	1,620	140	980	80	730	60	1,910	180	2,820	420
12mm	2,020	200	1,620	180	1,340	140	810	80	610	60	1,620	180	2,420	450
14mm	2,020	220	1,520	190	1,280	140	810	90	610	60	1,520	190	2,240	500
16mm	1,740	250	1,340	200	1,120	160	700	100	530	70	1,340	200	2,020	540
18mm	1,740	250	1,180	200	980	160	700	100	530	70	1,180	200	1,790	540
20mm	1,340	250	1,070	200	900	160	540	100	400	70	1,070	200	1,570	540
切削量 Cutting Amount (mm)	Ap=0.5D (D<3, Ap≦0.25D) 						Ap=0.1D (D<3, Ap≦0.05D) 				Ap=0.5D (D<3, Ap≦0.25D) 			

Table 08 S220 鎢鋼圓鼻銑刀 / S220 鎢鋼長柄型圓鼻銑刀- 4刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		HRC45~55		HRC55~63		—		HRC<30	
切削速度 Vc	94m/min		75m/min		63m/min		37m/min		28m/min		75m/min		110m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	5,040	550	6,450	380	5,240	180	3,380	220	2,580	170	6,450	380	9,680	1,010
4mm	6,050	550	4,840	380	4,030	180	2,420	220	1,820	170	4,840	380	7,260	1,210
5mm	5,040	550	3,830	380	3,220	180	2,020	220	1,510	170	3,830	380	5,650	1,210
6mm	4,030	550	3,220	380	2,620	180	1,620	220	1,210	170	3,220	380	4,840	1,210
8mm	3,020	550	2,420	380	2,020	200	1,210	220	900	170	2,420	380	3,630	1,210
10mm	2,420	570	1,910	400	1,620	200	960	230	730	180	1,910	400	2,820	1,310
12mm	2,020	570	1,920	400	1,340	200	810	230	610	180	1,620	400	2,420	1,410
14mm	2,020	620	1,520	450	1,280	220	810	260	610	190	1,520	450	2,240	1,570
16mm	1,740	670	1,340	470	1,120	220	700	270	530	200	1,340	470	2,020	1,680
18mm	1,570	670	1,180	470	980	220	620	270	470	200	1,180	470	1,790	1,680
20mm	1,340	670	1,070	470	900	220	540	270	400	200	1,070	470	1,570	1,790
切削量 Cutting Amount (mm)	Ap=1.5D Ap≦0.1D 						Ap=1D Ae≦0.05D 				Ap=1.5D Ae≦0.1D 			

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 09 S220 鎢鋼高導型銑刀- 3刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

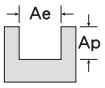
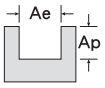
加工材質 Material	合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels	
工件料號 Material Code	SCM,SKT,SKD		SKT,SKD		SKT,SKD	
硬度 Hardness	HRC30~45		HRC45~55		HRC55~63	
切削速度 Vc	27m/min		18m/min		16m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	2,880	75	1,890	75	1,710	70
4mm	2,160	80	1,440	80	1,300	75
5mm	1,710	80	1,170	80	1,040	70
6mm	1,440	155	990	110	860	90
8mm	1,080	155	720	110	650	90
10mm	860	155	580	90	520	75
12mm	720	155	480	80	430	65
14mm	600	130	450	75	410	60
16mm	540	120	360	75	320	55
18mm	480	100	350	60	310	50
20mm	430	95	290	65	270	45
切削量 Cutting Amount (mm)	Ap=0.1D					

Table 10 M520 極細鎢鋼銑刀- 6刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

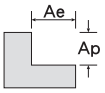
加工材質 Material	合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels	
工件料號 Material Code	SCM,SKT,SKD		SKT,SKD		SKT,SKD	
硬度 Hardness	HRC30~45		HRC45~55		HRC55~63	
切削速度 Vc	27m/min		18m/min		16m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	2,880	75	1,890	75	1,710	70
4mm	2,160	80	1,440	80	1,300	75
5mm	1,710	80	1,170	80	1,040	70
6mm	1,440	155	990	110	860	90
8mm	1,080	155	720	110	650	90
10mm	860	155	580	90	520	75
12mm	720	155	480	80	430	65
14mm	600	130	450	75	410	60
16mm	540	120	360	75	320	55
18mm	480	100	350	60	310	50
20mm	430	95	290	65	270	45
切削量 Cutting Amount (mm)	Ap=0.1D					

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 11 S220 鎢鋼鋁用(特)高導型銑刀- 2 / 3刃(白刀) 切削條件表

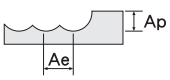
SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	鋁合金 Aluminum Alloys		銅合金 Copper Alloys	
工件料號 Material Code	Al 5052 / 6061 / 7075		C1100	
硬度 Hardness	—		—	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	18,000	810	7,200	290
4mm	13,500	950	5,400	320
5mm	10,800	990	4,320	340
6mm	9,000	1,080	3,600	360
8mm	7,200	1,170	2,700	410
10mm	5,760	1,260	2,030	430
12mm	4,680	1,350	1,710	460
16mm	3,510	1,350	1,260	460
切削量 Cutting Amount (mm)	Ap=1.5D Ae=0.1D			

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 12 S220 鎢鋼鋁用球刀- 2刃(白刀) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

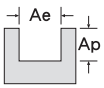
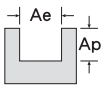
加工材質 Material	鋁合金 Aluminum Alloys		銅合金 Copper Alloys	
工件料號 Material Code	Al 5052 / 6061 / 7075		—	
切削速度 Vc	100~200m/min		70~110m/min	
半徑 R	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
1.0R	21,420	1,485	17,190	630
2.0R	10,800	1,485	8,550	810
3.0R	7,200	1,485	5,760	810
4.0R	5,400	1,485	4,320	810
5.0R	7,320	1,485	3,420	810
6.0R	3,780	1,485	2,880	810
8.0R	2,980	1,170	1,790	500
切削量 Cutting Amount (mm)	Ap=0.02D Ae=0.05D			

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 13 S220 鎢鋼鋁用波浪型銑刀- 3刃(白刀) 切削條件表

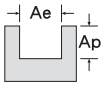
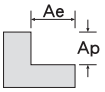
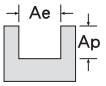
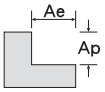
SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	鋁合金 Aluminum Alloys			
工件料號 Material Code	Al 5052 / 6061 / 7075			
切削速度 Vc	200m/min		250m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
6mm	10,600	2,000	13,200	2,300
8mm	8,000	1,500	10,000	2,000
10mm	6,400	1,200	8,000	1,900
12mm	5,300	1,000	6,600	1,600
16mm	4,000	750	5,000	1,200
20mm	3,200	600	4,000	960
切削量 Cutting Amount (mm)	Ap=1D 		Ap=0.5D 	

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 14 S220 鎢鋼波浪型銑刀- 2 / 3 / 4刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

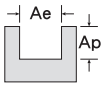
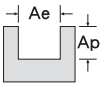
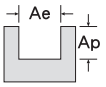
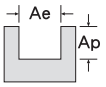
加工材質 Material	鈦合金 Titanium Alloys		鈦合金 Titanium Alloys		鈦合金 Titanium Alloys		鈦合金 Titanium Alloys	
工件料號 Material Code	Ti-6Al-4V		Ti5Al2Sn		Ti-6Al-4V		Ti5Al2Sn	
硬度 Hardness	HRC＞30		HRC≒30		HRC＞30		HRC≒30	
切削速度 Vc	40m/min		60m/min		40m/min		60m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
6mm	2,120	100	3,180	150	2,120	80	3,180	125
8mm	1,590	125	2,390	180	1,590	90	2,390	140
10mm	1,270	140	1,910	205	1,270	105	1,910	160
12mm	1,060	155	1,590	230	1,060	120	1,590	180
16mm	790	145	1,190	210	790	110	1,190	160
20mm	630	150	950	220	630	115	950	170
切削量 Cutting Amount (mm)	Ap=0.5D (2F / 3F) 		Ap=0.6D Ae=0.1D (4F) 		Ap=1D (2F / 3F) 		Ap=1.2D Ae=0.1D (4F) 	
備註 Remarks	※ 側銑時依上表可適時提高(溝銑)30%以上。 Side Milling could increase than 30% from Slotting one.							

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 15 S220 鎢鋼強力型銑刀- 2刃(鍍膜) 切削條件表

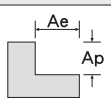
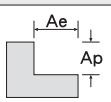
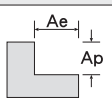
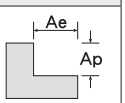
SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	不銹鋼 Stainless Steels		鈦合金 Titanium Alloys		鈦合金 Titanium Alloys		鋁合金 Aluminum Alloys	
工件料號 Material Code	SUS304		Ti5Al2Sn		Ti-6Al-4V		Al 5052 / 6061 / 7075	
硬度 Hardness	—		HRC≒30		HRC>30		—	
切削速度 Vc	54m/min		60m/min		40m/min		120m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
2mm	8,600	515	9,550	375	6,370	240	19,110	150
3mm	5,760	345	6,370	250	4,250	160	12,740	190
4mm	4,320	345	4,780	190	3,180	120	9,550	140
5mm	3,420	345	3,820	150	2,550	95	7,640	190
6mm	2,880	345	3,180	125	2,120	80	6,370	160
8mm	2,160	345	2,390	140	1,590	90	4,780	170
10mm	1,710	360	1,910	160	1,270	105	3,820	190
12mm	1,440	360	1,590	180	1,060	120	3,180	160
16mm	1,200	420	1,190	160	790	110	2,390	190
切削量 Cutting Amount (mm)	Ap=0.5D (D<3, Ap≦0.25D) 		Ap=0.5D 		Ap=1D 		Ap=1D (D<3, Ap≦0.5D) 	

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 16 S220 鎢鋼強力型銑刀- 4刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

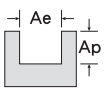
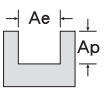
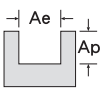
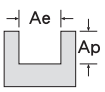
加工材質 Material	不銹鋼 Stainless Steels		鈦合金 Titanium Alloys		鈦合金 Titanium Alloys		鋁合金 Aluminum Alloys	
工件料號 Material Code	SUS304		Ti5Al2Sn		Ti-6Al-4V		Al 5052 / 6061 / 7075	
硬度 Hardness	—		HRC≒30		HRC＞30		—	
切削速度 Vc	54m/min		60m/min		40m/min		120m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
2mm	8,600	515	9,550	450	6,370	300	19,110	180
3mm	5,760	345	6,370	300	4,250	200	12,740	230
4mm	4,320	345	4,780	225	3,180	150	9,550	170
5mm	3,420	345	3,820	180	2,550	120	7,640	230
6mm	2,880	345	3,180	150	2,120	100	6,370	190
8mm	2,160	345	2,390	180	1,590	125	4,780	200
10mm	1,710	360	1,910	205	1,270	140	3,820	230
12mm	1,440	360	1,590	230	1,060	155	3,180	190
16mm	1,200	420	1,190	210	790	145	2,390	230
切削量 Cutting Amount (mm)	Ap=0.6D Ae≦0.1D 		Ap=0.6D Ae≦0.1D 		Ap=0.6D Ae≦0.1D 		Ap=0.6D Ae≦0.1D 	

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 17 S220 鎢鋼高導強力型銑刀- 2刃(鍍膜) 切削條件表

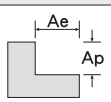
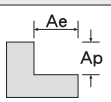
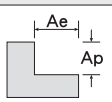
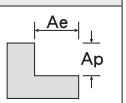
SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	不銹鋼 Stainless Steels		鈦合金 Titanium Alloys		鈦合金 Titanium Alloys		鋁合金 Aluminum Alloys	
工件料號 Material Code	SUS304		Ti5Al2Sn		Ti-6Al-4V		Al 5052 / 6061 / 7075	
硬度 Hardness	—		HRC≒30		HRC＞30		—	
切削速度 Vc	54m/min		60m/min		40m/min		120m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
2mm	10,320	620	11,460	450	7,640	290	22,930	180
3mm	6,910	410	7,640	300	5,100	190	15,290	230
4mm	5,180	410	5,740	230	3,820	140	11,460	170
5mm	4,100	410	4,580	180	3,060	110	9,170	230
6mm	3,460	410	3,820	150	2,540	100	7,640	190
8mm	2,590	410	2,870	170	1,910	110	5,740	200
10mm	2,050	430	2,290	190	1,520	130	4,580	230
12mm	1,730	430	1,910	220	1,270	140	3,820	190
16mm	1,440	500	1,430	190	950	130	2,870	230
切削量 Cutting Amount (mm)	Ap=0.5D (D≦3, Ap≦0.25D) 		Ap=1D 		Ap=0.5D 		Ap=1D (D≦3, Ap≦0.5D) 	

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 18 S220 鎢鋼高導強力型銑刀- 4刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

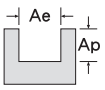
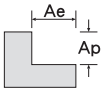
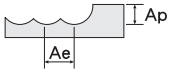
加工材質 Material	不銹鋼 Stainless Steels		鈦合金 Titanium Alloys		鈦合金 Titanium Alloys		鋁合金 Aluminum Alloys	
工件料號 Material Code	SUS304		Ti5Al2Sn		Ti-6Al-4V		Al 5052 / 6061 / 7075	
硬度 Hardness	—		HRC≒30		HRC＞30		—	
切削速度 Vc	54 m/min		60m/min		40m/min		120m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F(mm/min)	S (rpm)	F (mm/min)
2mm	10,320	620	11,460	540	7,640	360	22,930	220
3mm	6,910	410	7,640	360	5,100	240	15,290	280
4mm	5,180	410	5,740	270	3,820	180	11,460	200
5mm	4,100	410	4,580	220	3,060	140	9,170	280
6mm	3,460	410	3,820	180	2,540	120	7,640	230
8mm	2,590	410	2,870	220	1,910	150	5,740	240
10mm	2,050	430	2,290	250	1,520	170	4,580	280
12mm	1,730	430	1,910	280	1,270	190	3,820	230
16mm	1,440	500	1,430	250	950	170	2,870	280
切削量 Cutting Amount (mm)	Ap=0.6D Ae≦0.1D 		Ap=0.6D Ae≦0.1D 		Ap=0.6D Ae≦0.1D 		Ap=0.6D Ae≦0.1D 	

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 19 S220 鎢鋼石墨用銑刀- 2 / 4刃(鍍膜) 切削條件表

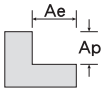
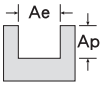
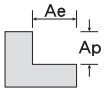
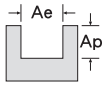
SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

刀具 END MILLS	CESG2-A		CESG4-A		CEBG2-A	
切削速度 Vc	225m/min		250m/min		250m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	23,000	800	25,000	960	25,000	1,000
4mm	17,000	700	19,000	820	19,000	850
5mm	14,000	650	15,500	750	15,500	800
6mm	11,500	600	12,600	700	12,600	750
8mm	8,500	400	9,300	600	9,300	640
10mm	6,900	450	7,600	550	7,600	600
12mm	5,700	400	6,300	340	6,300	580
切削量 Cutting Amount (mm)						

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 20 S220 鎢鋼銅鋁用銑刀- 2刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

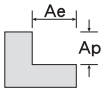
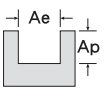
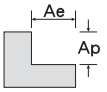
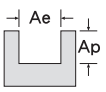
加工材質 Material	鋁合金 Aluminum Alloys				銅合金 Copper Alloys			
切削速度 Vc	150m/min		150m/min		80m/min		80m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
0.5mm	15,920	480	15,920	400	12,740	300	12,740	250
1.0mm	15,920	480	15,920	400	12,740	300	12,740	250
1.5mm	15,920	560	15,920	480	12,740	300	12,740	250
2.0mm	15,920	560	15,920	480	12,740	300	12,740	250
2.5mm	15,920	640	15,920	560	10,190	300	10,190	250
3.0mm	15,920	640	15,920	560	8,490	300	8,490	250
4.0mm	11,940	770	11,940	600	6,370	350	6,370	300
5.0mm	9,550	770	9,550	600	5,100	350	5,100	300
6.0mm	7,960	1,100	7,960	750	4,250	500	4,250	380
8.0mm	5,970	1,270	5,970	900	3,190	580	3,190	450
10.0mm	4,780	1,490	4,780	1,100	2,550	680	2,550	550
12.0mm	3,980	1,870	3,980	1,350	2,120	850	2,120	680
切削量 Cutting Amount (mm)	Ap≦1D Ae≦0.25D 		Ap≦0.5D 		Ap≦1D Ae≦0.25D 		Ap≦0.5D 	

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 21 S220 鎢鋼銅鋁用長刃型銑刀- 2刃(鍍膜) 切削條件表

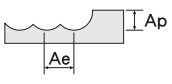
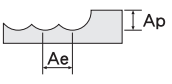
SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	鋁合金 Aluminum Alloys				銅合金 Copper Alloys			
切削速度 Vc	150m/min		150m/min		80m/min		80m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
0.5mm	15,920	430	15,920	360	12,740	270	12,740	230
1.0mm	15,920	430	15,920	360	12,740	270	12,740	230
1.5mm	15,920	500	15,920	430	12,740	270	12,740	230
2.0mm	15,920	500	15,920	430	12,740	270	12,740	230
2.5mm	15,920	580	15,920	500	10,190	270	10,190	230
3.0mm	15,920	580	15,920	500	8,490	270	8,490	230
4.0mm	11,940	690	11,940	540	6,370	320	6,370	270
5.0mm	9,550	690	9,550	540	5,100	320	5,100	270
6.0mm	7,960	990	7,960	680	4,250	450	4,250	340
8.0mm	5,970	1,140	5,970	810	3,190	520	3,190	410
10.0mm	4,780	1,340	4,780	990	2,550	610	2,550	500
12.0mm	3,980	1,680	3,980	1,220	2,120	770	2,120	610
切削量 Cutting Amount (mm)	Ap≦1.5D Ae≦0.1D 		Ap≦0.5D 		Ap≦1.5D Ae≦0.1D 		Ap≦0.5D 	

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 22 S220 鎢鋼銅鋁用球刀- 2刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

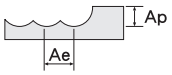
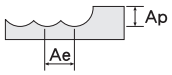
加工材質 Material	鋁合金 Aluminum Alloys		銅合金 Copper Alloys	
切削速度 Vc	150m/min		80m/min	
半徑 R	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
0.50R	15,920	550	12,740	300
0.75R	15,920	550	12,740	300
1.00R	15,920	550	12,740	300
1.25R	15,920	610	10,190	330
1.50R	15,920	610	8,490	330
2.00R	11,940	760	6,370	410
2.50R	9,550	760	5,100	410
3.00R	7,960	880	4,250	440
4.00R	5,970	1,000	3,190	500
5.00R	4,780	1,180	2,550	580
6.00R	3,980	1,500	2,120	750
切削量 Cutting Amount (mm)	Ap=0.02D Ae=0.05D 		Ap=0.02D Ae=0.05D 	

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 23 S220 鎢鋼銅鋁用長頸型球刀- 2刃(鍍膜) 切削條件表

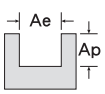
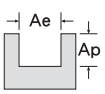
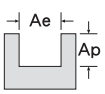
SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	鋁合金 Aluminum Alloys		銅合金 Copper Alloys	
切削速度 Vc	150m/min		80m/min	
半徑 R	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
0.50R	15,920	500	12,740	270
0.75R	15,920	500	12,740	270
1.00R	15,920	500	12,740	270
1.25R	15,920	550	10,190	300
1.50R	15,920	550	8,490	300
2.00R	11,940	680	6,370	370
2.50R	9,550	680	5,100	370
3.00R	7,960	790	4,250	400
4.00R	5,970	900	3,190	450
5.00R	4,780	1,060	2,550	520
6.00R	3,980	1,350	2,120	680
切削量 Cutting Amount (mm)	Ap=0.02D Ae=0.05D 		Ap=0.02D Ae=0.05D 	

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 24 M520 極細鎢鋼銑刀- 2刃(鍍膜) 切削條件表

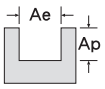
SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		HRC45~55		HRC55~63		—		HRC<30	
切削速度 Vc	136m/min		107m/min		90m/min		55m/min		41m/min		107m/min		158m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
1mm	40,000	180	34,200	150	28,800	97	16,000	75	12,000	52	34,200	150	50,400	405
2mm	21,600	232	17,280	180	14,400	127	8,640	97	6,480	67	17,280	180	25,200	435
3mm	15,120	232	11,520	202	9,360	135	6,000	97	4,460	67	11,520	202	17,280	435
4mm	10,800	247	8,640	202	7,200	150	4,320	97	3,240	75	8,640	202	12,960	435
5mm	9,000	270	6,840	202	5,760	150	3,600	112	2,700	82	6,840	202	10,080	487
6mm	7,200	270	5,760	202	4,680	150	2,880	112	2,160	82	5,760	202	8,640	540
8mm	5,400	270	4,320	232	3,600	165	2,160	112	1,620	82	4,320	232	6,480	540
10mm	4,320	270	3,420	232	2,880	180	1,740	112	1,300	82	3,420	232	5,040	570
12mm	3,600	270	2,880	232	2,400	180	1,440	112	1,080	82	2,880	232	4,320	600
14mm	3,600	300	2,720	255	2,280	195	1,440	120	1,080	90	2,720	255	4,000	660
16mm	3,120	330	2,400	270	2,000	210	1,260	135	940	97	2,400	270	3,600	720
18mm	3,120	330	2,120	270	1,760	210	1,260	135	940	97	2,120	270	3,200	720
20mm	2,400	330	1,920	270	1,600	210	960	135	720	97	1,920	270	2,800	720
切削量 Cutting Amount (mm)	Ap=0.3D (D<3, Ap≦0.15D) 						Ap=0.06D (D<3, Ap≦0.03D) 				Ap=0.3D (D<3, Ap≦0.15D) 			

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 25 M520 極細鎢鋼短刃型 / 短刃長柄型銑刀- 2刃(鍍膜) 切削條件表

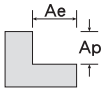
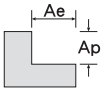
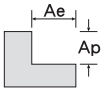
SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		鑄鐵 Cast Iron	
工件料號 Material Code	SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		FC,FCD	
硬度 Hardness	HRC20~30		HRC30～45		HRC45～55		HRC55～63		HRC<30	
切削速度 Vc	94m/min		79m/min		55m/min		39m/min		94m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
1mm	22,650	410	20,200	320	15,130	220	10,060	100	23,920	430
2mm	12,280	420	10,690	320	7,840	220	5,300	100	12,590	440
3mm	8,390	460	6,730	320	5,030	220	3,800	110	8,390	480
4mm	6,940	450	5,660	320	4,080	220	2,980	110	6,940	450
6mm	5,030	420	4,200	420	2,930	200	2,100	100	5030	420
8mm	3,800	420	3,170	300	2,220	200	1,580	100	3,800	420
10mm	3,010	420	2,540	300	1,780	200	1,260	100	3,010	420
12mm	2,540	420	2,100	300	1,470	200	1,070	100	2,540	420
切削量 Cutting Amount (mm)	D≦3, Ap=0.15D D>3, Ap=0.2D D≦6, Ap=0.1D D>6, Ap=0.15D									

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 26 M520 極細鎢鋼銑刀- 3 / 4刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC 30~45		HRC45~55		HRC55~63		—		HRC<30	
切削速度 Vc	136m/min		107m/min		90m/min		54m/min		41m/min		107m/min		158m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	15,120	735	11,520	517	9,360	247	6,040	300	4,600	225	11,520	517	17,280	1,350
4mm	10,800	735	8,640	517	7,200	247	4,320	300	3,240	225	8,640	517	12,960	1,620
5mm	9,000	735	6,840	517	5,760	247	3,600	300	2,700	225	6,840	517	10,080	1,620
6mm	7,200	735	5,760	517	4,680	247	2,880	300	2,160	225	5,760	517	8,640	1,620
8mm	5,400	735	4,320	517	3,600	262	2,160	300	1,620	225	4,320	517	6,480	1,620
10mm	4,320	757	3,420	540	2,880	262	1,720	315	1,300	232	3,420	540	5,040	1,755
12mm	3,600	757	2,880	540	2,400	262	1,440	315	1,080	232	2,880	540	4,320	1,890
14mm	3,600	840	2,720	600	2,280	285	1,440	345	1,080	255	2,720	600	4,000	2,100
16mm	3,120	900	2,400	630	2,000	300	1,240	360	940	270	2,400	630	3,600	2,250
18mm	3,120	900	2,120	630	1,760	300	1,120	360	940	270	2,120	630	3,200	2,250
20mm	2,400	900	1,920	630	1,600	300	960	360	720	270	1,920	630	2,800	2,400
切削量 Cutting Amount (mm)	Ap=1.5D Ae=0.06D						Ap=1D Ae=0.03D				Ap=1.5D Ae=0.06D			

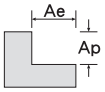
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 27 M520 極細鎢鋼短刃型 / 短刃長柄型銑刀- 4刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		鑄鐵 Cast Iron	
工件料號 Material Code	SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		FC,FCD	
硬度 Hardness	HRC20~30		HRC30～45		HRC45～55		HRC55～63		HRC<30	
切削速度 Vc	110m/min		110m/min		95m/min		79m/min		126m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	11,800	1,260	11,800	1,150	10,060	830	8,390	500	13,460	1,550
4mm	8,790	1,190	8,790	1,070	7,570	780	6,300	460	10,060	1,470
5mm	7,050	1,150	7,050	990	6,060	730	5,030	420	8,080	1,310
6mm	5,900	1,070	5,900	910	5,030	660	4,200	400	6,730	1,230
8mm	4,400	990	4,400	830	3,800	610	3,170	400	5,030	1,150
10mm	3,530	990	3,530	830	3,010	610	2,540	400	4,040	1,150
12mm	2,930	990	2,930	830	2,540	610	2,100	400	3,370	1,150
切削量 Cutting Amount (mm)	D<6, Ap=1D, Ae=0.02D D≧6, Ap=1D, Ae=0.05D									

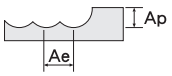


※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 28 M520 極細鎢鋼球刀- 2刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		HRC45~55		HRC55~63		—		HRC<30	
切削速度 Vc	100m/min		90m/min		75m/min		60m/min		45m/min		70m/min		100m/min	
半徑 R	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
0.5R	31,850	770	28,660	620	23,890	400	19,110	210	14,330	140	22,290	290	31,850	770
1.0R	15,920	770	14,330	620	11,940	400	9,550	210	7,170	140	11,150	290	15,920	940
2.0R	7,960	770	7,170	630	5,970	450	4,780	270	3,580	180	5,570	370	7,960	940
3.0R	5,310	860	4,780	670	3,980	470	3,190	300	2,390	190	3,720	390	5,310	1,050
4.0R	3,980	1,050	3,580	790	2,990	560	2,390	330	1,790	210	2,790	460	3,980	1,300
5.0R	3,190	860	2,870	750	2,390	530	1,910	340	1,430	210	2,230	430	3,190	1,200
6.0R	2,650	890	2,390	700	1,990	490	1,590	310	1,190	200	1,860	430	2,650	1,100
8.0R	1,990	840	1,790	650	1,490	480	1,190	270	900	190	1,390	380	1,990	1,050
10.0R	1,590	770	1,430	570	1,190	450	960	250	720	170	1,120	370	1,590	940
切削量 Cutting Amount (mm)	Ap=0.05D Ae=0.1D													

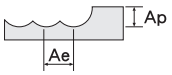


※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 29 M520 極細鎢鋼短刃型 / 短刃長柄型球刀- 2刃(鍍膜) 切削條件表

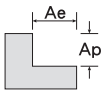
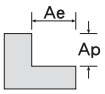
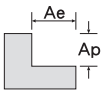
SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		HRC45~55		HRC55~63		—		HRC<30	
切削速度 Vc	100m/min		90m/min		75m/min		60m/min		45m/min		70m/min		100m/min	
半徑 R	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
0.5R	31,850	850	28,660	680	23,890	440	19,110	230	14,330	150	22,290	320	31,850	850
1.0R	15,920	850	14,330	680	11,940	440	9,550	230	7,170	150	11,150	320	15,920	1,030
2.0R	7,960	850	7,170	690	5,970	500	4,780	300	3,580	200	5,570	410	7,960	1,030
3.0R	5,310	950	4,780	740	3,980	520	3,190	330	2,390	210	3,720	430	5,310	1,160
4.0R	3,980	1,160	3,580	870	2,990	620	2,390	360	1,790	230	2,790	510	3,980	1,430
5.0R	3,190	950	2,870	830	2,390	580	1,910	370	1,430	230	2,230	470	3,190	1,320
6.0R	2,650	980	2,390	770	1,990	540	1,590	340	1,190	220	1,860	470	2,650	1,210
8.0R	1,990	920	1,790	720	1,490	530	1,190	300	900	210	1,390	420	1,990	1,160
10.0R	1,590	850	1,430	630	1,190	500	960	280	720	190	1,120	410	1,590	1,030
切削量 Cutting Amount (mm)	Ap=0.05D Ae=0.1D													

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 30 M520 極細鎢鋼短刃型 / 短刃長柄型圓鼻銑刀- 4刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		鑄鐵 Cast Iron	
工件料號 Material Code	SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		FC,FCD	
硬度 Hardness	HRC20~30		HRC30~45		HRC45~55		HRC55~63		HRC<30	
切削速度 Vc	128m/min		108m/min		65m/min		48m/min		189m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	13,820	620	11,230	300	7,250	360	5,520	270	20,740	1,620
4mm	10,370	620	8,640	300	5,180	360	3,890	270	15,550	1,940
5mm	8,210	620	6,910	300	4,320	360	3,240	270	12,100	1,940
6mm	6,910	620	5,620	300	3,460	360	2,590	270	10,370	1,940
8mm	5,180	620	4,320	310	2,590	360	1,940	270	7,780	1,940
10mm	4,100	650	3,460	310	2,060	380	1,560	280	6,050	2,100
12mm	3,460	650	2,880	310	1,730	380	1,300	280	5,180	2,270
14mm	3,260	720	2,740	340	1,730	410	1,300	310	4,800	2,520
16mm	2,880	760	2,400	360	1,490	430	1,130	320	4,320	2,700
18mm	2,540	760	2,110	360	1,340	430	1,130	320	3,840	2,700
20mm	2,300	760	1,920	360	1,150	430	860	320	3,360	2,880
切削量 Cutting Amount (mm)	Ap=1.5D Ae=0.06D				Ap=1D Ae=0.03D				Ap=1.5D Ae=0.06D	

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 31 M520 極細鎢鋼強重型銑刀- 3 / 4刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		HRC45~55		HRC55~63		—		HRC<30	
切削速度 Vc	94m/min		75m/min		63m/min		37m/min		28m/min		75m/min		110m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	10,500	675	8,000	475	6,500	225	4,200	250	3,150	200	8,000	475	12,000	1,250
4mm	7,500	675	6,000	475	5,000	225	3,000	275	2,250	200	6,000	475	9,000	1,500
5mm	6,250	675	4,000	475	4,000	225	2,500	275	1,875	200	4,750	475	7,000	1,500
6mm	5,000	675	3,250	475	3,250	225	2,000	275	1,500	200	4,000	475	6,000	1,500
8mm	3,750	675	3,000	475	2,500	238	1,500	275	1,125	200	3,000	475	4,500	1,500
10mm	3,000	700	2,375	500	2,000	238	1,200	275	900	213	2,375	500	3,500	1,625
12mm	2,500	700	2,000	500	1,650	238	1,000	275	750	213	2,000	500	3,000	1,750
14mm	2,250	700	1,700	500	1,425	238	900	275	675	213	1,700	500	2,500	1,750
16mm	1,950	750	1,500	525	1,250	250	800	300	575	225	1,500	525	2,250	1,875
18mm	1,750	750	1,325	525	1,100	250	700	300	525	225	1,325	525	2,000	1,875
20mm	1,500	750	1,200	525	1,000	250	600	300	450	225	1,200	525	1,750	2,000
切削量 Cutting Amount (mm)	Ap=1.5D Ap≦0.1D						Ap=1D Ae≦0.05D				Ap=1.5D Ae≦0.1D			

Table 32 M520 極細鎢鋼圓鼻銑刀- 2刃(鍍膜) 切削條件表

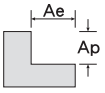
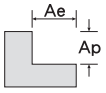
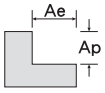
SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		HRC45~55		HRC55~63		—		HRC<30	
切削速度 Vc	95m/min		75m/min		63m/min		38m/min		28m/min		75m/min		110m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
1mm	28,000	170	23,940	140	20,160	90	11,200	70	8,400	50	23,940	140	35,280	380
2mm	15,120	220	12,100	170	10,080	120	6,050	90	4,540	60	12,100	170	17,640	410
3mm	10,580	220	8,060	190	6,550	125	4,200	90	3,120	60	8,060	190	12,100	410
4mm	7,560	230	6,050	190	5,040	140	3,020	90	2,270	70	6,050	190	9,070	410
5mm	6,300	250	4,790	190	4,030	140	2,520	105	1,890	80	4,790	190	7,060	455
6mm	5,040	250	4,030	190	3,280	140	2,020	105	1,510	80	4,030	190	6,050	500
8mm	3,780	250	3,020	220	2,520	150	1,510	105	1,130	80	3,020	220	4,540	500
10mm	3,020	250	2,390	220	2,020	170	1,220	105	910	80	2,390	220	3,530	530
12mm	2,520	250	2,020	220	1,680	170	1,010	105	760	80	2,020	220	3,020	560
14mm	2,520	280	1,900	240	1,600	180	1,010	110	760	80	1,900	240	2,800	620
16mm	2,180	310	1,680	250	1,400	200	880	130	660	90	1,680	250	2,520	670
18mm	2,180	310	1,480	250	1,230	200	880	130	660	90	1,480	250	2,240	670
20mm	1,680	310	1,340	250	1,120	200	670	130	500	90	1,340	250	1,960	670
切削量 Cutting Amount (mm)	Ap=0.5D (D<3, Ae≦0.25D)						Ap=0.1D (D<3, Ae≦0.05D)				Ap=0.5D (D<3, Ae≦0.25D)			

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 33 M520 極細鎢鋼圓鼻銑刀- 4刃(鍍膜) 切削條件表

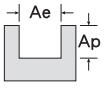
SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		HRC45~55		HRC55~63		—		HRC<30	
切削速度 Vc	94m/min		75m/min		63m/min		37m/min		28m/min		75m/min		110m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	10,580	690	8,060	480	6,550	230	4,230	280	3,220	210	8,060	480	12,100	1,260
4mm	7,560	690	6,050	480	5,040	230	3,020	280	2,270	210	6,050	480	9,070	1,510
5mm	6,300	690	4,790	480	4,030	230	2,520	280	1,890	210	4,790	480	7,060	1,510
6mm	5,040	690	4,030	480	3,280	230	2,020	280	1,510	210	4,030	480	6,050	1,510
8mm	3,780	690	3,020	480	2,520	245	1,510	280	1,130	210	3,020	480	4,540	1,510
10mm	3,020	710	2,390	500	2,020	245	1,200	290	910	220	2,390	500	3,530	1,640
12mm	2,520	710	2,020	500	1,680	245	1,010	290	760	220	2,020	500	3,020	1,760
14mm	2,520	780	1,900	560	1,600	270	1,010	320	760	240	1,900	560	2,800	1,960
16mm	2,180	840	1,680	590	1,400	280	870	340	660	250	1,680	590	2,520	2,100
18mm	1,960	840	1,480	590	1,230	280	780	340	590	250	1,480	590	2,240	2,100
20mm	1,680	840	1,340	590	1,120	280	670	340	500	250	1,340	590	1,960	2,240
切削量 Cutting Amount (mm)	Ap=1.5D Ae≦0.1D 						Ap=1D Ae≦0.05D 				Ap=1.5D Ae≦0.1D 			

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 34 N620 奈米鎢鋼短刃型銑刀- 2刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		鑄鐵 Cast Iron	
工件料號 Material Code	SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		FC,FCD	
硬度 Hardness	HRC20~30		HRC30～45		HRC45～55		HRC55～63		HRC<30	
切削速度 Vc	118m/min		108m/min		68m/min		48m/min		118m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
1mm	28,310	510	25,245	405	18,910	270	12,570	120	29,900	540
2mm	15,345	520	13,365	405	9,800	270	6,630	120	15,740	550
3mm	10,490	570	8,415	405	6,290	280	4,750	140	10,490	600
4mm	8,670	560	7,080	400	5,100	270	3,720	135	8,670	560
6mm	6,290	530	5,250	530	3,660	250	2,630	130	6,290	530
8mm	4,750	530	3,960	380	2,770	250	1,980	130	4,750	530
10mm	3,760	530	3,170	380	2,230	250	1,580	130	3,760	530
12mm	3,170	530	2,620	380	1,840	250	1,340	130	3,170	530
切削量 Cutting Amount (mm)	D≦3, Ap=0.15D D>3, Ap=0.2D D≦6, Ap=0.1D D>6, Ap=0.15D 									

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

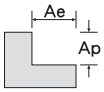
1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 35 N620 奈米鎢鋼短刃型銑刀- 3刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

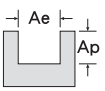
側銑加工 Side Milling

加工材質 Material	合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		鑄鐵 Cast Iron	
工件料號 MaterialCode	SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		FC,FCD	
硬度 Hardness	HRC20~30		HRC30~45		HRC45~55		HRC55~63		HRC<30	
切削速度 Vc	179m/min		179m/min		134m/min		90m/min		179m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	19,080	1,260	19,080	790	14,310	480	9,540	310	19,080	1,575
4mm	14,310	1,305	14,310	820	10,710	520	7,160	330	14,310	1,620
6mm	9,540	1,440	9,540	945	7,155	550	4,770	360	9,540	1,800
8mm	7,155	1,305	7,155	895	5,355	500	3,600	330	7,155	1,620
10mm	5,715	1,170	5,715	880	4,275	480	2,880	280	5,715	1,440
12mm	4,770	1,170	4,770	860	3,600	450	2,385	280	4,770	1,440
切削量 Cutting Amount (mm)	D≦6, Ap=1D, Ae=0.02D D>6, Ap=1D, Ae=0.05D									



溝銑加工 Slot Milling

加工材質 Material	合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		鑄鐵 Cast Iron	
工件料號 MaterialCode	SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		FC,FCD	
硬度 Hardness	HRC20~30		HRC30~45		HRC45~55		HRC<30	
切削速度 Vc	90m/min		89m/min		58m/min		107m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	9,540	625	8,595	355	6,210	256	11,430	945
4mm	7,155	652	6,435	373	4,635	270	8,595	990
6mm	4,770	747	4,275	409	3,105	297	5,715	1,080
8mm	3,600	729	3,240	396	2,340	270	4,275	945
10mm	3,600	706	2,565	378	1,845	234	3,420	855
12mm	2,385	661	2,160	364	1,530	234	2,880	855
切削量 Cutting Amount (mm)	Ap=0.3D Ap(Max)=3mm							

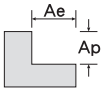


※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 36 N620 奈米鎢鋼短刃型銑刀- 4刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		鑄鐵 Cast Iron	
工件料號 Material Code	SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		FC,FCD	
硬度 Hardness	HRC20~30		HRC30～45		HRC45～55		HRC55～63		HRC<30	
切削速度 Vc	139m/min		139m/min		118m/min		98m/min		158m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	14,750	1,580	14,750	1,440	12,570	1,040	10,490	630	16,830	1,935
4mm	10,990	1,485	10,990	1,340	9,460	980	7,875	570	12,570	1,840
5mm	8,810	1,440	8,810	1,240	7,580	910	6,290	530	10,100	1,640
6mm	7,380	1,340	7,380	1,140	6,290	830	5,250	500	8,415	1,540
8mm	5,500	1,240	5,500	1,040	4,750	760	3,960	500	6,290	1,440
10mm	4,410	1,240	4,410	1,040	3,760	760	3,170	500	5,050	1,440
12mm	3,660	1,240	3,660	1,040	3,170	760	2,630	500	4,210	1,440
切削量 Cutting Amount (mm)	D≦6, Ap=1D, Ae=0.02D D>6, Ap=1D, Ae=0.05D									

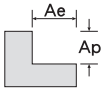
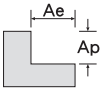
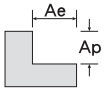
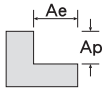


※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 37 N620 奈米鎢鋼高導短刃型銑刀- 6刃(鍍膜) 切削條件表

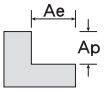
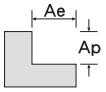
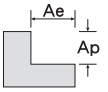
SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels	
工件料號 Material Code	SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD	
硬度 Hardness	HRC20~30		HRC30~45		HRC45~55		HRC55~63	
切削速度 Vc	178m/min		150m/min		117m/min		89m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
6mm	9,600	3,630	7,950	1,875	6,300	1,305	4,800	900
8mm	7,200	3,630	6,000	1,890	4,800	1,335	3,600	900
10mm	5,700	3,450	4,800	1,815	3,750	1,245	2,850	855
12mm	4,800	3,225	4,050	1,695	3,150	1,170	2,400	810
16mm	3,600	3,105	3,000	1,620	2,400	1,140	1,800	780
20mm	2,850	2,880	2,400	1,515	1,950	1,080	1,500	750
切削量 Cutting Amount (mm)	Ap=1.5D Ae=0.1D 		Ap=1.5D Ae=0.1D 		Ap=1.5D Ae=0.06D 		Ap=1.5D Ae=0.04D 	

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 38 N620 奈米鎢鋼短刃型圓鼻銑刀- 4刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

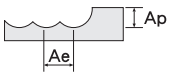
加工材質 Material	合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		鑄鐵 Cast Iron	
工件料號 Material Code	SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		FC,FCD	
硬度 Hardness	HRC20~30		HRC30~45		HRC45~55		HRC55~63		HRC<30	
切削速度 Vc	161m/min		135m/min		81m/min		61m/min		237m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	17,280	775	14,040	370	9,060	450	6,900	337	25,920	2,025
4mm	12,960	775	10,800	370	6,480	450	4,860	337	19,440	2,430
5mm	10,260	775	8,640	370	5,400	450	4,050	337	15,120	2,430
6mm	8,640	775	7,020	370	4,320	450	3,240	337	12,960	2,430
8mm	6,480	775	5,400	393	3,240	450	2,430	337	9,720	2,430
10mm	5,130	810	4,320	393	2,580	472	1,950	348	7,560	2,630
12mm	4,320	810	3,600	393	2,160	472	1,620	348	6,480	2,835
14mm	4,080	900	3,420	427	2,160	517	1,620	382	6,000	3,150
16mm	3,600	945	3,000	450	1,860	540	1,410	405	5,400	3,375
18mm	3,180	945	2,640	450	1,680	540	1,410	405	4,800	3,375
20mm	2,880	945	2,400	450	1,440	540	1,080	405	4,200	3,600
切削量 Cutting Amount (mm)	Ap=1D Ae=0.06D 				Ap=1D Ae=0.03D 				Ap=1D Ae=0.06D 	

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 39 N620 奈米鎢鋼短刃型 / 短刃長柄型球刀- 2刃(鍍膜) 切削條件表

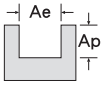
SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		鑄鐵 Cast Iron	
工件料號 Material Code	SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		FC,FCD	
硬度 Hardness	HRC20~30		HRC30~45		HRC45~55		HRC55~63		HRC<30	
切削速度 Vc	230m/min		180m/min		140m/min		110m/min		230m/min	
半徑 R	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
0.5R	32,000	2,000	32,000	2,000	32,000	1,700	32,000	1,360	32,000	2,000
1.0R	32,000	3,060	28,660	3,020	22,290	1,870	17,520	1,490	32,000	3,060
1.5R	24,420	3,400	19,110	2,720	14,860	1,700	11,680	1,360	24,420	3,400
2.0R	18,310	3,100	14,330	2,510	11,150	1,620	8,760	1,280	18,310	3,100
2.5R	14,650	2,980	11,470	2,250	8,920	1,450	7,010	1,150	14,650	2,980
3.0R	12,210	2,850	9,550	1,960	7,430	1,320	5,840	1,060	12,210	2,850
4.0R	9,160	2,420	7,170	1,740	5,570	1,150	4,380	890	9,160	2,420
5.0R	7,330	2,170	5,730	1,530	4,460	980	3,500	750	7,330	2,170
6.0R	6,100	2,040	4,780	1,400	3,720	820	2,920	680	6,100	2,040
切削量 Cutting Amount (mm)	Ap=0.02D Ae=0.05D									

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π (3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 40 N620 奈米鎢鋼短刃長頸型銑刀- 2刃(鍍膜) 切削條件表

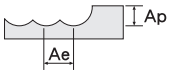
SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	合金鋼 Alloy Steels			合金鋼 Alloy Steels			調質鋼 Hardened Steels			調質鋼 Hardened Steels			鑄鐵 Cast Iron		
工件料號 Material Code	SCM,SKT,SKD			SCM,SKT,SKD			SKT,SKD			SKT,SKD			FC,FCD		
硬度 Hardness	HRC20~30			HRC30~45			HRC45~55			HRC 55~63			HRC<30		
切削速度 Vc	59m/min			59m/min			42m/min			25m/min			67m/min		
外徑 Diameter	S (rpm)	F (mm/min)	Ap (mm)	S (rpm)	F (mm/min)	Ap (mm)	S (rpm)	F (mm/min)	Ap (mm)	S (rpm)	F (mm/min)	Ap (mm)	S (rpm)	F (mm/min)	Ap (mm)
0.5mm- 2E	25,200	270	0.045	25,200	135	0.038	18,900	45	0.019	13,500	27	0.009	25,200	360	0.049
0.5mm- 4E	21,600	180	0.021	21,600	90	0.018	16,200	27	0.009	13,500	27	0.009	21,600	225	0.023
1.0mm- 6E	18,000	540	0.07	17,100	450	0.06	10,800	135	0.03	7,200	45	0.014	19,800	630	0.07
1.0mm- 8E	15,300	315	0.04	14,400	270	0.04	9,000	90	0.02	7,200	45	0.014	16,200	360	0.05
1.5mm- 8E	10,800	315	0.1	9,900	270	0.08	6,300	90	0.04	4,500	45	0.021	11,700	360	0.11
2.0mm- 8E	9,000	540	0.26	9,000	450	0.22	5,400	135	0.11	3,600	90	0.06	9,900	630	0.29
2.0mm- 10E	7,200	315	0.24	8,100	270	0.2	4,500	90	0.1	2,700	45	0.05	8,100	360	0.26
2.0mm- 12E	7,200	315	0.13	8,100	270	0.11	4,500	90	0.06	2,700	45	0.03	8,100	360	0.14
3.0mm- 08E	6,300	540	0.36	6,300	450	0.3	4,500	135	0.15	2,700	90	0.08	7,200	630	0.39
3.0mm- 12E	6,300	540	0.27	6,300	450	0.23	4,500	135	0.11	2,700	90	0.055	7,200	630	0.29
3.0mm- 16E	6,300	315	0.2	5,400	270	0.17	3,600	90	0.08	2,250	45	0.04	6,300	360	0.22
3.0mm- 20E	6,300	315	0.13	5,400	270	0.11	3,600	90	0.05	2,250	45	0.025	6,300	360	0.14
4.0mm- 16E	4,500	540	0.36	4,500	450	0.3	2,700	135	0.15	1,800	90	0.075	4,500	630	0.39
4.0mm- 20E	4,500	315	0.34	3,600	270	0.28	1,800	90	0.14	900	90	0.07	4,500	360	0.36
5.0mm- 20E	3,600	450	0.45	3,150	450	0.38	1,800	135	0.19	1,800	90	0.09	3,600	540	0.49
5.0mm- 30E	2,700	270	0.33	2,700	180	0.28	1,800	135	0.14	1,800	90	0.07	2,700	270	0.36
切削量 Cutting Amount (mm)															

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 41 N620 奈米鎢鋼短刃長頸型球刀- 2刃(鍍膜) 切削條件表

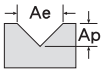
SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	合金鋼 Alloy Steels				合金鋼 Alloy Steels				調質鋼 Hardened Steels				調質鋼 Hardened Steels				鑄鐵 Cast Iron			
工件料號 Material Code	SCM,SKT,SKD				SCM,SKT,SKD				SKT,SKD				SKT,SKD				FC,FCD			
硬度 Hardness	HRC20~30				HRC30~45				HRC45~55				HRC55~63				HRC<30			
切削速度 Vc	79m/min				73m/min				56m/min				31m/min				79m/min			
半徑 R	S (rpm)	F (mm/min)	Ap (mm)	Ae (mm)	S (rpm)	F (mm/min)	Ap (mm)	Ae (mm)	S (rpm)	F (mm/min)	Ap (mm)	Ae (mm)	S (rpm)	F (mm/min)	Ap (mm)	Ae (mm)	S (rpm)	F (mm/min)	Ap (mm)	Ae (mm)
0.30R- 3E	27,000	360	0.03	0.12	22,500	225	0.03	0.12	21,600	180	0.03	0.06	15,300	135	0.02	0.04	27,000	360	0.03	0.12
0.30R- 4E	27,000	360	0.03	0.12	22,500	225	0.03	0.12	21,600	180	0.03	0.06	15,300	135	0.02	0.04	27,000	360	0.03	0.12
0.40R- 4E	24,300	540	0.04	0.16	20,700	405	0.04	0.16	18,900	270	0.04	0.08	13,050	180	0.04	0.08	24,300	540	0.04	0.16
0.40R- 6E	21,600	360	0.04	0.12	18,900	225	0.04	0.12	17,100	180	0.02	0.04	10,800	135	0.02	0.04	21,600	360	0.04	0.12
0.50R- 6E	18,900	360	0.05	0.20	17,100	270	0.05	0.20	14,400	180	0.05	0.10	10,350	135	0.05	0.10	18,900	360	0.05	0.20
0.50R- 8E	18,900	360	0.05	0.15	17,100	270	0.05	0.15	14,400	180	0.03	0.05	10,350	135	0.03	0.05	18,900	360	0.05	0.15
0.75R- 9E	15,300	540	0.08	0.30	13,500	270	0.08	0.30	10,800	225	0.08	0.15	7,200	180	0.08	0.15	15,300	540	0.08	0.30
0.75R- 12E	15,300	540	0.08	0.23	13,500	270	0.08	0.23	10,800	225	0.08	0.15	7,200	180	0.08	0.15	15,300	540	0.08	0.23
1.00R- 12E	12,600	630	0.10	0.40	11,700	450	0.10	0.40	9,000	270	0.10	0.20	4,950	180	0.10	0.20	12,600	630	0.10	0.40
1.00R- 16E	12,600	630	0.10	0.30	11,700	450	0.10	0.30	9,000	270	0.06	0.10	4,950	180	0.06	0.10	12,600	630	0.10	0.30
1.50R- 12E	9,000	540	0.15	0.60	7,650	270	0.15	0.60	5,850	225	0.15	0.30	2,700	135	0.15	0.30	9,000	540	0.15	0.60
1.50R- 25E	9,000	540	0.15	0.60	7,650	270	0.15	0.60	5,850	225	0.09	0.15	2,700	135	0.09	0.15	9,000	540	0.15	0.60
2.00R- 25E	6,300	540	0.20	0.80	5,400	360	0.20	0.80	4,500	225	0.20	0.40	2,250	90	0.20	0.40	6,300	540	0.20	0.80
2.00R- 30E	6,300	540	0.20	0.80	5,400	360	0.20	0.80	4,500	225	0.12	0.20	2,250	90	0.12	0.20	6,300	540	0.20	0.80
2.50R- 30E	5,400	450	0.25	1.00	4,500	450	0.25	1.00	3,600	225	0.25	0.50	2,700	90	0.25	0.50	5,400	450	0.25	1.00
2.50R- 40E	5,400	450	0.25	1.00	4,500	450	0.25	1.00	3,600	225	0.25	0.50	2,700	90	0.25	0.50	5,400	450	0.25	1.00
3.00R- 30E	4,500	450	0.30	1.20	3,600	360	0.30	1.20	3,600	270	0.30	0.60	2,700	180	0.30	0.60	4,500	450	0.30	1.20
3.00R- 45E	4,500	450	0.30	1.20	3,600	360	0.30	1.20	3,600	270	0.30	0.60	2,700	180	0.30	0.60	4,500	450	0.30	1.20
切削量 Cutting Amount (mm)																				

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 42 鎢鋼雕刻銑刀- 1刃(白刃) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

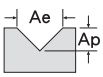
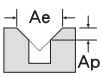
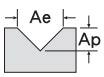
加工材質 Material	碳素鋼 Carbon Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron		鋁合金 Aluminum Alloys		高溫合金 High-Temp Alloys		非金屬 Non-metal	
工件料號 Material Code	S35C,S45C,S50C		SUS304		FC,FCD		Al 6061		Ti-6Al-4V		塑膠 Plastic	
硬度 Hardness	—		—		HRC<30		—		HRC<30		—	
切削速度 Vc	75m/min		40m/min		75m/min		75m/min		30m/min		75m/min	
角度 Angle	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
30°	6,000	90	3,180	70	6,000	150	6,000	150	2,390	70	6,000	220
60°	6,000	120	3,180	100	6,000	200	6,000	200	2,390	100	6,000	300
切削量 Cutting Amount (mm)	Ap≦0.25 											

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 43 鎢鋼鋁用倒角銑刀- 1刃(白刀) 切削條件表

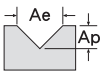
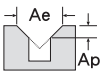
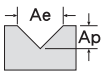
SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	鋁合金 Aluminum Alloys					
工件料號 Material Code	Al 5052 / 6061 / 7075					
硬度 Hardness	—					
加工方式 Cutting Mode	定點加工 Spotting		倒角加工 Chamfering		雕刻加工 Engraving	
切削速度 Vc	100~200m/min		100~200m/min		100~200m/min	
外徑 Diameter	S (rpm)	f (mm/rev)	S (rpm)	f (mm/rev)	S (rpm)	f (mm/rev)
3mm	11,000~21,000	0.01	11,000~21,000	0.01~0.04	11,000~21,000	0.01~0.02
4mm	8,000~16,000	0.01	8,000~16,000	0.01~0.04	8,000~16,000	0.01~0.03
6mm	5,000~11,000	0.02	5,000~11,000	0.02~0.07	5,000~11,000	0.02~0.04
8mm	4,000~8,000	0.03	4,000~8,000	0.02~0.10	4,000~8,000	0.03~0.06
10mm	3,200~6,400	0.03	3,200~6,400	0.02~0.15	3,200~6,400	0.03~0.06
12mm	2,700~5,300	0.04	2,700~5,300	0.02~0.14	2,700~5,300	0.04~0.08
16mm	2,000~4,000	0.05	2,000~4,000	0.02~0.14	2,000~4,000	0.05~0.10
切削量 Cutting Amount (mm)			Ap=0.5~1.0mm 		Ap≦0.03D 	

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 44 極細鎢鋼高硬用倒角銑刀- 3刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	合金鋼 Alloy Steels					
工件料號 Material Code	SCM,SKT,SKD					
硬度 Hardness	HRC≦50					
加工方式 Cutting Mode	定點加工 Spotting		倒角加工 Chamfering		雕刻加工 Engraving	
切削速度 Vc	90~150m/min		90~150m/min		90~150m/min	
外徑 Diameter	S (rpm)	f (mm/rev)	S (rpm)	f (mm/rev)	S (rpm)	f (mm/rev)
3mm	9,550~15,920	0.01	9,550~15,920	0.03~0.06	9,550~15,920	0.02~0.04
4mm	7,170~11,940	0.02	7,170~11,940	0.03~0.06	7,170~11,940	0.02~0.04
6mm	4,780~7,960	0.02	4,780~7,960	0.05~0.10	4,780~7,960	0.03~0.08
8mm	3,580~5,970	0.03	3,580~5,970	0.10~0.20	3,580~5,970	0.03~0.08
10mm	2,870~4,780	0.05	2,870~4,780	0.15~0.30	2,870~4,780	0.05~0.13
12mm	2,390~3,980	0.07	2,390~3,980	0.20~0.35	2,390~3,980	0.10~0.15
16mm	1,790~2,990	0.08	1,790~2,990	0.20~0.35	1,790~2,990	0.10~0.15
切削量 Cutting Amount (mm)			Ap=0.5~1.0mm 		Ap≦0.03D 	

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 45 鎢鋼T型銑刀 / 外圓槽銑刀 / 鳩尾槽銑刀 / 等角鳩尾槽銑刀 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		不銹鋼 Stainless Steels		鋁合金 Aluminum Alloys	
工件料號 Material Code	S35C,S45C,S50C		SUS304		Al 5052 / 6061 / 7075	
硬度 Hardness	HRC<20		—		—	
切削數度 Vc	25m/min		15m/min		60m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
4mm	1,990	80	1,190	50	4,780	80
6mm	1,330	80	800	50	3,180	80
8mm	980	90	600	60	2,400	90
10mm	790	70	480	50	1,900	90
12mm	670	70	400	50	1,600	90
14mm	580	70	330	50	1,360	90
16mm	500	70	300	50	1,200	100
18mm	450	70	260	50	1,060	100
20mm	400	60	240	40	950	80
25mm	320	60	190	40	760	80
30mm	270	60	160	40	640	80
40mm	200	60	120	30	480	80
備註 Remarks						

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 46 鎢鋼倒角兼用銑刀- 2刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels			合金鋼 Alloy Steels			不銹鋼 Stainless Steels			鋁合金 Aluminum Alloys		
工件料號 Material Code	S35C,S45C,S50C			SCM, SKT, SKD			SUS304			Al 5052 / 6061 / 7075		
硬度 Hardness	HRC<20			HRC20~30			—			—		
切削速度 Vc	60m/min			50m/min			40m/min			50m/min		
外徑 Diameter	S (rpm)	縱向 F Vertical (mm/min)	橫向 F Horizontal (mm/min)	S (rpm)	縱向 F Vertical (mm/min)	橫向 F Horizontal (mm/min)	S (rpm)	縱向 F Vertical (mm/min)	橫向 F Horizontal (mm/min)	S (rpm)	縱向 F Vertical (mm/min)	橫向 F Horizontal (mm/min)
3mm	6,400	25	50	5,300	20	40	4,200	20	40	5,300	40	80
4mm	4,800	25	55	4,000	20	45	3,200	20	45	4,000	40	85
6mm	3,200	25	60	2,650	20	50	2,100	20	50	2,650	40	90
8mm	2,400	25	65	2,000	20	55	1,600	20	55	2,000	40	110
10mm	1,900	25	70	1,600	20	60	1,300	20	60	1,600	40	110
12mm	1,600	25	70	1,350	20	60	1,050	20	60	1,350	40	120
16mm	1,200	30	80	1,000	25	65	800	25	65	1,000	50	120
20mm	950	30	80	800	25	65	640	25	65	800	50	110
備註 Remarks	※ 先端角=120°，可將進給量增加30%。 Tip Angle=120°, might increase 30% Feed Speed.											

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 47 鎢鋼內R角銑刀- 2刃(白刀) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels			合金鋼 Alloy Steels			調質鋼 Hardened Steels		
工件料號 Material Code	S35C,S45C,S50C			SCM,SKD			SKT,SKD		
硬度 Hardness	HRC<20			HRC30~45			HRC45~55		
切削速度 Vc	30~40m/min			20~30m/min			15~25m/min		
半徑 R	S (rpm)	粗加工 F Roughing (mm/min)	精加工 F Finishing (mm/min)	S (rpm)	粗加工 F Roughing (mm/min)	精加工 F Finishing (mm/min)	S (rpm)	粗加工 F Roughing (mm/min)	精加工 F Finishing (mm/min)
0.50R	9,900	50	90	7,200	45	60	5,760	35	50
0.75R	8,100	50	90	5,760	45	60	4,590	35	50
1.00R	5,580	50	90	3,960	45	60	3,780	35	50
1.25R	4,860	50	90	3,510	45	60	3,240	35	50
1.50R	3,330	50	90	2,430	45	60	2,880	35	50
1.75R	3,060	50	90	2,160	45	60	2,520	35	50
2.00R	2,880	50	90	2,070	45	60	2,250	35	50
2.50R	2,520	50	90	1,800	45	60	1,890	35	50
3.00R	2,250	50	90	1,620	45	60	1,620	35	50
4.00R	1,665	50	90	1,170	45	60	1,260	35	50
5.00R	1,440	50	90	990	45	60	1,080	35	50
6.00R	1,250	50	90	810	45	60	900	35	50
切削量 Cutting Amount (mm)	※ R≦0.5mm 精加工預留量(單邊)=0.02mm。 R≦0.5mm Finishing Stock Amount(Indicates Radius)=0.02mm ※ R>0.5mm 精加工預留量(單邊)=0.05mm。 R>0.5mm Finishing Stock Amount(Indicates Radius)=0.05mm ※ 切削量須區分多次切削 Divide the cutting depth into several time paths. ※ 須使用切削油 Use cutting fluid.								

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 48 鎢鋼中心鑽頭- 2刃(白刀) 切削條件表

SOLID CARBIDE DRILLS- DRILLING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron		高溫合金 High-Temp Alloys	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SUS304		FC,FCD		Ti-6Al-4V	
硬度 Hardness	HRC<20		HRC20~30		—		HRC<30		HRC<30	
切削速度 Vc	60m/min		50m/min		50m/min		50m/min		50m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
1.0mm	12,740	200	9,550	124	15,920	254	15,920	207	15,920	365
1.5mm	12,740	382	10,620	244	11,990	359	10,615	244	10,615	244
2.0mm	9,550	382	7,960	239	7,960	318	7,960	239	7,960	239
3.0mm	6,370	318	5,305	121	5,310	212	5,310	212	5,310	212
5.0mm	3,820	382	3,185	255	3,185	318	3,185	255	3,185	255
備註 Remarks										

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = f(每轉進給量) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 49 鎢鋼定點鑽頭- 2刃(白刃) 切削條件表

SOLID CARBIDE DRILLS- DRILLING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron		高溫合金 High-Temp Alloys	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SUS304		FC,FCD		Ti-6Al-4V	
硬度 Hardness	HRC<20		HRC20~30		—		HRC<30		HRC<30	
切削速度 Vc	48m/min		40m/min		28m/min		40m/min		24m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
4mm	3,820	310	3,180	220	2,230	160	3,180	220	1,910	110
5mm	3,060	240	2,550	180	1,780	120	2,550	180	1,530	90
6mm	2,550	200	2,120	150	1,490	100	2,120	150	1,270	80
8mm	1,910	210	1,590	140	1,110	100	1,590	140	960	80
10mm	1,530	240	1,270	170	890	120	1,270	170	760	80
12mm	1,270	360	1,060	220	740	160	1,060	220	640	130
16mm	960	310	800	190	560	130	800	190	480	120
備註 Remarks										

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = f(每轉進給量) × S(主軸轉速)

Table 50 CDM 鎢鋼微徑鑽頭- 2刃(鍍膜) 切削條件表

SOLID CARBIDE DRILLS- DRILLING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		—		HRC<30	
切削速度 Vc	60m/min		40m/min		20m/min		50m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
0.50mm	38,220	630	25,480	400	12,740	70	31,850	550
0.95mm	20,110	700	13,410	450	6,710	80	16,760	610
1.00mm	19,110	630	12,740	380	6,370	70	15,920	550
1.45mm	13,180	670	8,790	450	4,390	60	10,980	610
1.50mm	12,740	640	8,490	400	4,250	70	10,620	550
1.95mm	9,800	700	6,530	450	3,270	80	8,170	620
2.00mm	9,550	640	6,370	380	3,190	70	7,960	560
2.45mm	7,800	700	5,200	440	2,600	80	6,500	510
2.50mm	7,640	630	5,100	410	2,550	70	6,370	540
2.95mm	6,480	700	4,320	450	2,160	80	5,400	610
備註 Remarks								

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = f(每轉進給量) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 51 CDS 鎢鋼短刃型同柄鑽頭- 2刃(3倍長)(鍍膜) 切削條件表

SOLID CARBIDE DRILLS- DRILLING CONDITION TABLE

濕式鑽孔 Wet Drilling

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		—		HRC<30	
切削速度 Vc	110m/min		100m/min		60m/min		50m/min		120m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	11,680	860	10,620	620	6,370	470	5,310	240	12,740	780
5mm	7,000	860	6,370	640	3,820	350	3,190	190	7,640	760
8mm	4,380	820	3,980	600	2,390	320	1,990	180	4,780	740
10mm	3,500	800	3,190	560	1,910	280	1,590	140	3,820	730
12mm	2,920	770	2,650	550	1,590	270	1,330	130	3,190	720
備註 Remarks	※ 未鍍膜鑽頭，請依照上表，減少30%左右轉速和進給量。 Uncoated Drills Reduce 30% RPM & FEED From Coating One.									

乾式鑽孔 Dry Drilling

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		—		HRC<30	
切削速度 Vc	90m/min		65m/min		50m/min		40m/min		100m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	9,550	720	6,900	520	5,310	420	4,250	200	10,620	650
5mm	5,730	720	4,140	530	3,190	320	2,550	160	6,370	630
8mm	3,580	680	2,590	500	1,990	290	1,590	150	3,980	620
10mm	2,870	670	2,070	470	1,590	250	1,270	120	3,190	610
12mm	2,390	640	1,730	460	1,330	240	1,060	110	2,650	600
備註 Remarks	※ 未鍍膜鑽頭，請依照上表，減少30%左右轉速和進給量。 Uncoated Drills Reduce 30% RPM & FEED From Coating One.									

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π (3.14)　　F(進給速度) = f(每轉進給量) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 52 CDH 鎢鋼短刃型高速鑽頭- 2刃(3倍長)(鍍膜) 切削條件表

SOLID CARBIDE DRILLS- DRILLING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		—		HRC<30	
切削速度 Vc	120m/min		100m/min		60m/min		40m/min		130m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	12,740	1,040	10,620	770	6,370	510	4,250	290	13,800	1,080
4mm	9,550	1,040	7,960	770	4,780	510	3,180	290	10,350	1,080
5mm	7,640	780	6,370	590	3,820	380	2,550	220	8,280	810
6mm	6,370	780	5,310	590	3,190	350	2,120	220	6,900	810
8mm	4,780	720	3,980	540	2,390	350	1,590	200	5,180	760
10mm	3,820	640	3,180	490	1,910	320	1,270	180	4,140	680
12mm	3,180	600	2,650	430	1,590	290	1,060	160	3,450	610
14mm	2,730	600	2,270	430	1,370	290	910	160	2,960	610
16mm	2,390	490	1,990	380	1,190	260	800	140	2,590	530
18mm	2,120	490	1,770	380	1,060	260	710	140	2,300	530
20mm	1,910	390	1,590	300	960	210	640	110	2,070	420
備註 Remarks	※ 未鍍膜鑽頭，請依照上表，減少30%左右轉速和進給量。 Uncoated Drills Reduce 30% RPM & FEED From Coating One.									

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = f(每轉進給量) × S(主軸轉速)

Table 53 CDHF 鎢鋼標準型高速鑽頭- 2刃(5倍長)(鍍膜) 切削條件表

SOLID CARBIDE DRILLS- DRILLING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SUS304		GG40	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		—		HRC<30	
切削速度 Vc	120m/min		100m/min		60m/min		40m/min		130m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	12,740	930	10,620	690	6,370	470	4,250	260	13,800	970
4mm	9,550	930	7,960	690	4,780	470	3,180	260	10,350	970
5mm	7,640	700	6,370	520	3,820	350	2,550	200	8,280	730
6mm	6,370	700	5,310	520	3,190	350	2,120	200	6,900	730
8mm	4,780	660	3,980	490	2,390	320	1,590	180	5,180	680
10mm	3,820	580	3,180	430	1,910	280	1,270	160	4,140	610
12mm	3,180	530	2,650	390	1,590	270	1,060	150	3,450	550
14mm	2,730	530	2,270	390	1,370	270	910	150	2,960	550
16mm	2,390	450	1,990	350	1,190	240	800	130	2,590	470
18mm	2,120	450	1,770	350	1,060	240	710	130	2,300	470
20mm	1,910	360	1,590	280	960	190	640	100	2,070	380
備註 Remarks	※ 未鍍膜鑽頭，請依照上表，減少30%左右轉速和進給量。 Uncoated Drills Reduce 30% RPM & FEED From Coating One.									

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = f(每轉進給量) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 54 CDHC 鎢鋼短刃內冷型高速鑽頭- 2刃(3倍長)(鍍膜) 切削條件表

SOLID CARBIDE DRILLS- DRILLING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		—		HRC<30	
切削速度 Vc	150m/min		135m/min		70m/min		60m/min		160m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
4mm	11,940	1,130	10,750	860	5,570	570	4,780	320	12,740	1,180
5mm	9,550	860	8,600	640	4,460	430	3,820	240	10,190	890
6mm	7,960	860	7,170	640	3,720	430	3,180	240	8,490	890
8mm	5,970	790	5,370	590	2,790	400	2,390	220	6,370	830
10mm	4,780	710	4,300	530	2,230	360	1,910	200	5,100	740
12mm	3,980	660	3,580	490	1,860	330	1,590	180	4,250	740
14mm	3,410	660	3,070	490	1,590	330	1,360	180	3,640	660
16mm	2,990	560	2,690	420	1,390	280	1,190	160	3,180	570
18mm	2,650	560	2,390	420	1,240	280	1,060	160	2,830	570
20mm	2,390	450	2,150	340	1,120	220	960	130	2,550	460
備註 Remarks	※ 未鍍膜鑽頭，請依照上表，減少30%左右轉速和進給量。 Uncoated Drills Reduce 30% RPM & FEED From Coating One.									

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = f(每轉進給量) × S(主軸轉速)

Table 55 CDHCF 鎢鋼標準內冷型高速鑽頭- 2刃(5倍長)(鍍膜) 切削條件表

SOLID CARBIDE DRILLS- DRILLING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		—		HRC<30	
切削速度 Vc	150m/min		135m/min		70m/min		60m/min		160m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
4mm	11,940	1,020	10,750	770	5,570	510	4,780	280	12,740	1,060
5mm	9,550	770	8,600	570	4,460	380	3,820	210	10,190	800
6mm	7,960	770	7,170	570	3,720	380	3,180	210	8,490	800
8mm	5,970	720	5,370	540	2,790	350	2,390	200	6,370	740
10mm	4,780	640	4,300	490	2,230	320	1,910	180	5,100	660
12mm	3,980	570	3,580	430	1,860	290	1,590	160	4,250	610
14mm	3,410	570	3,070	430	1,590	290	1,360	160	3,640	610
16mm	2,990	490	2,690	380	1,390	260	1,190	140	3,180	530
18mm	2,650	490	2,390	380	1,240	260	1,060	140	2,830	530
20mm	2,390	390	2,150	300	1,120	210	960	110	2,550	420
備註 Remarks	※ 未鍍膜鑽頭，請依照上表，減少30%左右轉速和進給量。 Uncoated Drills Reduce 30% RPM & FEED From Coating One.									

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = f(每轉進給量) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 56 CDHCS 鎢鋼長刃內冷型高速鑽頭- 2刃(7倍長)(鍍膜) 切削條件表

SOLID CARBIDE DRILLS- DRILLING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		—		HRC<30	
切削速度 Vc	120m/min		85m/min		50m/min		40m/min		130m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	12,700	910	10,600	680	5,310	450	4,200	250	13,800	950
4mm	9,500	910	8,000	680	3,980	450	3,100	250	10,300	950
5mm	7,600	690	6,400	510	3,190	340	2,500	190	8,200	710
6mm	6,400	690	5,300	510	2,650	340	2,100	190	6,900	710
8mm	4,800	640	4,000	470	1,990	320	1,600	180	5,100	670
10mm	3,800	560	3,200	430	1,590	280	1,300	160	4,100	590
12mm	3,200	510	2,600	390	1,330	270	1,000	150	3,500	530
14mm	2,700	510	2,300	390	1,140	270	910	150	3,000	530
16mm	2,400	450	2,000	330	995	210	700	120	2,300	470
18mm	2,100	450	1,800	330	890	210	700	120	2,300	470
20mm	1,900	360	1,600	260	800	170	650	100	2,000	380
備註 Remarks	※ 未鍍膜鑽頭，請依照上表，減少30%左右轉速和進給量。 Uncoated Drills Reduce 30% RPM & FEED From Coating One.									

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = f(每轉進給量) × S(主軸轉速)

Table 57 鎢鋼銅鋁用直刃鑽鉸刀(白刀) 切削條件表

SOLID CARBIDE DRILLS- DRILLING CONDITION TABLE

加工材質 Material	鑄鐵 Cast Iron		青銅 Bronze		鋁合金 Aluminum Alloys	
工件料號 Material Code	FC,FCD		—		Al 5052 / 6061 / 7075	
硬度 Hardness	HRC<30		HRC≦25		—	
切削速度 Vc	120m/min		80m/min		140m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
5mm	7,640	960	5,100	410	8,920	1,430
6mm	6,370	800	4,250	340	7,430	1,190
8mm	4,780	600	3,190	260	5,570	890
10mm	3,820	480	2,550	200	4,460	710
12mm	3,190	400	2,120	170	3,720	600
16mm	2,390	300	1,590	130	2,790	450
20mm	1,910	240	1,270	100	2,230	360
備註 Remarks						

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = f(每轉進給量) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 58 鎢鋼螺旋機械鉸刀(白刀) 切削條件表

SOLID CARBIDE REAMERS- REAMING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels			合金鋼 Alloy Steels			鑄鐵 Cast Iron			銅合金 Copper Alloys			鋁合金 Aluminum Alloys		
工件料號 Material Code	S35C,S45C,S50C			SCM,SKT,SKD			FC,FCD			—			Al 5052 / 6061 / 707		
硬度 Hardness	HRC<20			HRC 20~30			HRC<30			—			—		
切削速度 Vc	16m/min			12m/min			18m/min			30m/min			30m/min		
外徑 Diameter	S (rpm)	F (mm/min)	預留量 Stock Amount	S (rpm)	F (mm/min)	預留量 Stock Amount	S (rpm)	F (mm/min)	預留量 Stock Amount	S (rpm)	F (mm/min)	預留量 Stock Amount	S (rpm)	F (mm/min)	預留量 Stock Amount
2mm	2,550	200	0.1~0.2	1,910	100	0.1~0.2	2,870	180	0.1~0.2	4,780	480	0.1~0.2	4,780	480	0.1~0.2
4mm	1,270	200	0.1~0.2	960	100	0.1~0.2	1,430	180	0.1~0.2	2,390	480	0.1~0.2	2,390	480	0.1~0.2
5mm	1,020	160	0.1~0.2	760	80	0.1~0.2	1150	140	0.1~0.2	1,910	380	0.1~0.2	1,910	380	0.1~0.2
8mm	640	160	0.2	480	80	0.2	720	140	0.2	1,190	370	0.2~0.3	1,190	370	0.2
10mm	510	160	0.2	380	80	0.2	570	140	0.2	960	380	0.2~0.3	960	380	0.2~0.3
備註 Remarks															

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π (3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 59 鎢鋼車刀 切削條件表

SOLID CARBIDE TURNING TOOLS- TURNING CONDITION TABLE

材質 Material Group	加工材質 Material		切削速度 Vc (m/min)	每轉進給量 f (mm/rev)
P	非合金鋼 Unalloyed Steels	低碳Low Carbon	20~125	0.01~0.03
		中碳Medium Carbon	20~125	0.01~0.03
		高碳High Carbon	30~90	0.01~0.03
	合金鋼 Alloy Steels		40~80	0.01~0.03
M	不銹鋼 Stainless Steels		20~80	0.01~0.03
K	鑄鋼 Cast Steels		40~80	0.01~0.03
	鑄鐵 Cast Iron		40~110	0.01~0.03
N	非金屬 & 鋁 Non-Ferrous & Aluminium		50~110	0.01~0.03
S	高溫合金 High-Temp Alloys		15~25	0.01~0.03
	鈦 Titanium		15~25	0.01~0.03
H	高硬度材 Hard Materials		13~25	0.01~0.03

車牙進刀數 Threading Passes							
牙距 Pitch:	mm	0.5	0.7	0.8	1.0	1.25	1.5
進刀數 Number of Passes		6~12	7~14	7~16	8~18	8~20	10~22

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 60 鎢鋼多功能螺旋鑽銑牙刀(鍍膜) 切削條件表

SOLID CARBIDE THREAD MILLS- THREADING CONDITION TABLE

材料種類 Material Group	加工材質 Material		布式硬度 HB	抗拉強度 Strength (N-mm)	切削速度 Vc (m/min)	每轉進給量 f (mm/rev)		每刃進給量 fz (mm)	
						≦6mm	≦12mm	≦6mm	≦12mm
K	灰鑄鐵 Grey Cast Iron	灰鑄鐵 Grey Cast Iron	≦150	≦500	55~85	0.07~0.105	0.105~0.154	0.014~0.035	0.035~0.07
		灰鑄鐵(熱處理) Grey Cast Iron (Heat Treated)	150~300	500~1000	55~85	0.07~0.105	0.105~0.154	0.014~0.035	0.035~0.07
N	銅 Copper	短屑、黃銅、青銅 Short Chips、Brass、Bronze	≦200	≦700	—	0.07~0.21	0.042~0.07	0.021~0.042	0.042~0.07
	鋁 / 鎂 Aluminium / Magnesium	鋁、鎂(非合金) Aluminium、Magnesium Non Alloy	≦100	≦350	70~280	0.07~0.175	0.175~0.21	0.021~0.042	0.042~0.07
		鋁鑄造合金 Aluminium、Cast AlloyS (矽 Si<10%)	≦180	≦600	70~280	0.07~0.175	0.175~0.21	0.021~0.042	0.042~0.07
		鋁鑄造合金 Aluminium、Cast Alloy (矽 Si≧10%)	≦180	≦600	70~280	0.07~0.175	0.175~0.21	0.021~0.042	0.042~0.07
X	塑膠 Plastic	熱塑性塑膠 Thermoplastics	—	—	40~80	0.07~0.175	0.175~0.21	0.021~0.042	0.042~0.07
		熱固性塑膠 Thermosetting Plastic	—	—	40~70	0.07~0.175	0.175~0.21	0.021~0.042	0.042~0.07
		纖維增強塑膠 Fiber Reinforce Plastic	—	—	40~55	0.07~0.105	0.105~0.154	0.014~0.035	0.035~0.07
備註 Remarks	※ f(鑽孔)=每轉進給量(mm/rev.) ※ fz(銑削)=每刃進給量(mm)								

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π (3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 61 鎢鋼銑牙刀 切削條件表

SOLID CARBIDE THREAD MILLS- THREADING CONDITION TABLE

材質 Material Group	加工材質 Material		布式硬度 HB	直刃 Straight		螺旋刃 Helix	
				切削速度 Vc (m/min)	每刃進給量 fz (mm)	切削速度 Vc (m/min)	每刃進給量 fz (mm)
P	非合金鋼 Unalloyed steels	低碳(C=0.1~0.25%) Low carbon	125	40~140	0.008~0.08	65~200	0.024~0.12
		中碳(C=0.25~0.55%) Medium carbon	150	40~110	0.008~0.064	65~185	0.024~0.08
		高碳(C=0.55~0.85%) High carbon	170	40~100	0.008~0.04	65~160	0.024~0.064
	低合金鋼(含量5%) Low alloy steels	易切的 Non hardened	180	50~140	0.024~0.06	50~145	0.024~0.08
		調質的 Hardened	275	50~130	0.024~0.06	50~135	0.024~0.056
		調質的 Hardened	350	50~130	0.004~0.008	50~130	0.008~0.024
	高合金鋼(含量5>%) High alloy steels	退火的 Annealed	200	30~70	0.008~0.024	30~80	0.024~0.04
		淬硬的 Hardened	325	20~60	0.004~0.008	25~65	0.008~0.024
	鑄鋼 Cast steels	低合金鋼(含量≦5%) Low alloy	200	60~160	0.008~0.024	65~200	0.024~0.08
		高合金鋼(含量>5%) Hight alloy	225	50~120	0.004~0.008	50~135	0.008~0.024
M	鐵素不銹鋼 Stainless steels Feritic	易切的 Non hardened	200	40-110	0.008~0.04	50~120	0.032~0.08
		淬硬的 Hardened	330	40~90	0.004~0.008	50~95	0.008~0.04
	奧式不銹鋼 Stainless steels Austenitic	奧氏 Austenitic	180	50~100	0.006~0.016	50~110	0.032~0.08
		優良奧氏 Super Austenitic	200	40~100	0.006~0.016	50~105	0.032~0.08
	鐵素鑄造不銹鋼 Stainless steels Cast Feritic	易切的 Non hardened	200	40~120	0.008~0.024	50~130	0.032~0.08
		淬硬的 Hardened	330	40~80	0.004~0.008	50~90	0.024~0.04
	奧式鑄造不銹鋼 Stainless steels Cast Austenitic	奧氏 Austenitic	200	40~110	0.008~0.024	50~120	0.032~0.08
		淬硬的 Hardened	330	40~70	0.008~0.024	50~80	0.024~0.04
K	球墨鑄鐵 Malleabe Cast Iron	鐵素(短屑) Feritic(short chips)	130	50~120	0.004~0.008	50~55	0.008~0.024
		珠光(長屑) Pearlitic(long chips)	230	40~110	0.004~0.008	50~120	0.024~0.04
	灰鑄鐵 Grey Cast Iron	低抗拉強度 Low tensile strength	180	40~110	0.006~0.016	55~130	0.02~0.08
		高抗拉強度 Hight tensile strength	260	30~90	0.004~0.008	30~95	0.024~0.04
	可鍛造鑄鐵 Nodular SG Iron	鐵素 Feritic	160	30~80	0.006~0.016	30~90	0.04~0.08
		珠光 Pearlitic	260	30~70	0.004~0.12	30~80	0.024~0.04
N	可鍛壓鋁合金 Aluminium Alloys Wrought	鍛造 Non aging	60	120~200	0.04~0.12	160~240	0.08~0.2
		時效處理 Aged	100	80~180	0.024~0.12	120~200	0.08~0.16
	鋁合金 Aluminium Alloys	鑄造 Cast	75	60~120	0.04~0.12	80~160	0.08~0.16
		鑄造和時效 Cast & Aged	90	70~130	0.24~0.08	95~175	0.08~0.12
	鋁合金 Aluminium Alloys	鑄鋁，含矽量13~22% Cast Si	130	120~200	0.04~0.12	160~240	0.08~0.16
	銅及鋁合金 Copper & Aluminium Alloys	黃銅 Brass	90	120~200	0.04~0.12	160~240	0.08~0.2
		青銅、紫銅 Bronze & non leaded copper	100	80~180	0.024~0.08	120~200	0.08~0.16
S	高溫合金 High-Temp Alloys	退火的(鐵基)Annealed(Iron based)	200	20~40	0.006~0.016	25~50	0.032~0.08
		時效的(鐵基)Aged(Iron based)	280	15~30	0.004~0.008	15~40	0.008~0.024
		退火的(鎳或鈷基) Annealed(Nickel or Cobalt based)	250	10~20	0.004~0.008	10~30	0.008~0.024
		時效的(鎳或鈷基) Aged(Nickel or Cobalt based)	350	12~20	0.004~0.008	10~25	0.008~0.024
		純鈦(99.5%) Pure(99.5% Ti)	400Rm	20~60	0.006~0.016	30~65	0.024~0.04
		α+β 合金 α+β alloys	1050Rm	15~40	0.006~0.016	15~40	0.024~0.04
H	超硬鋼 Extra Hard Steels	調質鋼 Hardened & Tempered	45~50HRC	10~30	0.002~0.005	10~35	0.004~0.008
			50~55HRC	10~20	0.002~0.005	10~30	0.004~0.008

※ 刀具「切入進給量」建議採取低於「螺紋切削時進給量」60%。
At tools entry, set the Feed (mm) to 60% lower than the threading Feed.

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 62 鎢鋼鋸片 切削條件表

SOLID CARBIDE SLITTING SAWS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels	合金鋼 Alloy Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C	SCM,SKT,SKD	SUS304	FC,FCD	Al 5052 / 6061 / 7075	Ti-6Al-4V
硬度 Hardness	HRC<30	HRC30~45	—	HRC<30	—	HRC<30
切削速度 Vc	70~140m/min	50~80m/min	50~80m/min	70~140m/min	150~200m/min	30~70m/min
外徑 Diameter	每刃進給量 fz (mm)	每刃進給量 fz (mm)	每刃進給量 fz (mm)	每刃進給量 fz (mm)	每刃進給量 fz (mm)	每刃進給量 fz (mm)
10~30mm	0.002~0.004	0.001~0.004	0.001~0.004	0.002~0.004	0.001~0.004	0.001~0.004
30~50mm	0.003~0.007	0.002~0.005	0.002~0.005	0.003~0.007	0.002~0.005	0.002~0005
50~80mm	0.004~0.008	0.002~0.008	0.002~0.008	0.004~0.010	0.002~0.008	0.002~0.008
80~125mm	0.004~0.012	0.003~0.012	0.003~0.012	0.004~0.010	0.003~0.012	0.003~0.012
125~200mm	0.004~0.012	0.003~0.012	0.003~0.012	0.004~0.010	0.003~0.012	0.003~0.012
備註 Remarks						

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 63 高速鋼 / 高鈷鋼鋸片 切削條件表

SOLID HSS & HSS-Co SLITTING SAWS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels	合金鋼 Alloy Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C	SCM,SKT,SKD	SUS304	FC,FCD	Al 5052 / 6061 / 7075	Ti-6Al-4V
硬度 Hardness	HRC<30	HRC30~45	—	HRC<30	—	HRC<30
切削速度 Vc	50m/min	30m/min	40m/min	50m/min	100m/min	30m/min
外徑 Diameter	每刃進給量 fz (mm)	每刃進給量 fz (mm)	每刃進給量 fz (mm)	每刃進給量 fz (mm)	每刃進給量 fz (mm)	每刃進給量 fz (mm)
10~30mm	0.002~0.004	0.001~0.004	0.001~0.004	0.002~0.004	0.001~0.004	0.001~0.004
30~50mm	0.003~0.007	0.002~0.005	0.002~0.005	0.003~0.007	0.002~0.005	0.002~0005
50~80mm	0.004~0.008	0.002~0.008	0.002~0.008	0.004~0.010	0.002~0.008	0.002~0.008
80~125mm	0.004~0.012	0.003~0.012	0.003~0.012	0.004~0.010	0.003~0.012	0.003~0.012
125~200mm	0.004~0.012	0.003~0.012	0.003~0.012	0.004~0.010	0.003~0.012	0.003~0.012
備註 Remarks						

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 64 M520 極細鎢鋼高精度型球刀- 2 / 4刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		HRC45~55		HRC55~63		—		HRC<30	
切削速度 Vc	100m/min		90m/min		75m/min		60m/min		45m/min		70m/min		100m/min	
半徑 R	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
0.5R	31,850	850	28,660	680	23,890	440	19,110	230	14,330	150	22,290	320	31,850	850
1.0R	15,920	850	14,330	680	11,940	440	9,550	230	7,170	150	11,150	320	15,920	1,030
2.0R	7,960	850	7,170	690	5,970	500	4,780	300	3,580	200	5,570	410	7,960	1,030
3.0R	5,310	950	4,780	740	3,980	520	3,190	330	2,390	210	3,720	430	5,310	1,160
4.0R	3,980	1,160	3,580	870	2,990	620	2,390	360	1,790	230	2,790	510	3,980	1,430
5.0R	3,190	950	2,870	830	2,390	580	1,910	370	1,430	230	2,230	470	3,190	1,320
6.0R	2,650	980	2,390	770	1,990	540	1,590	340	1,190	220	1,860	470	2,650	1,210
8.0R	1,990	920	1,790	720	1,490	530	1,190	300	900	210	1,390	420	1,990	1,160
10.0R	1,590	850	1,430	630	1,190	500	960	280	720	190	1,120	410	1,590	1,030
切削量 Cutting Amount (mm)	Ap=0.02D Ae=0.05D													

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π (3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 65 M520 極細鎢鋼圓鼻銑刀- 2刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		HRC45~55		HRC55~63		—		HRC<30	
切削速度 Vc	95m/min		75m/min		63m/min		38m/min		28m/min		75m/min		110m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
1mm	22,400	140	19,150	110	16,130	70	8,960	60	6,720	40	19,150	110	28,220	300
2mm	12,100	180	9,680	140	8,060	100	4,840	70	3,630	50	9,680	140	14,110	330
3mm	8,460	180	6,450	150	5,240	100	3,360	70	2,500	50	6,450	150	9,680	330
4mm	6,050	180	4,840	150	4,030	110	2,420	70	1,820	60	4,840	150	7,260	330
5mm	5,040	200	3,830	150	3,220	110	2,020	80	1,510	60	3,830	150	5,650	360
6mm	4,030	200	3,220	150	2,620	110	1,620	80	1,210	60	3,220	150	4,840	400
8mm	3,020	200	2,420	180	2,020	120	1,210	80	900	60	2,420	180	3,630	400
10mm	2,420	200	1,910	180	1,620	140	980	80	730	60	1,910	180	2,820	420
12mm	2,020	200	1,620	180	1,340	140	810	80	610	60	1,620	180	2,420	450
14mm	2,020	220	1,520	190	1,280	140	810	90	610	60	1,520	190	2,240	500
16mm	1,740	250	1,340	200	1,120	160	700	100	530	70	1,340	200	2,020	540
18mm	1,740	250	1,180	200	980	160	700	100	530	70	1,180	200	1,790	540
20mm	1,340	250	1,070	200	900	160	540	100	400	70	1,070	200	1,570	540
切削量 Cutting Amount (mm)	Ap=0.5D (D<3, Ap≦0.25D)						Ap=0.1D (D<3, Ap≦0.05D)				Ap=0.5D (D<3, Ap≦0.25D)			

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 66 M520 極細鎢鋼圓鼻銑刀- 4刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		HRC45~55		HRC55~63		—		HRC<30	
切削速度 Vc	94m/min		75m/min		63m/min		37m/min		28m/min		75m/min		110m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
1mm	5,040	550	6,450	380	5,240	180	3,380	220	2,580	170	6,450	380	9,680	1,010
2mm	6,050	550	4,840	380	4,030	180	2,420	220	1,820	170	4,840	380	7,260	1,210
3mm	5,040	550	3,830	380	3,220	180	2,020	220	1,510	170	3,830	380	5,650	1,210
4mm	4,030	550	3,220	380	2,620	180	1,620	220	1,210	170	3,220	380	4,840	1,210
5mm	3,020	550	2,420	380	2,020	200	1,210	220	900	170	2,420	380	3,630	1,210
6mm	2,420	570	1,910	400	1,620	200	960	230	730	180	1,910	400	2,820	1,310
8mm	2,020	570	1,620	400	1,340	200	810	230	610	180	1,620	400	2,420	1,410
10mm	2,020	620	1,520	450	1,280	220	810	260	610	190	1,520	450	2,240	1,570
12mm	1,740	670	1,340	470	1,120	220	700	270	530	200	1,340	470	2,020	1,680
14mm	1,570	670	1,180	470	980	220	620	270	470	200	1,180	470	1,790	1,680
16mm	1,340	670	1,070	470	900	220	540	270	400	200	1,070	470	1,570	1,790
18mm	1,740	250	1,180	200	980	160	700	100	530	70	1,180	200	1,790	540
20mm	1,340	250	1,070	200	900	160	540	100	400	70	1,070	200	1,570	540
切削量 Cutting Amount (mm)	Ap=1.5D Ae≦0.1D						Ap=1D Ae≦0.05D				Ap=1.5D Ae≦0.1D			

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 67 M520 極細鎢鋼高效型銑刀- 4刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

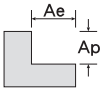
加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		不銹鋼 Stainless Steels		高溫合金 High-Temp Alloys	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SUS304		Ti-6Al-4V	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		—		HRC<30	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	7,880	550	6,410	510	5,890	390	5,590	350	5,400	330
4mm	5,810	550	4,800	580	4,430	390	4,160	390	4,050	370
5mm	4,650	550	3,830	570	3,530	410	3,340	410	3,230	400
6mm	3,860	560	3,190	480	2,960	430	2,780	430	2,700	410
8mm	2,890	450	2,400	410	2,210	410	2,100	390	2,030	380
10mm	2,330	440	1,910	410	1,760	360	1,690	360	1,610	340
12mm	1,950	420	1,610	360	1,460	350	1,390	330	1,350	330
切削量 Cutting Amount (mm)	Ap≦1D Ap(Max)=9mm						Ap≦0.5D		Ap≦0.2D	

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 68 M520 極細鎢鋼高效型銑刀- 4刃(鍍膜) 切削條件表

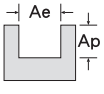
SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		不銹鋼 Stainless Steels		高溫合金 High-Temp Alloys	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SUS304		Ti-6Al-4V	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		—		HRC<30	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	9,380	830	7,160	630	6,080	470	5,740	460	5,550	410
4mm	7,310	900	5,660	740	4,800	510	4,540	530	4,390	470
5mm	5,960	980	4,610	790	3,940	540	3,710	580	3,600	500
6mm	5,060	1,200	3,940	900	3,340	670	3,150	630	3,040	520
8mm	3,790	1,160	2,960	830	2,510	610	2,360	610	2,290	510
10mm	3,080	1,090	2,400	790	2,030	540	1,910	540	1,840	480
12mm	2,550	1,050	1,990	750	1,690	540	1,580	510	1,540	450
切削量 Cutting Amount (mm)	Ap≦1.5D Ae≦0.2D						Ap≦1.5D Ae≦0.1D		Ap≦1.5D Ae≦0.05D	

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 69 M520 極細鎢鋼高效型圓鼻銑刀- 4刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		不銹鋼 Stainless Steels		高溫合金 High-Temp Alloys	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SUS304		Ti-6Al-4V	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		—		HRC<30	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	7,880	550	6,410	510	5,890	390	5,590	350	5,400	330
4mm	5,810	550	4,800	580	4,430	390	4,160	390	4,050	370
5mm	4,650	550	3,830	570	3,530	410	3,340	410	3,230	400
6mm	3,860	560	3,190	480	2,960	430	2,780	430	2,700	410
8mm	2,890	450	2,400	410	2,210	410	2,100	390	2,030	380
10mm	2,330	440	1,910	410	1,760	360	1,690	360	1,610	340
12mm	1,950	420	1,610	360	1,460	350	1,390	330	1,350	330
切削量 Cutting Amount (mm)	Ap≦1D Ap(Max)=9mm						Ap≦0.5D		Ap≦0.2D	

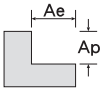
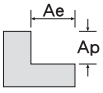
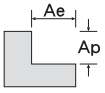
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 70 M520 極細鎢鋼高效型圓鼻銑刀- 4刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

側銑加工 Side Milling

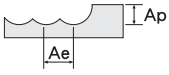
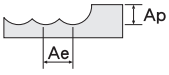
加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		不銹鋼 Stainless Steels		高溫合金 High-Temp Alloys	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SUS304		Ti-6Al-4V	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		—		HRC<30	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	9,380	830	7,160	630	6,080	470	5,740	460	5,550	410
4mm	7,310	900	5,660	740	4,800	510	4,540	530	4,390	470
5mm	5,960	980	4,610	790	3,940	540	3,710	580	3,600	500
6mm	5,060	1,200	3,940	900	3,340	670	3,150	630	3,040	520
8mm	3,790	1,160	2,960	830	2,510	610	2,360	610	2,290	510
10mm	3,080	1,090	2,400	790	2,030	540	1,910	540	1,840	480
12mm	2,550	1,050	1,990	750	1,690	540	1,580	510	1,540	450
切削量 Cutting Amount (mm)	Ap≦1.5D Ae≦0.2D 						Ap≦1.5D Ae≦0.1D 		Ap≦1.5D Ae≦0.05D 	

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 71 M520 極細鎢鋼高效型球刀- 4刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

溝銑加工 Slot Milling

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		不銹鋼 Stainless Steels		鈦合金 Titanium Alloys		鎳基合金 Ni-Based Alloys	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SUS304		Ti-6Al-4V		Inconel 718	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		—		HRC<30		HRC<30	
半徑 R	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
2.5R	5,565	910	4,305	735	3,675	508	3,465	543	3,360	469	1,715	172
3.0R	4,725	1,120	3,675	840	3,115	623	2,940	585	2,835	487	1,470	175
4.0R	3,535	1,085	2,765	770	2,345	571	2,205	567	2,135	473	1,120	158
5.0R	2,870	1,015	2,240	735	1,890	508	1,785	501	1,715	445	875	151
6.0R	2,380	980	1,855	700	1,575	504	1,470	473	1,435	424	735	147
8.0R	1,785	840	1,400	658	1,190	445	1,120	389	1,085	354	536	147
10.0R	1,435	690	1,120	529	945	413	875	361	875	322	445	140
切削量 Cutting Amount (mm)	Ap=1D Ae=0.5D 						Ap=1D Ae=0.4D		Ap=1D Ae=0.2D 			

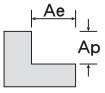
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

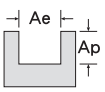
Table 72 S220 鎢鋼鋁用強力型銑刀- 3刃(白刀) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

側銑加工 Side Milling

加工材質 Material	鋁合金 Aluminum Alloys		銅合金 Copper Alloys	
工件料號 Material Code	Al 5052 / 6061 / 7075		C1100	
硬度 Hardness	—		—	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	18,000	810	7,200	290
4mm	13,500	950	5,400	320
5mm	10,800	990	4,320	340
6mm	9,000	1,080	3,600	360
8mm	7,200	1,170	2,700	410
10mm	5,760	1,260	2,030	430
12mm	4,680	1,350	1,710	460
16mm	3,510	1,350	1,260	460
切削量 Cutting Amount (mm)	Ap=1.5D Ae=0.1D			

溝銑加工 Slot Milling

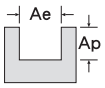
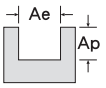
加工材質 Material	鋁合金 Aluminum Alloys		銅合金 Copper Alloys	
工件料號 Material Code	Al 5052 / 6061 / 7075		C1100	
硬度 Hardness	—		—	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	17,100	590	7,110	270
4mm	13,050	620	5,310	290
5mm	10,350	630	4,230	320
6mm	8,100	720	3,510	330
8mm	7,160	750	2,610	380
10mm	5,670	850	2,070	410
12mm	4,590	900	1,710	440
16mm	3,470	900	1,260	430
切削量 Cutting Amount (mm)	Ap=0.5D			

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 73 M520 極細鎢鋼銑刀- 2刃(鍍膜) 切削條件表

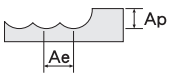
SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron		鋁合金,銅合金 Aluminum/ Copper	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SUS304		FC,FCD		—	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		HRC45~55		—		HRC<30		—	
切削速度 Vc	102m/min		81m/min		67m/min		40m/min		80m/min		118m/min		30m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
1mm	11,340	130	25,650	110	21,600	70	12,000	60	25,650	110	37,800	300	9,000	40
2mm	16,200	170	12,960	130	10,800	90	6,480	70	12,960	130	18,900	320	4,860	50
3mm	11,340	170	8,640	150	7,020	100	4,500	70	8,640	150	12,960	320	3,350	50
4mm	8,100	180	6,480	150	5,400	110	3,240	70	6,480	150	9,720	320	2,430	60
5mm	6,750	200	5,130	150	4,320	110	2,700	80	5,130	150	7,560	360	2,030	60
切削量 Cutting Amount (mm)	Ap=0.3D (D<3, Ap≦0.15D)						Ap=0.06D (D<3, Ap≦0.03D)		Ap=0.3D (D<3, Ap≦0.15D)				Ap=0.06D (D<3, Ap≦0.03D)	

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 74 M520 極細鎢鋼長頸型球刀- 2 / 4刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

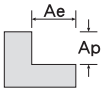
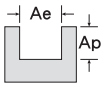
加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SKT,SKD		SUS304		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		HRC45~55		HRC55~63		—		HRC<30	
切削速度 Vc	90m/min		75m/min		65m/min		50m/min		35m/min		55m/min		90m/min	
半徑 R	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
0.50R	28,660	790	23,890	600	20,700	500	15,920	350	11,150	200	17,520	400	28,660	870
0.75R	19,110	820	15,920	650	13,800	540	10,620	370	7,430	200	11,680	400	19,110	900
1.00R	14,330	820	11,940	680	10,350	570	7,960	370	5,570	200	8,760	430	14,330	900
1.25R	11,470	820	9,550	680	8,280	570	6,370	370	4,460	200	7,010	430	11,470	900
1.50R	9,550	820	7,960	680	6,900	570	5,310	370	3,720	200	5,840	430	9,550	900
2.00R	7,170	820	5,970	680	5,180	570	3,980	370	2,790	200	4,380	430	7,170	900
切削量 Cutting Amount (mm)	Ap=0.02D Ae=0.05D													

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 75 M520 極細鎢鋼不銹鋼用高導型銑刀- 4刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	不銹鋼 Stainless Steels			
工件料號 Material Code	SUS304			
硬度 Hardness	—			
切削速度 Vc	70m/min			
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
1mm	22,290	300~1,000	22,290	100~200
2mm	11,146	300~1,000	11,146	100~200
3mm	7,430	300~1,000	7,430	100~200
4mm	5,570	300~1,000	5,570	100~200
5mm	4,460	500~1,000	4,460	200~300
6mm	3,720	500~1,200	3,720	200~300
7mm	3,190	500~1,200	3,190	300~400
8mm	2,790	500~1,100	2,790	300~400
10mm	2,230	500~1,100	2,230	300~400
12mm	1,860	600~800	1,860	250~300
14mm	1,590	600~800	1,590	250~300
15mm	1,490	400~600	1,490	250~300
16mm	1,390	400~600	1,390	250~300
18mm	1,240	300~500	1,240	100~250
20mm	1,120	300~500	1,120	100~250
25mm	890	300~500	890	100~250
切削量 Cutting Amount (mm)	Ap≦0.5D Ae=0.1~0.5D 		Ap≦0.5D 	

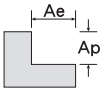
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π (3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

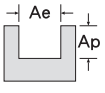
Table 76 S220 鎢鋼鋁用高效型銑刀- 3刃(白刀) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

側銑加工 Side Milling

加工材質 Material	鋁合金 Aluminum Alloys	
工件料號 Material Code	Al 5052 / 6061 / 7075	
硬度 Hardness	—	
切削速度 Vc	180m/min	
外徑 Diameter	S (rpm)	F (mm/min)
3mm	19,100	970
4mm	14,330	1,140
5mm	11,460	1,200
6mm	9,550	1,300
8mm	7,170	1,400
10mm	5,730	1,500
12mm	4,780	1,600
16mm	3,580	1,600
切削量 Cutting Amount (mm)	Ap=1.5D Ae=0.1~0.5D	

溝銑加工 Slot Milling

加工材質 Material	鋁合金 Aluminum Alloys	
工件料號 Material Code	Al 5052 / 6061 / 7075	
硬度 Hardness	—	
切削速度 Vc	180m/min	
外徑 Diameter	S (rpm)	F (mm/min)
3mm	19,100	700
4mm	14,330	740
5mm	11,460	760
6mm	9,550	860
8mm	7,170	900
10mm	5,730	1,020
12mm	4,780	1,080
16mm	3,580	1,080
切削量 Cutting Amount (mm)	Ap=0.5D	

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 77 鎢鋼多功能單 / 雙牙鑽銑牙刀 切削條件表

SOLID CARBIDE THREAD MILLS- THREADING CONDITION TABLE

材質 Material Group	加工材質 Material		硬度 Hardness	MSHIA		MSHDIA	
				切削速度 Vc (m/min)	每刃進給量 fz (mm)	切削速度 Vc (m/min)	每刃進給量 fz (mm)
P	碳素鋼 Carbon Steels	S35C,S45C,S50C	HRC<20	—	—	65~200	0.008~0.01
	合金鋼 Alloy Steels	SCM,SKT,SKD	HRC20~30	—	—	65~185	0.005~0.008
	合金鋼 Alloy Steels	SCM,SKT,SKD	HRC30~45	—	—	65~160	0.004~0.005
M	不銹鋼 Stainless Steels	SUS304	—	—	—	50~100	0.004~0.008
K	鑄鐵 Cast Iron	FC,FCD	HRC<30	—	—	40~110	0.004~0.008
N	鋁合金 Aluminum Alloys	Al 5052 / 6061 / 7075	—	60~120	0.007~0.08	—	—

※ 刀具「切入進給量」建議採取低於「螺紋切削時進給量」60%。
At tools entry, set the Feed (mm) to 60% lower than the threading Feed.

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 78 CDSF 鎢鋼標準型同柄鑽頭- 2刃(5倍長)(鍍膜) 切削條件表

SOLID CARBIDE DRILLS- DRILLING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SUS304		FC/FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		—		HRC<30	
切削速度 Vc	90m/min		65m/min		50m/min		40m/min		80m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	9,550	830	6,900	620	5,310	410	4,250	230	8,490	860
5mm	5,730	620	4,140	460	3,190	320	2,550	170	5,100	840
8mm	3,580	570	2,590	440	1,990	290	1,590	160	3,190	810
10mm	2,870	530	2,070	390	1,590	260	1,270	140	2,550	800
12mm	2,390	470	1,730	350	1,330	230	1,060	140	2,120	800
16mm	1,790	400	1,290	310	1,000	210	800	110	1,590	790
備註 Remarks	※ 未鍍膜鑽頭，請依照上表，減少30%左右轉速和進給量。 Uncoated Drills Reduce 30% RPM & FEED From Coating One.									

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = f(每轉進給量) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 79 鎢鋼平底型鑽頭- 2刃 切削條件表

SOLID CARBIDE DRILLS- DRILLING CONDITION TABLE

鋁合金加工 For Aluminum Alloy Machining

加工材質 Material	鋁合金 Aluminum Alloys	
工件料號 Material Code	Al 6061	
硬度 Hardness	—	
切削速度 Vc	100m/min	
外徑 Diameter	S (rpm)	F (mm/min)
2mm	16,700	350
3mm	10,620	400
4mm	7,960	400
5mm	6,370	400
6mm	5,310	500
8mm	4,000	500
10mm	3,180	600
12mm	2,650	600
16mm	1,990	550
20mm	1,590	550
切削量 Cutting Amount (mm)	Ap≦3D 	
備註 Remarks	※ 加工工件斜度(θ)在30°以下，建議使用進給速度(F)40~60%。 When drilling incline angle is less than 30°, reduce the feed rate to 40~60%. ※ 加工工件斜度在(θ)30°以上，建議使用主軸轉速(S)60~80%和進給速度(F)40~60%以下。 When drilling incline angle is over 30°, reduce the spindle speed to 60~80%, the feed rate to 40~60%.	

鋼材加工 For Steel Machining

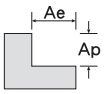
加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		鑄鐵 Cast Iron	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		FC,FCD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		HRC<30	
切削速度 Vc	75m/min		65m/min		35m/min		65m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
2mm	11,100	350	10,550	300	5,550	150	10,550	250
3mm	7,950	400	6,900	350	3,700	170	6,900	300
4mm	5,950	400	5,150	350	2,800	170	5,150	300
5mm	4,800	420	4,150	350	2,200	170	4,150	300
6mm	4,000	420	3,450	350	1,800	170	3,450	300
8mm	3,000	420	2,600	350	1,400	170	2,600	300
10mm	2,400	420	2,050	350	1,100	170	2,050	300
12mm	2,000	420	1,700	350	950	170	1,700	300
16mm	1,500	350	1,300	300	700	150	1,300	280
20mm	1,200	350	1,050	300	550	150	1,050	280
切削量 Cutting Amount (mm)	Ap≦3D							
備註 Remarks	※ 加工工件斜度(θ)在30°以下，建議使用進給速度(F)40~60%。 When drilling incline angle is less than 30°, reduce the feed rate to 40~60%. ※ 加工工件斜度在(θ)30°以上，建議使用主軸轉速(S)60~80%和進給速度(F)40~60%以下。 When drilling incline angle is over 30°, reduce the spindle speed to 60~80%, the feed rate to 40~60%.							

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = f(每轉進給量) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 80 鎢鋼複合材料用銑刀- DIA鑽石塗層- 切削條件表

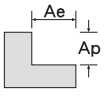
SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	非金屬 Non-metal			
工件料號 Material Code	碳纖維 Carbon Fiber CFRP		玻璃纖維 Glass Fiber GFRP	
硬度 Hardness	—		—	
切削速度 Vc	100m/min		70m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3	10,610	640	7,430	450
4	7,960	720	5,570	500
5	6,370	960	4,450	670
6	5,310	1,110	3,710	780
8	3,980	1,310	2,780	910
10	3,180	1,530	2,230	1,060
12	2,650	1,700	1,860	1,190
切削量 Cutting Amount (mm)	Ap≦2D Ae≦0.35D			

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 81 鎢鋼複合材料用銑刀- RD彩鑽塗層- 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	非金屬 Non-metal			
工件料號 Material Code	碳纖維 Carbon Fiber CFRP		玻璃纖維 Glass Fiber GFRP	
硬度 Hardness	—		—	
切削速度 Vc	100m/min		70m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3	10,610	260	7,430	180
4	7,960	290	5,570	200
5	6,370	380	4,450	270
6	5,310	440	3,710	310
8	3,980	520	2,780	360
10	3,180	610	2,230	420
12	2,650	680	1,860	480
切削量 Cutting Amount (mm)	Ap≦2D Ae≦0.35D			

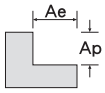
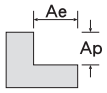
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

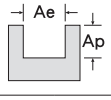
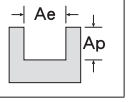
Table 82 M520 極細鎢鋼不等距高導型銑刀- 4刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

側銑加工 Side Milling

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		HRC45~55	
切削速度 Vc	110m/min		90m/min		75m/min		70m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	11,670	770	9,550	580	7,960	430	7,430	380
4mm	8,750	840	7,160	680	5,970	470	5,570	440
5mm	7,000	910	5,730	730	4,770	500	4,450	460
6mm	5,830	1,120	4,770	840	3,980	620	3,710	480
8mm	4,370	1,080	3,580	770	2,980	570	2,780	470
10mm	3,500	1,010	2,860	730	2,380	500	2,220	440
12mm	2,910	980	2,380	700	1,990	500	1,850	420
16mm	2,180	840	1,790	650	1,490	440	1,390	350
20mm	1,750	680	1,430	520	1,190	410	1,110	320
25mm	1,400	610	1,140	470	955	370	890	270
切削量 Cutting Amount (mm)	Ap≦1.5D Ae≦0.2D						Ap≦1.5D Ae≦0.05D	

溝銑加工 Slot Milling

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		HRC45~55	
切削速度 Vc	95m/min		75m/min		70m/min		60m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	10,080	510	7,960	480	7,430	360	6,360	310
4mm	7,560	510	5,970	540	5,570	360	4,770	340
5mm	6,050	510	4,770	530	4,450	380	3,820	370
6mm	5,040	520	3,980	440	3,710	400	3,180	380
8mm	3,780	420	2,980	390	2,780	390	2,380	360
10mm	3,020	410	2,380	380	2,220	340	1,910	320
12mm	2,520	390	1,990	330	1,850	320	1,590	300
16mm	1,890	380	1,490	300	1,390	260	1,190	250
20mm	1,510	330	1,190	270	1,110	250	955	230
25mm	1,210	320	950	250	890	220	760	160
切削量 Cutting Amount (mm)	Ap≦1D						Ap≦0.2D	

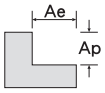
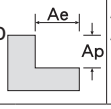
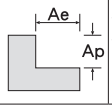
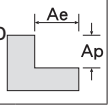
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π (3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

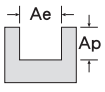
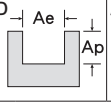
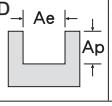
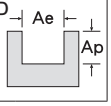
Table 83 M520 極細鎢鋼鈦合金用高效型銑刀- 4刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

側銑加工 Side Milling

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels		高溫合金 High-Temp Alloys	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SUS304		Ti-6Al-4V	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		HRC45~55		—		HRC<30	
切削速度 Vc	110m/min		90m/min		75m/min		70m/min		70m/min		35m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	11,670	1,100	9,550	840	7,960	620	7,430	540	7,430	610	3,710	220
4mm	8,750	1,200	7,160	980	5,970	680	5,570	630	5,570	710	2,780	240
5mm	7,000	1,300	5,730	1,050	4,770	720	4,450	670	4,450	770	2,220	240
6mm	5,830	1,600	4,770	1,200	3,980	890	3,710	690	3,710	830	1,850	250
8mm	4,370	1,550	3,580	1,100	2,980	810	2,780	670	2,780	810	1,390	220
10mm	3,500	1,450	2,860	1,050	2,380	720	2,220	630	2,220	710	1,110	210
12mm	2,910	1,400	2,380	1,000	1,990	720	1,850	600	1,850	675	920	210
16mm	2,180	1,200	1,790	940	1,490	630	1,390	500	1,390	550	690	210
20mm	1,750	980	1,430	750	1,190	590	1,110	460	1,110	510	550	200
25mm	1,400	880	1,140	670	955	530	890	390	890	480	440	180
切削量 Cutting Amount (mm)	Ap≦1.5D Ae≦0.2D 						Ap≦1.5D Ae≦0.05D 		Ap≦1.5D Ae≦0.1D 		Ap≦1.5D Ae≦0.05D 	

溝銑加工 Slot Milling

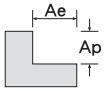
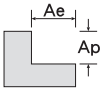
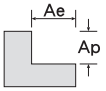
加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels		高溫合金 High-Temp Alloys	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SUS304		Ti-6Al-4V	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		HRC45~55		—		HRC<30	
切削速度 Vc	95m/min		75m/min		70m/min		60m/min		60m/min		20m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
3mm	10,080	730	7,960	680	7,430	520	6,360	440	6,360	460	2,120	120
4mm	7,560	730	5,970	770	5,570	520	4,770	490	4,770	510	1,590	130
5mm	6,050	730	4,770	750	4,450	540	3,820	530	3,820	540	1,270	140
6mm	5,040	740	3,980	630	3,710	570	3,180	540	3,180	570	1,060	140
8mm	3,780	600	2,980	550	2,780	550	2,380	510	2,380	520	790	150
10mm	3,020	580	2,380	540	2,220	480	1,910	450	1,910	470	630	140
12mm	2,520	560	1,990	470	1,850	460	1,590	430	1,590	440	530	140
16mm	1,890	550	1,490	430	1,390	370	1,190	360	1,190	370	390	110
20mm	1,510	470	1,190	380	1,110	350	955	330	955	330	310	110
25mm	1,210	450	950	360	890	310	760	230	760	280	250	100
切削量 Cutting Amount (mm)	Ap≦1D 						Ap≦0.2D 		Ap≦0.5D 		Ap≦0.2D 	

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π (3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 84 M520 極細鎢鋼高硬型銑刀- 6刃(鍍膜) 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		不銹鋼 Stainless Steels	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SUS304	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		—	
切削速度 Vc	110m/min		95m/min		75m/min		75m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
6mm	5,840	1,060	5,040	900	3,980	710	3,980	540
8mm	4,380	1,050	3,780	840	2,990	690	2,990	530
10mm	3,500	970	3,030	780	2,390	610	2,390	480
12mm	2,920	900	2,520	760	1,990	1,120	1,990	450
16mm	2,190	810	1,890	700	1,490	980	1,490	390
切削量 Cutting Amount (mm)	Ae=0.03D~0.1D 				Ae=0.02D~0.1D 		Ae=0.02D~0.05D 	

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = f(每轉進給量) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 86 JDG 粉末高速鋼鑽頭- 2刃(3倍長)(鍍膜) 切削條件表

POWDER HIGH SPEED STEEL DRILLS- DRILLING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		合金鋼 Alloy Steels		不銹鋼 Stainless Steels		鑄鐵 Cast Iron		鋁合金 Aluminum Alloys	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SCM,SKT,SKD		SUS304		FC,FCD		Al 5052 / 6061 / 7075	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		—		HRC<30		—	
切削速度 Vc	35m/min		30m/min		20m/min		10m/min		40m/min		60m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
1mm	9,500	250	8,000	190	6,370	140	3,500	65	12,000	400	15,000	500
2mm	5,570	360	4,780	240	3,190	160	1,900	80	6,370	490	9,550	760
3mm	3,720	460	3,190	320	2,120	170	1,300	80	4,250	640	6,370	980
4mm	2,790	430	2,390	290	1,590	165	800	80	3,190	600	4,780	920
5mm	2,230	430	1,910	290	1,270	165	760	80	2,550	600	3,820	920
6mm	1,860	370	1,590	250	10,60	150	530	80	2,120	530	3,190	790
7mm	1,590	370	1,370	250	910	150	500	65	1,820	530	2,730	790
8mm	1,400	370	1,190	250	800	150	480	65	1,590	530	2,390	790
9mm	1,240	340	1,060	230	710	140	390	65	1,420	460	2,120	730
10mm	1,120	340	960	230	640	140	380	65	1,270	460	1,910	730
11mm	1,010	310	870	210	580	130	350	70	1,160	430	1,740	670
12mm	930	310	800	210	530	130	320	70	1,060	430	1,590	670
13mm	860	290	740	200	490	120	290	70	980	390	1,470	610
14mm	800	290	680	200	460	120	270	70	910	390	1,370	610
15mm	740	290	640	200	430	120	250	65	850	390	1,270	610
16mm	700	290	600	200	400	120	240	65	800	390	1,190	610
17mm	660	260	560	180	380	110	220	65	750	350	1,120	550
18mm	620	260	530	180	350	110	210	60	710	350	1,060	550
19mm	590	260	500	180	340	110	200	60	670	350	1,010	550
20mm	560	260	480	180	320	110	190	60	640	350	960	550
備註 Remarks	※ 加工3字頭不銹鋼建議使用程式碼G83(啄鑽工序)進行加工。 For machining stainless steel(300 series), code G83(peck drilling) are recommended.											

Table 87 鎢鋼端面槽刀 切削條件表

SOLID CARBIDE TURNING TOOLS- TURNING CONDITION TABLE

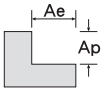
加工材質 Material	碳素鋼 Carbon Steels	碳素鋼 Carbon Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C	S35C,S45C,S50C	SUS304	FC,FCD	Al 5052 / 6061 / 7075	Ti-6Al-4V
硬度 Hardness	HRC<30	HRC30~45	—	HRC<30	—	HRC<30
切削速度 Vc	40~100m/min	30~80m/min	30~80m/min	40~100m/min	50~120m/min	20~40m/min
每轉進給量 f (mm)	0.01~0.04	0.01~0.03	0.01~0.03	0.01~0.04	0.02~0.05	0.005~0.030
備註 Remarks						

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = f(每轉進給量) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 150 ELN / HLN / FLN 高進給型銑刀桿 切削條件表

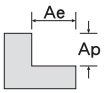
HIGH FEED MILLING CUTTERS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~50	—	HRC<30	HRC<30
切削速度 Vc	120~250m/min	50~120m/min	100~180m/min	120~250m/min	50~100m/min
每刃進給量 fz (mm)	0.3~1.6	0.3~1.0	0.3~1.2	0.3~1.6	0.3~0.8
加工深度 Ap (mm)	0.3~0.9	0.3~0.7	0.3~0.9	0.3~0.9	0.3~0.7
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 151 ELO / HLO / FLO 高進給型銑刀桿 切削條件表

HIGH FEED MILLING CUTTERS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~50	—	HRC<30	HRC<30
切削速度 Vc	120~250m/min	50~120m/min	100~180m/min	120~250m/min	50~100m/min
每刃進給量 fz (mm)	0.3~1.6	0.3~1.0	0.3~1.2	0.3~1.6	0.3~0.8
加工深度 Ap (mm)	0.3~0.9	0.3~0.7	0.3~0.9	0.3~0.9	0.3~0.7
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

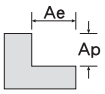
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

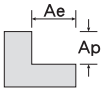
Table 152 EBN / HBN / FBN 高進給型銑刀桿 切削條件表

HIGH FEED MILLING CUTTERS- CUTTING CONDITION TABLE

使用銑刀片型號：BNMX0603 For BNMX0603 Inserts

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	120~250m/min	50~120m/min	100~180m/min	120~250m/min	50~100m/min
每刃進給量 fz (mm)	0.3~1.6	0.3~1.0	0.3~1.2	0.3~1.6	0.3~0.8
加工深度 Ap (mm)	0.3~0.9	0.3~0.7	0.3~0.9	0.3~0.9	0.3~0.7
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

使用銑刀片型號：BNMX0904 For BNMX0904 Inserts

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	120~250m/min	50~120m/min	100~180m/min	120~250m/min	50~100m/min
每刃進給量 fz (mm)	0.3~1.8	0.3~1.2	0.3~1.4	0.3~1.8	0.3~1.0
加工深度 Ap (mm)	0.3~1.4	0.3~1.2	0.3~1.2	0.3~1.4	0.3~1.2
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

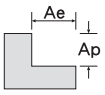
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

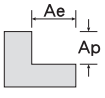
Table 153 EWN / FWN 高進給型銑刀桿 切削條件表

HIGH FEED MILLING CUTTERS- CUTTING CONDITION TABLE

使用銑刀片型號：WNMX09T3 For WNMX09T3 Inserts

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	120~250m/min	50~120m/min	100~180m/min	120~250m/min	50~100m/min
每刃進給量 fz (mm)	0.3~1.5	0.3~1.1	0.3~1.2	0.3~1.5	0.3~1.0
加工深度 Ap (mm)	0.40~1.35	0.4~1.0	0.4~1.0	0.40~1.35	0.4~1.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

使用銑刀片型號：WNMX1305 For WNMX1305 Inserts

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	120~250m/min	50~120m/min	100~180m/min	120~250m/min	50~100m/min
每刃進給量 fz (mm)	0.3~1.7	0.3~1.3	0.3~1.4	0.3~1.7	0.3~1.2
加工深度 Ap (mm)	0.4~1.7	0.4~1.3	0.4~1.4	0.4~1.7	0.4~1.3
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

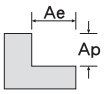
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

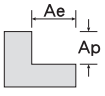
Table 154 FJD 高進給型銑刀盤 切削條件表

HIGH FEED FACE MILLING CUTTERS- CUTTING CONDITION TABLE

使用銑刀片型號：JDMW1204 For JDMW1204 Inserts

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	120~250m/min	50~120m/min	100~180m/min	120~250m/min	50~100m/min
每刃進給量 fz (mm)	0.3~1.3	0.3~1.0	0.3~1.0	0.3~1.3	0.3~1.0
加工深度 Ap (mm)	0.3~1.5	0.3~1.0	0.3~1.0	0.3~1.5	0.3~1.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

使用銑刀片型號：JDMW1405 For JDMW1405 Inserts

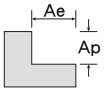
加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	120~250m/min	50~120m/min	100~180m/min	120~250m/min	50~100m/min
每刃進給量 fz (mm)	0.3~1.5	0.3~1.2	0.3~1.2	0.3~1.5	0.3~1.2
加工深度 Ap (mm)	0.5~2.0	0.5~1.5	0.5~1.5	0.5~2.0	0.5~1.5
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 155 FSD 高進給型銑刀盤 切削條件表

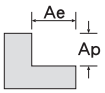
HIGH FEED FACE MILLING CUTTERS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	120~250m/min	50~120m/min	100~180m/min	120~250m/min	50~100m/min
每刃進給量 fz (mm)	0.3~1.5	0.3~1.2	0.3~1.2	0.3~1.5	0.3~1.2
加工深度 Ap (mm)	0.3~1.5	0.3~1.0	0.3~1.0	0.3~1.5	0.3~1.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 156 FHN 面銑刀盤 切削條件表

FACE MILLING CUTTERS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	60~140m/min	100~250m/min	40~80m/min
每刃進給量 fz (mm)	0.1~0.3	0.08~0.25	0.1~0.3	0.08~0.20
加工深度 Ap (mm)	0.3~3.5	0.3~2.0	0.3~3.5	0.3~2.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 			

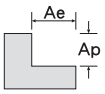
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

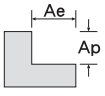
Table 157 FSN / FON 面銑刀盤 切削條件表

FACE MILLING CUTTERS- CUTTING CONDITION TABLE

使用銑刀片型號：SNMX1205 For SNMX1205 Inserts

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	80~200m/min	40~80m/min	60~120m/min	80~200m/min	40~70m/min
每刃進給量 fz (mm)	0.1~0.3	0.08~0.25	0.08~0.25	0.1~0.3	0.08~0.20
加工深度 Ap (mm)	0.3~5.0	0.3~2.0	0.3~3.5	0.3~5.0	0.3~2.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

使用銑刀片型號：ONMX0505 For ONMX0505 Inserts

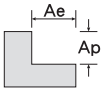
加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	80~200m/min	40~80m/min	60~120m/min	80~200m/min	40~70m/min
每刃進給量 fz (mm)	0.1~0.3	0.08~0.25	0.08~0.25	0.1~0.3	0.08~0.20
加工深度 Ap (mm)	0.3~2.0	0.3~1.5	0.3~1.5	0.3~2.0	0.3~1.5
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 158 FOF 面銑刀盤 切削條件表

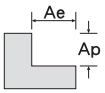
FACE MILLING CUTTERS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	80~160m/min	100~250m/min	50~100m/min
每刃進給量 fz (mm)	0.1~0.3	0.08~0.25	0.08~0.25	0.1~0.3	0.08~0.25
加工深度 Ap (mm)	0.3~2.8	0.3~1.7	0.3~1.7	0.3~2.8	0.3~1.7
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 159 FSE..12 面銑刀盤 切削條件表

FACE MILLING CUTTERS- CUTTING CONDITION TABLE

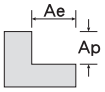
加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Al 5052 / 6061 / 7075	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	—	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	80~160m/min	100~250m/min	150~300m/min	50~100m/min
每刃進給量 fz (mm)	0.1~0.3	0.08~0.25	0.08~0.25	0.1~0.3	0.1~0.4	0.08~0.25
加工深度 Ap (mm)	0.3~4.0	0.3~2.0	0.3~3.0	0.3~4.0	0.3~4.0	0.3~2.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 					

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 160 FSE..13 面銑刀盤 切削條件表

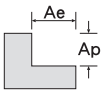
FACE MILLING CUTTERS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Al 5052 / 6061 / 7075	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	—	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	80~160m/min	100~250m/min	150~300m/min	50~100m/min
每刃進給量 fz (mm)	0.1~0.3	0.08~0.25	0.08~0.25	0.1~0.3	0.1~0.4	0.08~0.25
加工深度 Ap (mm)	0.3~4.0	0.3~2.0	0.3~3.0	0.3~4.0	0.3~4.0	0.3~2.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 					

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 161 FSP 面銑刀盤 切削條件表

FACE MILLING CUTTERS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels	合金鋼 Alloy Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron
工件料號 Material Code	S35C,S45C,S50C	SCM,SKT,SKD	SUS304	FC,FCD
硬度 Hardness	HRC<30	HRC30~45	—	HRC<30
切削速度 Vc	100~200m/min	80~150m/min	80~160m/min	100~200m/min
每刃進給量 fz (mm)	0.1~0.3	0.05~0.20	0.1~0.3	0.1~0.3
加工深度 Ap (mm)	0.5~2.5	0.5~2.0	0.5~2.5	0.5~2.5
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 			

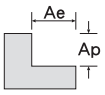
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

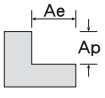
Table 162 EXN / HXN / FXN 直角型銑刀桿 切削條件表

SHOULDER MILLING CUTTERS- CUTTING CONDITION TABLE

使用銑刀片型號：XNMX0403 For XNMX0403 Inserts

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	80~180m/min	100~250m/min	50~100m/min
每刃進給量 fz (mm)	0.10~0.16	0.08~0.12	0.08~0.12	0.10~0.16	0.08~0.12
加工深度 Ap (mm)	0.3~3.0	0.3~1.5	0.3~1.5	0.3~3.0	0.3~1.5
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

使用銑刀片型號：XNMX0806 For XNMX0806 Inserts

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	80~180m/min	100~250m/min	50~100m/min
每刃進給量 fz (mm)	0.1~0.2	0.08~0.15	0.08~0.15	0.1~0.2	0.08~0.15
加工深度 Ap (mm)	0.3~4.0	0.3~2.0	0.3~2.0	0.3~4.0	0.3~2.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

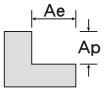
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

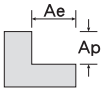
Table 163 EAP / HAP / FAP 直角型銑刀桿 切削條件表

SHOULDER MILLING CUTTERS- CUTTING CONDITION TABLE

使用銑刀片型號：APKT1003 For APKT1003 Inserts

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Al 5052 / 6061 / 7075	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	—	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	80~160m/min	100~250m/min	150~300m/min	50~100m/min
每刃進給量 fz (mm)	0.10~0.25	0.07~0.15	0.08~0.18	0.10~0.25	0.10~0.25	0.07~0.15
加工深度 Ap (mm)	0.3~3.0	0.3~1.0	0.3~2.0	0.3~3.0	0.3~4.0	0.3~1.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 					

使用銑刀片型號：APKT1604, APET1604 For APKT1604 & APET1604 Inserts

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Al 5052 / 6061 / 7075	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	—	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	80~160m/min	100~250m/min	150~300m/min	50~100m/min
每刃進給量 fz (mm)	0.1~0.3	0.1~0.2	0.10~0.22	0.1~0.3	0.1~0.3	0.1~0.2
加工深度 Ap (mm)	0.5~3.0	0.5~1.0	0.5~2.0	0.5~3.0	0.5~4.0	0.5~1.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 					

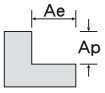
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14) F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

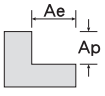
Table 164 EAP / HAP / FAP 直角型銑刀桿 切削條件表

SHOULDER MILLING CUTTERS- CUTTING CONDITION TABLE

使用銑刀片型號：APMT1035 / APMT1135 For APMT1035 / APMT1135 Inserts

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Al 5052 / 6061 / 7075	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	—	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	80~160m/min	100~250m/min	—	50~100m/min
每刃進給量 fz (mm)	0.10~0.25	0.07~0.15	0.08~0.18	0.10~0.25	—	0.07~0.15
加工深度 Ap (mm)	0.3~3.0	0.3~1.0	0.3~2.0	0.3~3.0	—	0.3~1.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 					

使用銑刀片型號：APMT1604, APGT1604 For APMT1604 & APGT1604 Inserts

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Al 5052 / 6061 / 7075	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	—	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	80~160m/min	100~250m/min	150~300m/min	50~100m/min
每刃進給量 fz (mm)	0.1~0.3	0.1~0.2	0.10~0.22	0.1~0.3	0.1~0.3	0.1~0.2
加工深度 Ap (mm)	0.5~3.0	0.5~1.0	0.5~2.0	0.5~3.0	0.5~4.0	0.5~1.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 					

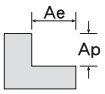
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14) F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

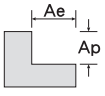
Table 165 EAX / HAX / FAX 直角型銑刀桿 切削條件表

SHOULDER MILLING CUTTERS- CUTTING CONDITION TABLE

使用銑刀片型號：AXMT1235 For AXMT1235 Inserts

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	80~160m/min	100~250m/min	50~100m/min
每刃進給量 fz (mm)	0.10~0.25	0.07~0.15	0.08~0.18	0.10~0.25	0.07~0.15
加工深度 Ap (mm)	0.3~3.0	0.3~1.0	0.3~2.0	0.3~3.0	0.3~1.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

使用銑刀片型號：AXMT1705 For AXMT1705 Inserts

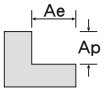
加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	80~160m/min	100~250m/min	50~100m/min
每刃進給量 fz (mm)	0.1~0.3	0.1~0.2	0.10~0.22	0.1~0.3	0.1~0.2
加工深度 Ap (mm)	0.5~3.0	0.5~1.0	0.5~2.0	0.5~3.0	0.5~1.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 166 EJD 直角型銑刀桿 切削條件表

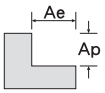
SHOULDER MILLING CUTTERS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	80~160m/min	100~250m/min	50~100m/min
每刃進給量 fz (mm)	0.1~0.3	0.1~0.2	0.10~0.22	0.1~0.3	0.1~0.2
加工深度 Ap (mm)	0.5~3.0	0.5~1.0	0.5~2.0	0.5~3.0	0.5~1.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 167 FSO 直角型銑刀盤 切削條件表

SHOULDER FACE MILLING CUTTERS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Al 5052 / 6061 / 7075	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	—	HRC<30
切削速度 Vc	120~250m/min	50~100m/min	80~160m/min	120~250m/min	150~300m/min	50~100m/min
每刃進給量 fz (mm)	0.05~0.15	0.03~0.10	0.04~0.12	0.05~0.15	0.05~0.15	0.03~0.10
加工深度 Ap (mm)	0.3~7.0	0.3~4.0	0.3~6.0	0.3~7.0	0.3~9.0	0.3~4.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 					

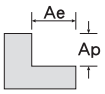
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

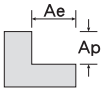
Table 168 ETP / HTP / FTP 直角型銑刀桿 切削條件表

SHOULDER MILLING CUTTERS- CUTTING CONDITION TABLE

使用銑刀片型號：TPMX1004 For TPMX1004 Inserts

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	80~160m/min	100~250m/min	50~100m/min
每刃進給量 fz (mm)	0.08~0.20	0.05~0.12	0.05~0.15	0.08~0.20	0.05~0.10
加工深度 Ap (mm)	0.3~5.0	0.3~2.0	0.3~2.0	0.3~5.0	0.3~2.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

使用銑刀片型號：TPMX1505 For TPMX1505 Inserts

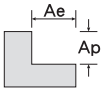
加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	80~160m/min	100~250m/min	50~100m/min
每刃進給量 fz (mm)	0.12~0.30	0.10~0.18	0.1~0.2	0.12~0.30	0.10~0.18
加工深度 Ap (mm)	0.5~5.0	0.5~2.0	0.5~2.0	0.5~5.0	0.5~2.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 169 EW390 直角型銑刀桿 切削條件表

SHOULDER MILLING CUTTERS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	80~160m/min	100~250m/min	50~100m/min
每刃進給量 fz (mm)	0.10~0.22	0.07~0.15	0.08~0.20	0.10~0.22	0.07~0.15
加工深度 Ap (mm)	0.5~3.0	0.5~1.0	0.5~2.0	0.5~3.0	0.5~1.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

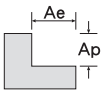
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π (3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

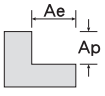
Table 170 ERT / HRT / FRT 直角型銑刀桿 切削條件表

SHOULDER MILLING CUTTERS- CUTTING CONDITION TABLE

使用銑刀片型號：ANRT0702 For ANRT0702 Inserts

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	80~160m/min	100~250m/min	50~100m/min
每刃進給量 fz (mm)	0.08~0.20	0.05~0.13	0.05~0.15	0.08~0.20	0.05~0.12
加工深度 Ap (mm)	0.3~2.0	0.3~1.0	0.3~2.0	0.3~2.0	0.3~1.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

使用銑刀片型號：ANRT1003 For ANRT1003 Inserts

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	80~160m/min	100~250m/min	50~100m/min
每刃進給量 fz (mm)	0.10~0.22	0.07~0.15	0.08~0.18	0.10~0.22	0.07~0.15
加工深度 Ap (mm)	0.5~2.0	0.5~1.0	0.5~2.0	0.5~2.0	0.5~1.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

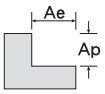
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

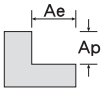
Table 171 EAD / HAD / FAD 直角型銑刀桿 切削條件表

SHOULDER MILLING CUTTERS- CUTTING CONDITION TABLE

使用銑刀片型號：ADMT0602 For ADMT0602 Inserts

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	80~160m/min	100~250m/min	50~100m/min
每刃進給量 fz (mm)	0.08~0.20	0.05~0.13	0.05~0.15	0.08~0.20	0.05~0.13
加工深度 Ap (mm)	0.3~2.0	0.3~1.0	0.3~2.0	0.3~2.0	0.3~1.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

使用銑刀片型號：ADMT10T3 For ADMT10T3 Inserts

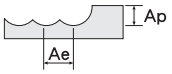
加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	80~160m/min	100~250m/min	50~100m/min
每刃進給量 fz (mm)	0.10~0.22	0.07~0.15	0.07~0.18	0.10~0.22	0.07~0.15
加工深度 Ap (mm)	0.5~2.0	0.5~1.0	0.5~2.0	0.5~2.0	0.5~1.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 172 EBCM / HBCM 高精度球刀桿 切削條件表

HIGH PRECISION- BALL NOSED CUTTERS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels	合金鋼 Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys
工件料號 Material Code	S35C,S45C,S50C	SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Al 5052/6061/7075
硬度 Hardness	HRC<30	HRC30~45	HRC45~55	—	HRC<30	—
切削速度 Vc	100~250m/min	80~150m/min	50~120m/min	80~160m/min	100~200m/min	150~300m/min
外徑 Diameter	每轉進給量 f (mm/rev)	每轉進給量 f (mm/rev)	每轉進給量 f (mm/rev)	每轉進給量 f (mm/rev)	每轉進給量 f (mm/rev)	每轉進給量 f (mm/rev)
8~16mm	0.3~0.6	0.25~0.60	0.2~0.5	0.25~0.60	0.3~0.6	0.3~0.7
20~32mm	0.35~0.70	0.30~0.65	0.25~0.55	0.25~0.70	0.5~0.8	0.35~0.70
備註 Remarks	Ap=0.05D Ae=0.15D		Ap=0.04D Ae=0.1D	Ap=0.05D Ae=0.15D	Ap=0.05D Ae=0.15D	Ap=0.05D Ae=0.15D

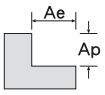
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = f(每轉進給量) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

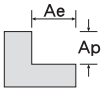
Table 173 EWP / FWP 高進給型銑刀桿 切削條件表

HIGH FEED MILLING CUTTERS- CUTTING CONDITION TABLE

使用銑刀片型號：WP26339R14 For WP26339R14 Inserts

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	80~160m/min	100~250m/min	50~100m/min
每刃進給量 fz (mm)	0.3~1.5	0.3~1.2	0.3~1.5	0.3~1.0
加工深度 Ap (mm)	0.4~1.5	0.4~1.0	0.4~1.5	0.4~1.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 			

使用銑刀片型號：WP26379R25 For WP26379R25 Inserts

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	80~160m/min	100~250m/min	50~100m/min
每刃進給量 fz (mm)	0.3~1.5	0.3~1.2	0.3~1.5	0.3~1.0
加工深度 Ap (mm)	0.4~2.0	0.4~1.5	0.4~2.0	0.4~1.5
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 			

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

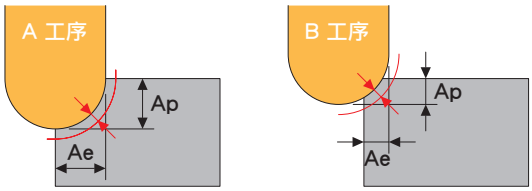
1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 174 HBWP 球刀頭(粗加工) 切削條件表

BALL NOSED CUTTERS- ROUGHING- CUTTING CONDITION TABLE

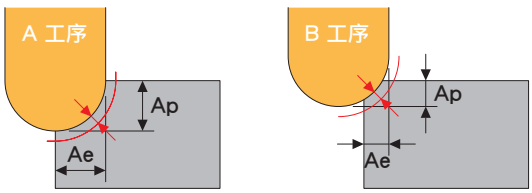
使用銑刀片型號：WP26339R14 For WP26339R14 Inserts

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	80~160m/min	100~250m/min	50~100m/min
A 工序 每刃進給量 fz (mm)	0.16~0.30	0.08~0.14	0.16~0.30	0.08~0.12
B 工序 每刃進給量 fz (mm)	0.2~0.4	0.10~0.18	0.2~0.4	0.10~0.18
備註 Remarks	A 工序：Ap = 0.50D, Ae = 0.50D B 工序：Ap = 0.25D, Ae = 0.25D			



使用銑刀片型號：WP26379R25 For WP26379R25 Inserts

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	80~160m/min	100~250m/min	50~100m/min
A 工序 每刃進給量 fz (mm)	0.20~0.35	0.08~0.15	0.20~0.35	0.08~0.12
B 工序 每刃進給量 fz (mm)	0.25~0.45	0.1~0.2	0.25~0.45	0.1~0.2
備註 Remarks	A 工序：Ap = 0.50D, Ae = 0.50D B 工序：Ap = 0.25D, Ae = 0.25D			



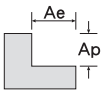
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

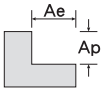
Table 175 ERD / HRD / FRD 圓角型銑刀桿 切削條件表

CORNER ROUNDING MILLING CUTTERS- CUTTING CONDITION TABLE

※ 外徑 ≦ 10mm Diameter ≦ 10mm

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	80~180m/min	100~250m/min	50~100m/min
每刃進給量 fz (mm)	0.1~0.6	0.08~0.30	0.08~0.30	0.1~0.6	0.08~0.30
加工深度 Ap (mm)	0.3~1.5	0.3~1.0	0.3~1.5	0.3~1.5	0.3~1.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

※ 外徑 > 10mm Diameter > 10mm

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	80~180m/min	100~250m/min	50~100m/min
每刃進給量 fz (mm)	0.15~0.80	0.1~0.3	0.15~0.40	0.15~0.80	0.1~0.3
加工深度 Ap (mm)	0.5~1.5	0.5~1.0	0.5~1.5	0.5~1.5	0.5~1.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

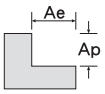
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

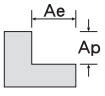
Table 176 ERP / HRP / FRP 圓角型銑刀桿 切削條件表

CORNER ROUNDING MILLING CUTTERS- CUTTING CONDITION TABLE

※ 外徑 ≦ 10mm Diameter ≦ 10mm

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	80~180m/min	100~250m/min	50~100m/min
每刃進給量 fz (mm)	0.1~0.6	0.08~0.30	0.08~0.30	0.1~0.6	0.08~0.30
加工深度 Ap (mm)	0.3~1.5	0.3~1.0	0.3~1.5	0.3~1.5	0.3~1.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

※ 外徑 > 10mm Diameter > 10mm

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	80~180m/min	100~250m/min	50~100m/min
每刃進給量 fz (mm)	0.15~0.80	0.1~0.3	0.15~0.40	0.15~0.80	0.1~0.3
加工深度 Ap (mm)	0.5~1.5	0.5~1.0	0.5~1.5	0.5~1.5	0.5~1.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 177 ETCC / FTCC- T型銑刀桿 切削條件表

T-SLOT MILLING CUTTERS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SUS304	FC,FCD	Al 5052 / 6061 / 7075	Ti-6Al-4V
硬度 Hardness	HRC<40	—	HRC<30	—	HRC<30
切削速度 Vc	70~120m/min	50~150m/min	70~120m/min	100~200m/min	40~80m/min
每刃進給量 fz (mm)	0.02~0.10	0.02~0.08	0.02~0.10	0.05~0.10	0.02~0.06
備註 Remarks					

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 178 EDDC 鳩尾槽型銑刀桿 切削條件表

DOVETAIL CUTTERS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SUS304	FC,FCD	Al 5052 / 6061 / 7075	Ti-6Al-4V
硬度 Hardness	HRC<30	—	HRC<30	—	HRC<30
切削速度 Vc	70~120m/min	50~100m/min	70~120m/min	100~200m/min	40~80m/min
每刃進給量 fz (mm)	0.02~0.10	0.02~0.08	0.02~0.10	0.05~0.10	0.02~0.06
備註 Remarks					

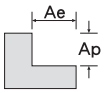
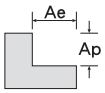
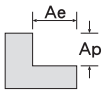
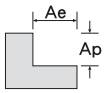
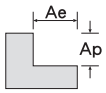
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

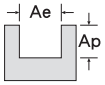
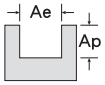
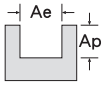
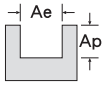
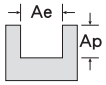
Table 179 CHS / CHCR 鎖牙式- S220鎢鋼銑刀頭 4刃 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

側銑加工 Side Milling

加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels		鋁合金 Aluminum Alloys	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SKT,SKD		SUS304		Al 5052 / 6061 / 7075	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		—		—	
切削速度 Vc	120m/min		100m/min		65m/min		65m/min		170m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
8mm	4,780	1,000	3,980	800	2,590	520	2,590	620	6,770	1,090
10mm	3,810	920	3,190	770	2,070	420	2,070	500	5,420	870
12mm	3,190	770	2,660	640	1,730	350	1,730	420	4,520	730
16mm	2,390	580	1,990	480	1,300	260	1,300	320	3,390	550
20mm	1,910	450	1,600	390	1,040	210	1,040	250	2,710	440
25mm	1,530	370	1,280	310	830	170	830	200	2,170	350
備註 Remarks	Ap≦0.5D Ae≦0.15D		Ap≦0.5D Ae≦0.15D		Ap≦0.5D Ae≦0.1D		Ap≦0.5D Ae≦0.1D		Ap≦0.5D Ae≦0.2D	

溝銑加工 Slot Milling

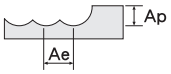
加工材質 Material	碳素鋼 Carbon Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels		鋁合金 Aluminum Alloys	
工件料號 Material Code	S35C,S45C,S50C		SCM,SKT,SKD		SKT,SKD		SUS304		Al 5052 / 6061 / 7075	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		—		—	
切削速度 Vc	90m/min		70m/min		50m/min		50m/min		150m/min	
外徑 Diameter	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
8mm	3,590	720	2,790	560	1,990	320	1,990	400	5,970	900
10mm	2,870	600	2,230	450	1,600	250	1,600	320	4,780	720
12mm	2,390	500	1,860	380	1,330	220	1,330	270	3,980	600
16mm	1,800	380	1,400	280	1,000	150	1,000	200	2,990	450
20mm	1,440	300	1,120	230	800	130	800	150	2,390	360
25mm	1,150	250	900	180	640	100	640	130	1,910	290
備註 Remarks	Ap≦0.3D		Ap≦0.3D		Ap≦0.1D		Ap≦0.25D		Ap≦0.3D	

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 180 CHB 鎖牙式- S220鎢鋼球刀頭 4刃 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

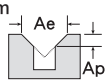
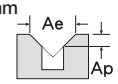
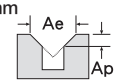
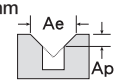
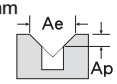
加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels		合金鋼 Alloy Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels		鋁合金 Aluminum Alloys	
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD		SCM,SKT,SKD		SKT,SKD		SUS304		Al 5052 / 6061 / 7075	
硬度 Hardness	HRC<20		HRC20~30		HRC30~45		—		—	
切削速度 Vc	120m/min		100m/min		65m/min		65m/min		170m/min	
半徑 R	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)	S (rpm)	F (mm/min)
4.0R	4,780	1,440	3,980	1,200	2,590	520	2,590	650	6,770	1,700
5.0R	3,810	1,150	3,190	960	2,070	420	2,070	520	5,420	1,470
6.0R	3,190	960	2,660	800	1,730	350	1,730	440	4,520	1,360
8.0R	2,390	720	1,990	600	1,300	260	1,300	330	3,390	1,020
10.0R	1,910	580	1,600	480	1,040	210	1,040	260	2,710	820
12.5R	1,530	460	1,280	390	830	170	830	210	2,170	650
備註 Remarks	Ap=0.05D Ae=0.15D 				Ap=0.04D Ae=0.1D		Ap=0.05D Ae=0.15D		Ap=0.05D Ae=0.15D	

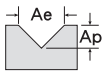
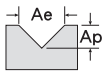
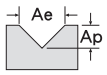
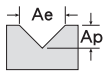
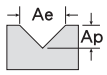
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

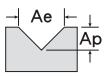
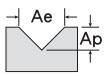
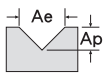
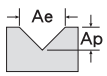
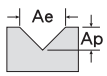
1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

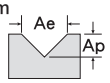
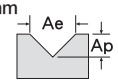
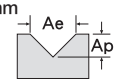
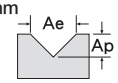
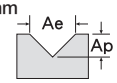
Table 181 ECSC / HCSC / ECDC / ECTCX 多功能倒角型銑刀桿 切削條件表

INDEXABLE TOOLS- MULTIPURPOSE- CHAMFERING CONDITION TABLE

加工方式 Cutting Mode	倒角加工 Chamfering				
加工材質 Material	碳素鋼 Carbon Steels	合金鋼 Alloy Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys
工件料號 Material Code	S35C,S45C,S50C	SCM,SKT,SKD	SUS304	FC,FCD	Al 5052 / 6061 / 7075
硬度 Hardness	HRC<20	HRC20~45	—	HRC<30	—
切削速度 Vc	150~300m/min	100~250m/min	60~120m/min	150~250m/min	150~350m/min
每轉進給量 f	0.15~0.20mm/rev	0.1~0.2mm/rev	0.1~0.2mm/rev	0.15~0.25mm/rev	0.15~0.30mm/rev
切削量 Cutting Amount (mm)	Ap=0.5~1mm 	Ap=0.5~1mm 	Ap=0.5~1mm 	Ap=0.5~1mm 	Ap=0.5~1mm 

加工方式 Cutting Mode	定點加工 Spotting				
加工材質 Material	碳素鋼 Carbon Steels	合金鋼 Alloy Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys
工件料號 Material Code	S35C,S45C,S50C	SCM,SKT,SKD	SUS304	FC,FCD	Al 5052 / 6061 / 7075
硬度 Hardness	HRC<20	HRC20~45	—	HRC<30	—
切削速度 Vc	60~250m/min	50~200m/min	60~120m/min	100~200m/min	100~300m/min
每轉進給量 f	0.05~0.10mm/rev	0.04~0.06mm/rev	0.03~0.06mm/rev	0.05~0.10mm/rev	0.05~0.10mm/rev
切削量 Cutting Amount (mm)	Ap≦5.5mm 	Ap≦5.5mm 	Ap≦5.5mm 	Ap≦5.5mm 	Ap≦5.5mm 

加工方式 Cutting Mode	開V槽加工 V-Grooving				
加工材質 Material	碳素鋼 Carbon Steels	合金鋼 Alloy Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys
工件料號 Material Code	S35C,S45C,S50C	SCM,SKT,SKD	SUS304	FC,FCD	Al 5052 / 6061 / 7075
硬度 Hardness	HRC<20	HRC20~45	—	HRC<30	—
切削速度 Vc	60~250m/min	50~200m/min	60~120m/min	100~200m/min	100~300m/min
每轉進給量 f	0.05~0.07mm/rev	0.04~0.06mm/rev	0.03~0.06mm/rev	0.05~0.07mm/rev	0.05~0.07mm/rev
切削量 Cutting Amount (mm)	Ap≦5.5mm 	Ap≦5.5mm 	Ap≦5.5mm 	Ap≦5.5mm 	Ap≦5.5mm 

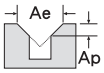
加工方式 Cutting Mode	雕刻加工 Engraving				
加工材質 Material	碳素鋼 Carbon Steels	合金鋼 Alloy Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys
工件料號 Material Code	S35C,S45C,S50C	SCM,SKT,SKD	SUS304	FC,FCD	Al 5052 / 6061 / 7075
硬度 Hardness	HRC<20	HRC20~45	—	HRC<30	—
切削速度 Vc	60~250m/min	50~200m/min	60~120m/min	100~200m/min	100~300m/min
每轉進給量 f	0.02~0.05mm/rev	0.02~0.03mm/rev	0.01~0.02mm/rev	0.02~0.05mm/rev	0.02~0.05mm/rev
切削量 Cutting Amount (mm)	Ap=0.2~1mm 	Ap=0.2~1mm 	Ap=0.2~1mm 	Ap=0.2~1mm 	Ap=0.2~1mm 

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = f(每轉進給量) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 182 ECSP 倒角型銑刀桿 切削條件表

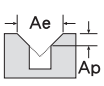
INDEXABLE TOOLS- CHAMFERING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels	合金鋼 Alloy Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C	SCM,SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<30	HRC30~45	—	HRC<30	HRC<30
加工方式 Cutting Mode	倒角加工 Chamfering				
切削速度 Vc	100~250m/min	50~100m/min	80~180m/min	100~250m/min	40~100m/min
外徑 Diameter	每刃進給量 fz (mm)	每刃進給量 fz (mm)	每刃進給量 fz (mm)	每刃進給量 fz (mm)	每刃進給量 fz (mm)
11~15mm	0.06~0.12	0.03~0.06	0.05~0.10	0.06~0.12	0.03~0.06
16~22mm	0.06~0.12	0.03~0.06	0.05~0.10	0.06~0.12	0.03~0.06
23~33mm	0.06~0.12	0.03~0.06	0.05~0.10	0.06~0.12	0.03~0.06
34~41mm	0.12~0.24	0.05~0.10	0.10~0.17	0.12~0.24	0.05~0.10
42~50mm	0.12~0.25	0.05~0.10	0.10~0.17	0.12~0.25	0.05~0.10
備註 Remarks	Ap=0.5~1.0mm 				

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π (3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

Table 183 ECTC 倒角型銑刀桿 切削條件表

INDEXABLE TOOLS- CHAMFERING CONDITION TABLE

加工材質 Material	碳素鋼 Carbon Steels	合金鋼 Alloy Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys
工件料號 Material Code	S35C,S45C,S50C	SCM,SKT,SKD	SUS304	FC,FCD	Al 5052 / 6061 / 7075
硬度 Hardness	HRC<30	HRC30~45	—	HRC<30	—
加工方式 Cutting Mode	倒角加工 Chamfering				
切削速度 Vc	100~250m/min	50~100m/min	80~180m/min	100~250m/min	150~350m/min
外徑 Diameter	每轉進給量 f (mm/rev)	每轉進給量 f (mm/rev)	每轉進給量 f (mm/rev)	每轉進給量 f (mm/rev)	每轉進給量 f (mm/rev)
20~25mm	0.06~0.12	0.03~0.06	0.05~0.10	0.06~0.12	0.12~0.25
30~40mm	0.12~0.24	0.05~0.10	0.10~0.17	0.12~0.24	0.15~0.30
備註 Remarks	Ap=0.5~1.0mm 				

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π (3.14)　　F(進給速度) = f(每轉進給量) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 184 DSP 快速鑽頭 切削條件表

INDEXABLE- HIGH SPEED DRILLS- DRILLING CONDITION TABLE

加工材質 Material	工件料號 Material Code	硬度 Hardness	切削速度 Vc (m/min)	每轉進給量 f (mm/rev)				
				Φ13~15	Φ16~21	Φ22~27	Φ28~33	Φ34~41
碳素鋼 Carbon Steels	S35C,S45C,S50C	HRC<30	100~150	0.04~0.08	0.05~0.09	0.06~0.12	0.07~0.13	0.08~0.15
		HRC30~45	70~140	0.04~0.07	0.05~0.08	0.05~0.09	0.06~0.12	0.07~0.14
調質鋼 Hardened Steels	SKT,SKD	HRC45~55	—	—	—	—	—	—
不銹鋼 Stainless Steels	SUS304	—	80~140	0.04~0.08	0.05~0.09	0.05~0.10	0.06~0.12	0.07~0.14
鑄鐵 Cast Iron	FC,FCD	HRC<30	100~150	0.05~0.08	0.06~0.11	0.07~0.13	0.08~0.15	0.10~0.18
鋁合金 Aluminum Alloys	Al 5052 / 6061 / 7075	—	150~250	0.04~0.08	0.05~0.10	0.06~0.13	0.07~0.15	0.08~0.18
高溫合金 High-Temp Alloys	Ti-6Al-4V	HRC<30	30~60	0.02~0.04	0.03~0.05	0.03~0.05	0.04~0.06	0.05~0.08
備註 Remarks	※ 4倍長請調降主軸轉速(S)和每轉進給量(f) 10%。 When 4xD, please reduce 10% of rpm and feed per tooth.							

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = f(每轉進給量) × S(主軸轉速)

Table 185 DW / DDW 快速鑽頭 切削條件表

INDEXABLE- HIGH SPEED DRILLS- DRILLING CONDITION TABLE

加工材質 Material	工件料號 Material Code	硬度 Hardness	切削速度 Vc (m/min)	每轉進給量 f (mm/rev)				
				Φ14~20.5	Φ22~25.5	Φ26~30	Φ31~39	Φ40~60
碳素鋼 Carbon Steels	S35C,S45C,S50C	HRC<30	90~140	0.06~0.09	0.06~0.11	0.07~0.13	0.08~0.18	0.10~0.25
		HRC30~45	70~120	0.05~0.07	0.05~0.09	0.06~0.11	0.07~0.14	0.08~0.17
調質鋼 Hardened Steels	SKT,SKD	HRC45~55	—	—	—	—	—	—
不銹鋼 Stainless Steels	SUS304	—	60~140	0.05~0.09	0.05~0.10	0.06~0.13	0.07~0.15	0.08~0.18
鑄鐵 Cast Iron	FC,FCD	HRC<30	90~140	0.06~0.10	0.06~0.12	0.07~0.14	0.08~0.16	0.10~0.20
鋁合金 Aluminum Alloys	Al 5052 / 6061 / 7075	—	150~250	0.06~0.11	0.08~0.13	0.09~0.15	0.11~0.18	0.12~0.25
高溫合金 High-Temp Alloys	Ti-6Al-4V	HRC<30	30~60	0.03~0.05	0.03~0.06	0.04~0.08	0.05~0.10	0.06~0.12
備註 Remarks	※ 4倍長請調降主軸轉速(S)和每轉進給量(f) 10%。 When 4xD, please reduce 10% of rpm and feed per tooth.							

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = f(每轉進給量) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 186 正角型車刀片 切削條件表

CARBIDE TURNING INSERTS(POSITIVE INSERT)- TURNING CONDITION TABLE

ISO 材質 Material Group	加工材質 Material		硬度 Hardness	斷屑槽 Chip Breaker	切削速度 Vc (m/min)	每轉進給量 f (mm/rev)	加工深度 (單邊) Ap (mm) (Indicates Radius)
P	碳素鋼 Carbon Steels	S35C,S45C,S50C	HRC<20	MP	80 ~ 200	0.10 ~ 0.30	0.20 ~ 2.00
				MK		0.10 ~ 0.50	0.20 ~ 3.00
				FX		0.05 ~ 0.15	0.20 ~ 1.50
				FY		0.05 ~ 0.18	0.20 ~ 1.00
				FB		0.05 ~ 0.18	0.20 ~ 2.00
	合金鋼 Alloy Steels	SCM,SKT,SKD	HRC20~40	MP	60 ~ 150	0.10 ~ 0.30	0.20 ~ 2.00
				MK		0.10 ~ 0.45	0.20 ~ 2.50
				FX		0.05 ~ 0.15	0.20 ~ 1.50
				FY		0.05 ~ 0.18	0.20 ~ 1.00
				FB		0.05 ~ 0.18	0.20 ~ 2.00
M	不銹鋼 Stainless Steels	SUS304	—	MP	60 ~ 100	0.10 ~ 0.25	0.20 ~ 1.50
				MK		0.10 ~ 0.30	0.20 ~ 2.00
				FX		0.05 ~ 0.15	0.10 ~ 1.50
				FY		0.05 ~ 0.18	0.10 ~ 1.00
				FB		0.05 ~ 0.18	0.10 ~ 1.50
K	鑄鐵 Cast Iron	FC,FCD	HRC<30	MP	80 ~ 200	0.10 ~ 0.30	0.20 ~ 2.00
				MK		0.10 ~ 0.50	0.20 ~ 3.00
				FX		0.05 ~ 0.15	0.20 ~ 1.50
				FY		0.05 ~ 0.18	0.20 ~ 1.00
				FB		0.05 ~ 0.18	0.20 ~ 2.00
N	鋁合金 Aluminum Alloys	Al 5052 / 6061 / 7075	—	FA	100 ~ 300	0.10 ~ 0.40	0.30 ~ 4.00
				PCD 聚晶鑽石	300 ~ 1,000	0.05 ~ 0.25	0.10 ~ 1.00
S	鈦合金 Titanium Alloys	TiAl6V4	—	MP	30 ~ 70	0.10 ~ 0.20	0.20 ~ 1.00
				MK		0.10 ~ 0.25	0.20 ~ 1.00
				FX		0.05 ~ 0.10	0.10 ~ 1.00
				FY		0.05 ~ 0.13	0.10 ~ 0.50
				FB		0.05 ~ 0.13	0.10 ~ 1.00
H	調質鋼 Hardened Steels	SKT,SKD	HRC45~65	PCBN 聚晶立方氮化硼	100 ~ 200	0.05 ~ 0.30	精加工 Finishing 0.05 ~ 0.20 粗加工 Roughing 0.20 ~ 0.30

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π (3.14)　　F(進給速度) = f(每轉進給量) × S(主軸轉速)
※ 建議先採用最低切削速度 Vc 和每轉進給量 f 參數加工，如加工狀況良好，再逐步調高參數。
We recommend starting with slow speeds and feeds. If processing goes well, you can raise parameters gradually.

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 187 負角型車刀片 切削條件表

CARBIDE TURNING INSERTS(NEGATIVE INSERT)- TURNING CONDITION TABLE

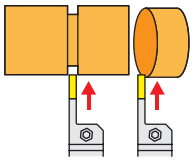
ISO 材質 Material Group	加工材質 Material		硬度 Hardness	斷屑槽 Chip Breaker	切削速度 Vc (m/min)	每轉進給量 f (mm/rev)	加工深度 (單邊) Ap (mm) (Indicates Radius)
P	碳素鋼 Carbon Steels	S35C,S45C,S50C	HRC<20	FP	80 ~ 200	0.10 ~ 0.30	1.00 ~ 3.00
				SM		0.15 ~ 0.35	0.80 ~ 3.00
				SP		0.08 ~ 0.25	0.80 ~ 3.00
				MP		0.18 ~ 0.50	0.80 ~ 4.00
				ME		0.15 ~ 0.35	1.00 ~ 4.00
				RK		0.20 ~ 0.50	1.00 ~ 4.50
				RG		0.25 ~ 0.58	1.50 ~ 5.50
				RP		0.25 ~ 0.58	1.50 ~ 5.50
				HG		0.20 ~ 0.60	1.50 ~ 6.00
	合金鋼 Alloy Steels	SCM,SKT,SKD	HRC20~40	FP	60 ~ 150	0.10 ~ 0.30	1.00 ~ 3.00
				SM		0.15 ~ 0.35	0.80 ~ 3.00
				SP		0.08 ~ 0.25	0.80 ~ 3.00
				MP		0.18 ~ 0.45	0.80 ~ 3.50
				ME		0.15 ~ 0.30	1.00 ~ 3.50
				RK		0.20 ~ 0.47	1.00 ~ 4.00
				RG		0.25 ~ 0.54	1.50 ~ 5.00
				RP		0.25 ~ 0.54	1.50 ~ 5.00
				HG		0.20 ~ 0.55	1.50 ~ 5.50
M	不銹鋼 Stainless Steels	SUS304	—	FP	60 ~ 100	0.08 ~ 0.25	0.50 ~ 1.50
				SM		0.10 ~ 0.30	0.10 ~ 3.00
				SP		0.10 ~ 0.30	0.20 ~ 3.00
				MP		0.15 ~ 0.35	0.30 ~ 3.50
				ME		0.15 ~ 0.35	0.30 ~ 3.50
				RK		0.20 ~ 0.53	0.40 ~ 3.50
				RG		0.20 ~ 0.53	0.40 ~ 3.50
				RP		0.20 ~ 0.53	0.40 ~ 3.50
				HG		0.20 ~ 0.55	0.40 ~ 3.50
K	鑄鐵 Cast Iron	FC,FCD	HRC<30	FP	80 ~ 200	0.10 ~ 0.30	1.00 ~ 3.50
				SM		0.15 ~ 0.35	0.80 ~ 3.00
				SP		0.08 ~ 0.25	0.80 ~ 3.00
				MP		0.18 ~ 0.50	0.80 ~ 4.00
				ME		0.15 ~ 0.35	1.00 ~ 4.00
				RK		0.20 ~ 0.50	1.00 ~ 4.50
				RG		0.25 ~ 0.58	1.50 ~ 5.50
				RP		0.25 ~ 0.58	1.50 ~ 5.50
				HG		0.20 ~ 0.60	1.50 ~ 6.00
N	鋁合金 Aluminum Alloys	Al 5052 / 6061 / 7075	—	PCD 聚晶鑽石	300 ~ 1,000	0.05 ~ 0.25	0.10 ~ 2.00
S	鈦合金 Titanium Alloys	TiAl6V4	—	FP	30 ~ 70	0.08 ~ 0.20	0.50 ~ 1.00
				SM		0.10 ~ 0.25	0.10 ~ 1.00
				SP		0.10 ~ 0.25	0.20 ~ 1.00
				MP		0.15 ~ 0.30	0.30 ~ 1.00
				ME		0.15 ~ 0.30	0.30 ~ 1.00
				RK		0.20 ~ 0.30	0.40 ~ 1.00
				RG		0.20 ~ 0.30	0.40 ~ 1.00
				RP		0.20 ~ 0.30	0.40 ~ 1.00
				HG		0.20 ~ 0.30	0.40 ~ 1.00
H	調質鋼 Hardened Steels	SKT,SKD	HRC45~65	PCBN 聚晶立方氮化硼	100 ~ 200	0.05 ~ 0.30	精加工 Finishing 0.05 ~ 0.20 粗加工 Roughing 0.20 ~ 0.30

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = f(每轉進給量) × S(主軸轉速)
※ 建議先採用最低切削速度 Vc 和每轉進給量 f 參數加工，如加工狀況良好，再逐步調高參數。
We recommend starting with slow speeds and feeds. If processing goes well, you can raise parameters gradually.

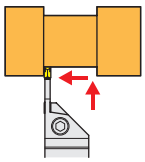
Table 188 切槽切斷車刀片 切削條件表

CARBIDE GROOVING / PARTING INSERTS- CUTTING CONDITION TABLE

切槽加工 & 切斷加工 Grooving & Parting

加工材質 Material	碳素鋼 Carbon Steels	合金鋼 Alloy Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C	SCM,SKT,SKD	SUS304	FC,FCD	Al 5052 / 6061 / 7075	Ti-6Al-4V
硬度 Hardness	HRC<30	HRC30~40	—	HRC<30	—	HRC<30
切削速度 Vc	50~130m/min	50~130m/min	50~100m/min	50~150m/min	80~200m/min	50~100m/min
每轉進給量 f (mm/rev)	0.03~0.07	0.03~0.07	0.02~0.06	0.03~0.08	0.03~0.10	0.02~0.07
備註 Remarks	※ 建議先採用最低切削速度Vc和每轉進給量f 參數加工，如加工狀況良好，再逐步調高參數。 We recommend starting with slow speeds and feeds. If processing goes well, you can raise parameters gradually. 					

橫向加工 Plunge Turning

加工材質 Material	碳素鋼 Carbon Steels	合金鋼 Alloy Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C	SCM,SKT,SKD	SUS304	FC,FCD	Al 5052 / 6061 / 7075	Ti-6Al-4V
硬度 Hardness	HRC<30	HRC30~40	—	HRC<30	—	HRC<30
切削速度 Vc	50~130m/min	50~130m/min	50~100m/min	50~150m/min	80~200m/min	50~100m/min
每轉進給量 f (mm/rev)	0.02~0.07	0.02~0.07	0.02~0.06	0.02~0.08	0.03~0.10	0.02~0.06
備註 Remarks	※ 建議先採用最低切削速度Vc和每轉進給量f 參數加工，如加工狀況良好，再逐步調高參數。 We recommend starting with slow speeds and feeds. If processing goes well, you can raise parameters gradually. 					

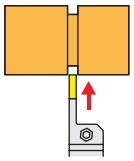
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = f(每轉進給量) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 189 切槽車刀片 切削條件表

CARBIDE GROOVING INSERTS- CUTTING CONDITION TABLE

切槽加工 Grooving

加工材質 Material	碳素鋼 Carbon Steels	合金鋼 Alloy Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C	SCM,SKT,SKD	SUS304	FC,FCD	Al 5052 / 6061 / 7075	Ti-6Al-4V
硬度 Hardness	HRC<30	HRC30~40	—	HRC<30	—	HRC<30
切削速度 Vc	50~130m/min	50~130m/min	50~100m/min	50~150m/min	80~200m/min	50~100m/min
每轉進給量 f (mm/rev)	0.02~0.06	0.02~0.06	0.02~0.06	0.02~0.07	0.02~0.09	0.02~0.06
備註 Remarks	※ 建議先採用最低切削速度Vc和每轉進給量f 參數加工，如加工狀況良好，再逐步調高參數。 We recommend starting with slow speeds and feeds. If processing goes well, you can raise parameters gradually. 					

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 190 螺紋車削- ISO規格60˚切削條件表

CARBIDE THREAD INSERTS(ISO METRIC 60˚)- THREADING CONDITION TABLE

螺距 Pitch (mm)	外螺紋 (ISO 規格 60˚) EXTERNAL (ISO METRIC 60˚) 走刀數 No. of Passes																總切深 (單邊) All Cut
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
0.50	0.102	0.102	0.076	0.076	–	–	–	–	–	–	–	–	–	–	–	–	0.356
0.75	0.178	0.152	0.102	0.076	–	–	–	–	–	–	–	–	–	–	–	–	0.508
0.80	0.178	0.152	0.127	0.076	–	–	–	–	–	–	–	–	–	–	–	–	0.533
1.00	0.178	0.178	0.127	0.102	0.076	–	–	–	–	–	–	–	–	–	–	–	0.660
1.25	0.178	0.178	0.152	0.127	0.102	0.076	–	–	–	–	–	–	–	–	–	–	0.813
1.50	0.229	0.203	0.178	0.152	0.127	0.076	–	–	–	–	–	–	–	–	–	–	0.965
1.75	0.229	0.203	0.152	0.152	0.127	0.102	0.102	0.076	–	–	–	–	–	–	–	–	1.143
2.00	0.254	0.229	0.178	0.152	0.152	0.127	0.102	0.076	–	–	–	–	–	–	–	–	1.270
2.50	0.279	0.254	0.203	0.178	0.152	0.127	0.127	0.102	0.102	0.076	–	–	–	–	–	–	1.600
3.00	0.279	0.254	0.203	0.178	0.152	0.152	0.127	0.127	0.127	0.102	0.102	0.076	–	–	–	–	1.880
3.50	0.330	0.305	0.254	0.203	0.178	0.178	0.152	0.152	0.152	0.127	0.102	0.076	–	–	–	–	2.210
4.00	0.330	0.330	0.254	0.229	0.178	0.178	0.152	0.152	0.152	0.127	0.127	0.127	0.102	0.076	–	–	2.515
4.50	0.381	0.330	0.279	0.229	0.229	0.203	0.178	0.178	0.152	0.152	0.152	0.127	0.127	0.102	–	–	2.819
5.00	0.406	0.381	0.330	0.279	0.229	0.229	0.203	0.178	0.178	0.178	0.152	0.152	0.127	0.102	–	–	3.124
5.50	0.432	0.406	0.330	0.279	0.229	0.229	0.203	0.178	0.178	0.178	0.152	0.152	0.127	0.127	0.127	0.102	3.429
6.00	0.457	0.432	0.356	0.305	0.279	0.229	0.229	0.203	0.203	0.178	0.178	0.152	0.152	0.152	0.127	0.102	3.734

螺距 Pitch (mm)	內螺紋 (ISO 規格 60˚) INTERNAL (ISO METRIC 60˚) 走刀數 No. of Passes																總切深 (單邊) All Cut
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
0.50	0.102	0.102	0.076	0.076	–	–	–	–	–	–	–	–	–	–	–	–	0.356
0.75	0.178	0.127	0.102	0.076	–	–	–	–	–	–	–	–	–	–	–	–	0.483
0.80	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1.00	0.178	0.152	0.102	0.102	0.076	–	–	–	–	–	–	–	–	–	–	–	0.610
1.25	0.203	0.178	0.127	0.102	0.102	0.076	–	–	–	–	–	–	–	–	–	–	0.787
1.50	0.254	0.203	0.152	0.102	0.102	0.076	–	–	–	–	–	–	–	–	–	–	0.889
1.75	0.229	0.203	0.152	0.127	0.102	0.102	0.102	0.076	–	–	–	–	–	–	–	–	1.092
2.00	0.254	0.229	0.178	0.152	0.127	0.102	0.102	0.076	–	–	–	–	–	–	–	–	1.219
2.50	0.279	0.229	0.178	0.152	0.152	0.127	0.102	0.102	0.102	0.076	–	–	–	–	–	–	1.499
3.00	0.279	0.229	0.203	0.152	0.152	0.152	0.127	0.102	0.102	0.102	0.102	0.076	–	–	–	–	1.778
3.50	0.305	0.279	0.229	0.203	0.178	0.152	0.152	0.152	0.127	0.102	0.102	0.076	–	–	–	–	2.057
4.00	0.330	0.305	0.229	0.203	0.178	0.152	0.152	0.152	0.127	0.127	0.102	0.102	0.102	0.076	–	–	2.337
4.50	0.356	0.330	0.279	0.229	0.203	0.178	0.152	0.152	0.152	0.152	0.127	0.127	0.102	0.102	–	–	2.642
5.00	0.381	0.356	0.305	0.254	0.229	0.203	0.178	0.152	0.152	0.152	0.152	0.152	0.127	0.102	–	–	2.896
5.50	0.381	0.356	0.305	0.254	0.229	0.203	0.178	0.178	0.152	0.152	0.152	0.152	0.152	0.127	0.127	0.102	3.200
6.00	0.406	0.406	0.356	0.279	0.229	0.229	0.203	0.178	0.178	0.152	0.152	0.152	0.152	0.152	0.127	0.102	3.454

應用材質 Work Material	碳素鋼 Carbon Steels	合金鋼 Alloy Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys	高溫合金 High-Temp Alloys
	HRC<20	HRC20~30	HRC30~45	HRC45~55	HRC55~63	–	HRC<30	–	HRC<30
切削速度 Vc (m/min)	60~140	60~120	40~100	20~60	–	40~120	60~120	–	20~60

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 191 螺紋車削- UN美製規格60° 切削條件表

CARBIDE THREAD INSERTS(UN METRIC 60°)- THREADING CONDITION TABLE

螺距 Tpi (牙/吋)	外螺紋 (UN 美製規格 60°) EXTERNAL (UN METRIC 60°) 走刀數 No. of Passes																總切深 (單邊) All Cut
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
32	0.178	0.152	0.127	0.076	–	–	–	–	–	–	–	–	–	–	–	–	0.533
28	0.178	0.152	0.127	0.102	0.076	–	–	–	–	–	–	–	–	–	–	–	0.635
24	0.178	0.178	0.152	0.127	0.076	–	–	–	–	–	–	–	–	–	–	–	0.711
20	0.203	0.178	0.152	0.127	0.102	0.076	–	–	–	–	–	–	–	–	–	–	0.838
18	0.229	0.203	0.152	0.152	0.127	0.076	–	–	–	–	–	–	–	–	–	–	0.940
16	0.229	0.203	0.152	0.152	0.127	0.102	0.076	–	–	–	–	–	–	–	–	–	1.041
14	0.229	0.229	0.178	0.152	0.127	0.102	0.102	0.076	–	–	–	–	–	–	–	–	1.194
13	0.254	0.229	0.178	0.152	0.152	0.127	0.102	0.076	–	–	–	–	–	–	–	–	1.270
12	0.279	0.229	0.203	0.152	0.152	0.152	0.127	0.076	–	–	–	–	–	–	–	–	1.372
11	0.279	0.254	0.203	0.178	0.152	0.152	0.127	0.102	0.076	–	–	–	–	–	–	–	1.499
10	0.279	0.229	0.203	0.178	0.152	0.152	0.152	0.127	0.102	0.076	–	–	–	–	–	–	1.651
9	0.279	0.229	0.203	0.178	0.152	0.152	0.152	0.127	0.127	0.102	0.076	–	–	–	–	–	1.778
8	0.305	0.254	0.229	0.178	0.178	0.152	0.152	0.152	0.127	0.127	0.102	0.076	–	–	–	–	2.032

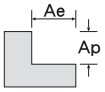
螺距 Tpi (牙/吋)	內螺紋 (UN 美製規格 60°) INTERNAL (UN METRIC 60°) 走刀數 No. of Passes																總切深 (單邊) All Cut
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
32	0.178	0.152	0.102	0.076	–	–	–	–	–	–	–	–	–	–	–	–	0.508
28	0.178	0.152	0.102	0.102	0.076	–	–	–	–	–	–	–	–	–	–	–	0.610
24	0.178	0.152	0.152	0.102	0.076	–	–	–	–	–	–	–	–	–	–	–	0.660
20	0.203	0.178	0.127	0.102	0.102	0.076	–	–	–	–	–	–	–	–	–	–	0.787
18	0.229	0.178	0.152	0.127	0.102	0.076	–	–	–	–	–	–	–	–	–	–	0.864
16	0.229	0.178	0.152	0.127	0.102	0.102	0.076	–	–	–	–	–	–	–	–	–	0.940
14	0.229	0.203	0.152	0.152	0.102	0.102	0.102	0.076	–	–	–	–	–	–	–	–	1.118
13	0.254	0.229	0.152	0.152	0.127	0.102	0.102	0.076	–	–	–	–	–	–	–	–	1.194
12	0.279	0.229	0.178	0.152	0.127	0.102	0.102	0.076	–	–	–	–	–	–	–	–	1.245
11	0.279	0.229	0.178	0.152	0.152	0.127	0.102	0.102	0.076	–	–	–	–	–	–	–	1.397
10	0.279	0.229	0.152	0.152	0.152	0.127	0.102	0.102	0.102	0.076	–	–	–	–	–	–	1.499
9	0.279	0.229	0.178	0.152	0.152	0.152	0.127	0.102	0.102	0.102	0.076	–	–	–	–	–	1.651
8	0.305	0.279	0.203	0.178	0.152	0.152	0.127	0.102	0.102	0.102	0.102	0.076	–	–	–	–	1.880

應用材質 Work Material	碳素鋼 Carbon Steels	合金鋼 Alloy Steels		調質鋼 Hardened Steels		不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys	高溫合金 High-Temp Alloys
	HRC<20	HRC20~30	HRC30~45	HRC45~55	HRC55~63	–	HRC<30	–	HRC<30
切削速度 Vc (m/min)	60~140	60~120	40~100	20~60	–	40~120	60~120	–	20~60

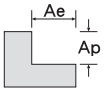
1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 192 ELP / HLP 高進給型銑刀桿 切削條件表

HIGH FEED MILLING CUTTERS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~50	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	100~180m/min	120~250m/min	50~100m/min
每刃進給量 fz (mm)	0.2~0.7	0.2~0.5	0.2~0.6	0.2~0.7	0.2~0.4
加工深度 Ap (mm)	0.2~0.5	0.2~0.3	0.2~0.4	0.2~0.5	0.2~0.3
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

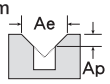
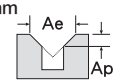
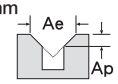
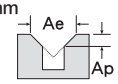
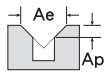
加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~50	—	HRC<30	HRC<30
切削速度 Vc	100~250m/min	50~100m/min	100~180m/min	120~250m/min	50~100m/min
每刃進給量 fz (mm)	0.2~0.6	0.2~0.3	0.2~0.5	0.2~0.6	0.2~0.3
加工深度 Ap (mm)	0.2~0.5	0.2~0.3	0.2~0.4	0.2~0.5	0.2~0.3
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

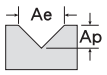
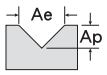
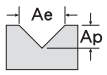
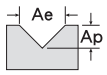
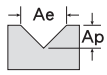
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

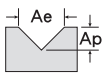
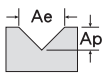
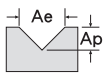
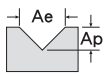
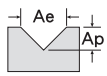
1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

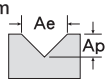
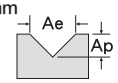
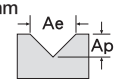
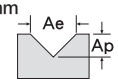
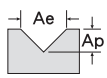
Table 193 ECSD 多功能倒角型銑刀桿 切削條件表

INDEXABLE TOOLS- MULTIPURPOSE- CHAMFERING CONDITION TABLE

加工方式 Cutting Mode	倒角加工 Chamfering				
加工材質 Material	碳素鋼 Carbon Steels	合金鋼 Alloy Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys
工件料號 Material Code	S35C,S45C,S50C	SCM,SKT,SKD	SUS304	FC,FCD	Al 5052 / 6061 / 7075
硬度 Hardness	HRC<20	HRC20~45	—	HRC<30	—
切削速度 Vc	100~150m/min	100~130m/min	60~120m/min	100~150m/min	—
每轉進給量 f	0.03~0.06mm/rev	0.03~0.06mm/rev	0.01~0.05mm/rev	0.05~0.08mm/rev	—
切削量 Cutting Amount (mm)	Ap=0.5~1mm 	Ap=0.5~1mm 	Ap=0.5~1mm 	Ap=0.5~1mm 	

加工方式 Cutting Mode	定點加工 Spotting				
加工材質 Material	碳素鋼 Carbon Steels	合金鋼 Alloy Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys
工件料號 Material Code	S35C,S45C,S50C	SCM,SKT,SKD	SUS304	FC,FCD	—
硬度 Hardness	HRC<20	HRC20~45	—	HRC<30	—
切削速度 Vc	100~150m/min	100~130m/min	60~120m/min	100~150m/min	—
每轉進給量 f	0.02~0.03mm/rev	0.02~0.03mm/rev	0.01~0.05mm/rev	0.02~0.03mm/rev	—
切削量 Cutting Amount (mm)	Ap≦2mm 	Ap≦2mm 	Ap≦2mm 	Ap≦2mm 	

加工方式 Cutting Mode	開V槽加工 V-Grooving				
加工材質 Material	碳素鋼 Carbon Steels	合金鋼 Alloy Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys
工件料號 Material Code	S35C,S45C,S50C	SCM,SKT,SKD	SUS304	FC,FCD	Al 5052 / 6061 / 7075
硬度 Hardness	HRC<20	HRC20~45	—	HRC<30	—
切削速度 Vc	100~150m/min	100~130m/min	60~120m/min	100~150m/min	—
每轉進給量 f	0.05~0.07mm/rev	0.04~0.06mm/rev	0.01~0.05mm/rev	0.05~0.07mm/rev	—
切削量 Cutting Amount (mm)	Ap≦2mm 	Ap≦2mm 	Ap≦2mm 	Ap≦2mm 	

加工方式 Cutting Mode	雕刻加工 Engraving				
加工材質 Material	碳素鋼 Carbon Steels	合金鋼 Alloy Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	鋁合金 Aluminum Alloys
工件料號 Material Code	S35C,S45C,S50C	SCM,SKT,SKD	SUS304	FC,FCD	Al 5052 / 6061 / 7075
硬度 Hardness	HRC<20	HRC20~45	—	HRC<30	—
切削速度 Vc	100~150m/min	100~130m/min	60~120m/min	100~150m/min	—
每轉進給量 f	0.02~0.05mm/rev	0.02~0.03mm/rev	0.01~0.05mm/rev	0.02~0.05mm/rev	—
切削量 Cutting Amount (mm)	Ap=0.2~1mm 	Ap=0.2~1mm 	Ap=0.2~1mm 	Ap=0.2~1mm 	

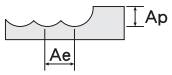
※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = f(每轉進給量) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

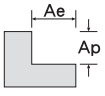
Table 194 EBC 圓角型銑刀桿 切削條件表

CORNER ROUNDING MILLING CUTTERS- CUTTING CONDITION TABLE

仿形加工 Profile Milling

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~50	—	HRC<30	HRC<30
切削速度 Vc	150~250m/min	80~150m/min	120~180m/min	150~250m/min	50~80m/min
每刃進給量 fz (mm)	0.2~0.30	0.15~0.20	0.15~0.20	0.2~0.25	0.15~0.20
加工深度 Ap (mm)	≦0.03D	≦0.02D	≦0.03D	≦0.03D	≦0.02D
步距 Ae (mm)	≦0.03D	≦0.02D	≦0.03D	≦0.03D	≦0.02D
備註 Remarks					

面銑加工 Face Milling

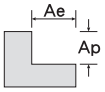
加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~50	—	HRC<30	HRC<30
切削速度 Vc	120~200m/min	50~130m/min	100~160m/min	120~200m/min	50~80m/min
每刃進給量 fz (mm)	0.2~0.30	0.15~0.20	0.15~0.20	0.2~0.25	0.15~0.20
加工深度 Ap (mm)	0.1~3.0	0.1~0.5	0.1~2.0	0.1~3.0	0.1~0.5
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π(3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 195 FAN 直角型銑刀盤 切削條件表

SHOULDER FACE MILLING CUTTERS- CUTTING CONDITION TABLE

加工材質 Material	碳素鋼 / 合金鋼 Carbon Steels Alloy Steels	調質鋼 Hardened Steels	不銹鋼 Stainless Steels	鑄鐵 Cast Iron	高溫合金 High-Temp Alloys
工件料號 Material Code	S35C,S45C,S50C SCM,SKT,SKD	SKT,SKD	SUS304	FC,FCD	Ti-6Al-4V
硬度 Hardness	HRC<40	HRC40~55	—	HRC<30	HRC<30
切削速度 Vc	120~250m/min	50~100m/min	80~160m/min	120~250m/min	50~70m/min
每刃進給量 fz (mm)	0.05~0.15	0.03~0.10	0.04~0.12	0.05~0.15	0.03~0.10
加工深度 Ap (mm)	0.3~7.0	0.3~4.0	0.3~6.0	0.3~7.0	0.3~4.0
備註 Remarks	※ 面銑加工寬度(Ae)建議 = 外徑 < 80%。 Recommended cutting width(Ae) for face milling is less than 80% of diameter. 				

※ 切削公式 Cutting Formula：S(主軸轉速) = Vc(切削速度) × 1000 / D(外徑) / π (3.14)　　F(進給速度) = fz(每刃進給量) × Z(刃數) × S(主軸轉速)

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。 When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。 When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。 When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統…等而改變。
   These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.