石墨用立銑刀
End Mills For Graphite

Page	165	167	169	171
Apperance				
Code No	G696DC	G234DC G244DC	G697DC	G298DC
Carbide	MG Carbide	MG Carbide	MG Carbide	MG Carbide
Coating	Diamond DC	Diamond DC	Diamond DC	Diamond DC
Helix Angle	 30°	 30°	 30°	 30°
No.of Flutes	 2	 2	 2	 4

7leaders®
The Art of Cutting

G696DC 超微粒鎢鋼鑽石塗層石墨用圓頭立銑刀
Ball Nose End Mills For Graphite

Code No. G696DC-R×L1

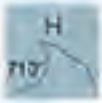
R ±0.01	L1 mm	Lc mm	L mm	d h5	D1 mm	Diamond G696DC
0.2R	5	0.6	50	4	0.37	●
0.2R	10	0.6	50	4	0.37	●
0.3R	5	0.9	50	4	0.55	●
0.3R	10	0.9	50	4	0.55	●
0.3R	15	0.9	60	4	0.55	●
0.3R	20	0.9	60	4	0.55	●
0.5R	5	1.5	50	4	0.95	●
0.5R	10	1.5	50	4	0.95	●
0.5R	15	1.5	60	4	0.95	●
0.5R	20	1.5	60	4	0.95	●
0.5R	30	1.5	80	4	0.95	●
0.75R	5	2.3	60	4	1.45	●
0.75R	10	2.3	60	4	1.45	●
0.75R	15	2.3	60	4	1.45	●
0.75R	20	2.3	60	4	1.45	●
0.75R	30	2.3	80	4	1.45	●
0.75R	40	2.3	80	4	1.45	●
1R	5	3	60	4	1.95	●
1R	10	3	60	4	1.95	●
1R	15	3	60	4	1.95	●
1R	20	3	60	4	1.95	●
1R	30	3	80	4	1.95	●
1R	40	3	80	4	1.95	●
1R	60	3	100	4	1.95	●
1.5R	10	4.5	60	4	2.85	●
1.5R	20	4.5	60	4	2.85	●
1.5R	40	4.5	80	4	2.85	●
1.5R	60	4.5	100	4	2.85	●
2R	20	6	60	4	3.85	●
2R	40	6	80	4	3.85	●
2R	60	6	120	4	3.85	●

Graphite

P	H	M	K	N	S
				●	

MG Carbide

Diamond DC



Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel	
	GR2	低合金鋼鋼<24HRC Low-alloyed Steel	
	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	
H	GR4	硬化鋼 30-38HRC Hardened Steel	
	GR5	硬化鋼 38-48HRC Hardened Steel	
	GR6	硬化鋼 48-55HRC Hardened Steel	
	GR7	硬化鋼 55-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	
N	GR10	鋁 Aluminium	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Materials	
	GR14	石墨 Graphite	●
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

High-speed machining 高速加工

被削材 Work Material		GR14 石墨 Graphite		
型號 Code No.	刃部×刃長 R×Ll	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/min)	AP 切削深度 (mm)
G696DC-0.2R	0.2R×5	38000~20000	850~480	0.03
G696DC-0.2R	0.2R×10	30000~18000	430~250	0.03
G696DC-0.3R	0.3R×5	38000~20000	960~480	0.06
G696DC-0.3R	0.3R×10	30000~20000	580~385	0.05
G696DC-0.3R	0.3R×15	15000~10000	215~145	0.03
G696DC-0.3R	0.3R×20	8000~7000	115~95	0.03
G696DC-0.5R	0.5R×5	38000~20000	1080~600	0.1
G696DC-0.5R	0.5R×10	30000~20000	840~575	0.1
G696DC-0.5R	0.5R×15	23000~18000	530~410	0.08
G696DC-0.5R	0.5R×20	16000~12000	270~205	0.08
G696DC-0.5R	0.5R×30	8000~5000	145~85	0.04
G696DC-0.75R	0.75R×5	38000~20000	1700~900	0.15
G696DC-0.75R	0.75R×10	36000~20000	1440~885	0.15
G696DC-0.75R	0.75R×15	30000~20000	1300~885	0.15
G696DC-0.75R	0.75R×20	20000~18000	670~625	0.15
G696DC-0.75R	0.75R×30	11500~9000	295~240	0.1
G696DC-0.75R	0.75R×40	7000~5000	190~130	0.075
G696DC-1R	1R×5	38000~20000	2650~1350	0.2
G696DC-1R	1R×10	38000~20000	2250~1350	0.2
G696DC-1R	1R×15	28000~20000	1800~1350	0.2
G696DC-1R	1R×20	21800~18000	1470~1100	0.2
G696DC-1R	1R×30	15200~11500	800~615	0.18
G696DC-1R	1R×40	5700~4000	315~210	0.13
G696DC-1R	1R×60	5700~4000	315~210	0.08
G696DC-1.5R	1.5R×10	38000~20000	2400~1350	0.3
G696DC-1.5R	1.5R×20	19000~15500	1945~1550	0.3
G696DC-1.5R	1.5R×40	11875~9200	960~740	0.22
G696DC-1.5R	1.5R×60	6650~4000	485~280	0.15
G696DC-2R	2R×20	19000~14000	2800~2050	0.4
G696DC-2R	2R×40	11000~9500	1615~1350	0.4
G696DC-2R	2R×60	7600~5700	1120~770	0.3

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、刃徑、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

G234DC / G244DC 超微粒鎢鋼鑽石塗層石墨用圓頭立銑刀

Ball Nose End Mills For Graphite

Code No. G234DC-Dc

Dc $^{0}_{-0.03}$	R ±0.015	Lc mm	L mm	d h6	Diamond G234DC
4	2R	8	80	4	●
6	3R	12	80	6	●
8	4R	16	100	8	●
10	5R	20	100	10	●
12	6R	24	110	12	●

Code No. G244DC-Dc

Dc $^{0}_{-0.03}$	R ±0.015	Lc mm	L mm	d h6	Diamond G244DC
4	2R	20	120	4	●
6	3R	30	120	6	●
8	4R	40	160	8	●
10	5R	50	180	10	●
12	6R	60	200	12	●

Graphite

P	H	M	K	N	S
				●	

Type of Operation

Work Material

P	GR1	鋼 Carbon Steel
	GR2	低合金鋼鋼<24HRC Low-alloyed Steel
	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel
H	GR4	硬化鋼 30-38HRC Hardened Steel
	GR5	硬化鋼 38-48HRC Hardened Steel
	GR6	硬化鋼 48-56HRC Hardened Steel
	GR7	硬化鋼 56-68HRC Hardened Steel
M	GR8	不銹鋼 Stainless Steel
K	GR9	鑄鐵 Cast Iron
N	GR10	鋁 Aluminum
	GR11	銅 Copper
	GR12	塑膠 Plastics
	GR13	複合材料 FRP CFRP Composite Material
	GR14	石墨 Graphite ●
S	GR15	鈦合金 Titanium
	GR16	鎳 Nickel
	GR17	耐熱鋼 Heat-resistant Steel

Roughing 粗加工

被削材 Work Material		GRA 石墨 Graphite		
型號 Code No.	刃徑 Dc	RPM 主軸速度 [min-1]	Feed 進給速度 [mm/min]	AP 切削深度 [mm]
G234DC/G244DC-R2	4	19000~11000	2900~1800	0.40
G234DC/G244DC-R3	6	19000~9600	4000~2100	0.60
G234DC/G244DC-R4	8	15200~7200	3700~1800	0.80
G234DC/G244DC-R5	10	11875~5700	2750~1350	1.00
G234DC/G244DC-R6	12	9975~4800	2400~1100	1.20

Finishing 精加工

被削材 Work Material		GRA 石墨 Graphite		
型號 Code No.	刃徑 Dc	RPM 主軸速度 [min-1]	Feed 進給速度 [mm/min]	AP 切削深度 [mm]
G234DC/G244DC-R2	4	19000~11000	1600~1200	0.12
G234DC/G244DC-R3	6	19000~9600	2600~1400	0.18
G234DC/G244DC-R4	8	15200~7200	2400~1200	0.22
G234DC/G244DC-R5	10	11875~5700	1800~900	0.25
G234DC/G244DC-R6	12	9975~4800	1600~750	0.30

※ Notice: G244DC is Long Length series End Mills, Please adjust the parameter according.

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

※ 注意G244DC為加長柄系列銑刀，請按照適當的伸出長度調整刀具的參數。

1. 請使用剛性好，精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

G697DC 超微粒鎢鋼鑽石塗層石墨用立銑刀

End Mills For Graphite

Code No. G697DC-Dc×R×Ll

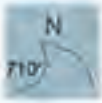
Dc $^{0}_{-0.02}$	R ±0.01	Ll mm	Lc mm	L mm	d h5	Dl mm	Diamond G697DC
0.5	R0.1	5	0.9	50	4	0.45	•
0.5	R0.1	10	0.9	50	4	0.45	•
0.5	R0.1	15	0.9	60	4	0.45	•
0.5	R0.1	20	0.9	60	4	0.45	•
1	R0.2	5	1.5	50	4	0.95	•
1	R0.2	10	1.5	50	4	0.95	•
1	R0.2	15	1.5	60	4	0.95	•
1	R0.2	20	1.5	60	4	0.95	•
1	R0.2	30	1.5	80	4	0.95	•
1.5	R0.2	5	2.3	60	4	1.45	•
1.5	R0.2	10	2.3	60	4	1.45	•
1.5	R0.2	15	2.3	60	4	1.45	•
1.5	R0.2	20	2.3	60	4	1.45	•
1.5	R0.2	30	2.3	80	4	1.45	•
1.5	R0.2	40	2.3	80	4	1.45	•
2	R0.2	5	3	60	4	1.95	•
2	R0.2	10	3	60	4	1.95	•
2	R0.2	15	3	60	4	1.95	•
2	R0.2	20	3	60	4	1.95	•
2	R0.2	30	3	80	4	1.95	•
2	R0.2	40	3	80	4	1.95	•
2	R0.2	60	3	100	4	1.95	•
3	R0.2	10	4.5	60	4	2.85	•
3	R0.2	20	4.5	60	4	2.85	•
3	R0.2	40	4.5	80	4	2.85	•
3	R0.2	60	4.5	100	4	2.85	•
4	R0.2	20	6	60	4	3.85	•
4	R0.2	40	6	80	4	3.85	•
4	R0.2	60	6	120	4	3.85	•

Graphite

P	H	M	K	N	S
				•	

MG Carbide

Diamond DC



Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel	
	GR2	低合金鋼 Low-alloyed Steel	
	GR3	高合金鋼 High-alloyed Steel	
H	GR4	硬化鋼 Hardened Steel	
	GR5	硬化鋼 Hardened Steel	
	GR6	硬化鋼 Hardened Steel	
	GR7	硬化鋼 Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	
N	GR10	鋁 Aluminium	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Materials	
	GR14	石墨 Graphite	•
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

High-speed machining 高速加工

被削材 Work Material		GR14 石墨 Graphite			
型號 Code No.	刃徑×刃長 Dc×Ll	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/min)	AP 切削深度 (mm)	AE 切削寬度 (mm)
G697DC	0.5×5	19000~16000	684~575	0.05	0.24
G697DC	0.5×10	15200~12000	540~500	0.04	0.24
G697DC	0.5×15	10400~9000	375~325	0.03	0.12
G697DC	0.5×20	10200~8000	375~290	0.03	0.09
G697DC	1×5	15200~12000	1080~865	0.12	0.45
G697DC	1×10	15200~12000	1080~865	0.1	0.45
G697DC	1×15	13300~11000	950~790	0.1	0.43
G697DC	1×20	11000~8000	820~575	0.1	0.4
G697DC	1×30	8500~700	615~505	0.08	0.35
G697DC	1.5×5	15200~13000	1300~1100	0.17	0.85
G697DC	1.5×10	15200~13000	1300~1100	0.12	0.85
G697DC	1.5×15	13300~11000	1140~925	0.1	0.85
G697DC	1.5×20	12000~10000	1020~850	0.1	0.85
G697DC	1.5×30	11400~8000	950~670	0.08	0.85
G697DC	1.5×40	9500~7000	870~590	0.08	0.7
G697DC	2×5	15200~12000	1900~1500	0.3	1.25
G697DC	2×10	15200~12000	1900~1500	0.3	1.25
G697DC	2×15	12300~9000	1500~1150	0.2	1.25
G697DC	2×20	104500~8000	1330~1000	0.18	1.2
G697DC	2×30	9000~7000	1080~850	0.13	0.8
G697DC	2×40	7600~6000	950~755	0.13	0.8
G697DC	2×60	5700~4000	715~505	0.07	0.6
G697DC	3×10	15200~12000	2300~1850	0.35	2.0
G697DC	3×20	13300~10000	2040~1550	0.3	2.0
G697DC	3×40	11400~8000	1750~1250	0.2	1.8
G697DC	3×60	6650~4000	1045~615	0.15	1.6
G697DC	4×20	12000~8500	3250~2300	0.35	2.6
G697DC	4×40	11400~8000	2950~2100	0.35	2.6
G697DC	4×60	5700~3000	1615~855	0.2	2.0

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工狀況、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

G298DC 超微粒鎢鋼鑽石塗層石墨用立銑刀

End Mills For Graphite

Code No. G298DC-Dc×R×Ll

Dc $^{0}_{-0.03}$	R ±0.01	Ll mm	Lc mm	L mm	d h5	Dl mm	Diamond G298DC
4	R0.5	20	8	80	4	3.85	●
6	R0.5	30	12	100	6	5.7	●
8	R0.5	40	16	120	8	7.6	●
10	R0.5	50	20	140	10	9.5	●
12	R0.5	60	24	160	12	11.4	●

Graphite

P	H	M	K	N	S
				●	

MG Carbide

Diamond DC

Type of Operation

Work Material

P	GR1	鋼 Carbon Steel	
	GR2	低合金鋼鋼<24HRC Low-alloyed Steel	
	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	
H	GR4	硬化鋼 30-38HRC Hardened Steel	
	GR5	硬化鋼 38-48HRC Hardened Steel	
	GR6	硬化鋼 48-56HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	
N	GR10	鋁 Aluminum	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	●
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Ordinary cutting 普通切削

被削材 Work Material		GRJ4 石墨 Graphite			
型號 Code No.	刃徑 Dc	RPM 主軸轉速 [min-1]	Feed 進給速度 [mm/min]	AP 切削深度 (mm)	AE 切削寬度 (mm)
G298DC-4	4	12000~8000	2450~1650	0.08	1.00
G298DC-6	6	12000~7000	3050~1800	0.20	2.00
G298DC-8	8	10000~7000	2700~1900	0.20	2.80
G298DC-10	10	8000~4000	2200~1100	0.20	4.40
G298DC-12	12	6000~3000	1650~815	0.20	4.40
					

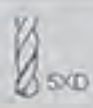
1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

鑽頭
Drills

Page	175	177	179	183	185	187
Apperance						
Code No	D921X D922X D932X	D923X D924X	D420HX	D421TX	D422TX	D423TX-3
Carbide	MG Carbide	MG Carbide	MG Carbide	MG Carbide	MG Carbide	MG Carbide
Coating	AlTiN X-NaNo	AlTiN X-NaNo	AlTiCrN HX	AlTiSiN TX	AlTiSiN TX	AlTiSiN TX
Helix Angle						
No.of Flutes						

7leaders®
The Art of Cutting

189	191	193	195
			
D423TX-5	D423TX-8	D423TX-12 D423TX-16	D423TX-20 D423TX-25 D423TX-30
MG Carbide	MG Carbide	MG Carbide	MG Carbide
AlTiSiN TX	AlTiSiN TX	AlTiSiN TX	AlTiSiN TX
			
			

D921X / D922X / D932X 超微粒鎢鋼塗層NC定點鑽頭

NC Spot Drills

Code No. D921X

Dc h6	Lc mm	L mm	d h6	Dl mm	60° D921X
0.5	1	38	3	0.15	●
1	2	38	3	0.3	●
2	4	38	3	0.6	●
3	6	50	3	1.0	●
4	8	50	4	1.5	●
6	12	70	6	2.0	●
8	16	80	8	2.5	●
10	20	90	10	3.0	●
12	24	110	12	4.0	●
16	32	120	16	5.0	●
20	40	130	20	6.0	●

Code No. D922X

Dc h6	Lc mm	L mm	d h6	Dl mm	90° D922X
0.5	1	38	3	0.15	●
1	2	38	3	0.3	●
2	4	38	3	0.6	●
3	6	50	3	1.0	●
4	8	50	4	1.5	●
6	12	70	6	2.0	●
8	16	80	8	2.5	●
10	20	90	10	3.0	●
12	24	110	12	4.0	●
16	32	120	16	5.0	●
20	40	130	20	6.0	●

Code No. D932X

Dc h6	Lc mm	L mm	d h6	Dl mm	90° D932X
3	9	75	3	1	●
4	12	100	4	1.5	●
6	15	150	6	2	●
8	20	150	8	2.5	●
10	25	200	10	3	●
12	30	200	12	4	●
16	40	250	16	5	●
20	45	250	20	6	●

Steel < 48HRC

P	H	M	K	N	S
●	●	○	●	○	○

MG Carbide

AlTiN X-NaNo

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鋼<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-56HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	○
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminum	
	GR11	銅 Copper	○
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	○
	GR16	鎳 Nickel	○
	GR17	耐熱鋼 Heat-resistant Steel	○

Borehole parameters 鑽孔參數

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (-24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (-30HRC)		GR.4 硬化鋼 Hardened Steel (30-38HRC)		GR.5 硬化鋼 Hardened Steel (38-48HRC)		GR.9 鑄鐵 Cast Iron	
切削速度 Vc m/min		40~85		40~85		40~85		20~30		15~25		65~100	
型號 Code No.	外徑 Dc	RPM 轉速 (min-1)	Feed 進給速度 (mm/rev.)	RPM 轉速 (min-1)	Feed 進給速度 (mm/rev.)	RPM 轉速 (min-1)	Feed 進給速度 (mm/rev.)	RPM 轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 轉速 (min-1)	Feed 進給速度 (mm/rev.)
D921X/D922X-0.5	0.5	20,000	0.003~0.02	20,000	0.003~0.02	20,000	0.003~0.02	15,000	0.003~0.02	9,000	0.003~0.02	–	–
D921X/D922X-1	1	10,000	0.01~0.04	10,000	0.01~0.04	10,000	0.01~0.04	7,500	0.01~0.04	4,500	0.01~0.04	20,000	0.01~0.035
D921X/D922X-2	2	5,000	0.03~0.07	5,000	0.03~0.07	5,000	0.03~0.07	3,800	0.03~0.07	2,200	0.03~0.07	12,000	0.03~0.063
D921X/D922X/D932X-3	3	7,500	0.04~0.085	7,500	0.04~0.085	7,500	0.04~0.085	2,500	0.04~0.085	1,500	0.04~0.085	8,000	0.05~0.095
D921X/D922X/D932X-4	4	5,700	0.05~0.12	5,700	0.05~0.12	5,700	0.05~0.12	1,900	0.05~0.12	1,100	0.05~0.12	6,500	0.07~0.15
D921X/D922X/D932X-6	6	3,800	0.06~0.13	3,800	0.06~0.13	3,800	0.06~0.13	1,300	0.06~0.13	750	0.06~0.13	4,300	0.12~0.2
D921X/D922X/D932X-8	8	2,800	0.08~0.16	2,800	0.08~0.16	2,800	0.08~0.16	1,000	0.08~0.16	550	0.08~0.16	3,200	0.15~0.2
D921X/D922X/D932X-10	10	2,300	0.1~0.2	2,300	0.1~0.2	2,300	0.1~0.2	750	0.1~0.2	450	0.1~0.2	2,600	0.1~0.25
D921X/D922X/D932X-12	12	1,900	0.15~0.25	1,900	0.15~0.25	1,900	0.15~0.25	650	0.15~0.25	370	0.15~0.25	2,200	0.2~0.3
D921X/D922X/D932X-16	16	1,400	0.15~0.3	1,400	0.15~0.3	1,400	0.15~0.3	480	0.15~0.3	280	0.15~0.3	1,600	0.25~0.35
D921X/D922X/D932X-20	20	1,150	0.18~0.35	1,150	0.18~0.35	1,150	0.18~0.35	380	0.18~0.35	220	0.18~0.35	1,300	0.28~0.4

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工狀況，自行，使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果振動產生，請降低切削條件。

D923X / D924X 超微粒鎢鋼塗層NC定點鑽頭

NC Spot Drills

Code No. D923X

Dc h6	Lc mm	L mm	d h6	120° D923X
0.5	1	38	3	●
1	2	38	3	●
2	4	38	3	●
3	6	50	3	●
4	8	50	4	●
6	12	70	6	●
8	16	80	8	●
10	20	90	10	●
12	24	110	12	●
16	32	120	16	●
20	40	130	20	●

Code No. D924X

Dc h6	Lc mm	L mm	d h6	142° D924X
0.5	1	38	3	●
1	2	38	3	●
2	4	38	3	●
3	6	50	3	●
4	8	50	4	●
6	12	70	6	●
8	16	80	8	●
10	20	90	10	●
12	24	110	12	●
16	32	120	16	●
20	40	130	20	●

Steel < 48HRC

P	H	M	K	N	S
●	●	○	●	○	○

MG Carbide

AlTiN X-NaNo

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼硬<24HRC Low-alloyed Steel	●
	GR3	高合金鋼硬<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-56HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	○
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	
	GR11	銅 Copper	○
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	○
	GR16	鎳 Nickel	○
	GR17	耐熱鋼 Heat-resistant Steel	○

D923X / D924X 切削條件參考表

Recommanded Milling Conditions

Borehole parameters 鑽孔參數

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.9 鑄鐵 Cast Iron	
切削速度 Vc m/min		40~85		40~85		40~85		20~30		15~25		65~100	
型號 Code No.	切徑 Dc	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)
D923X/D924X-0.5	0.5	20,000	0.003~0.02	20,000	0.003~0.02	20,000	0.003~0.02	15,000	0.003~0.02	9,000	0.003~0.02	-	-
D923X/D924X-1	1	10,000	0.01~0.04	10,000	0.01~0.04	10,000	0.01~0.04	7,500	0.01~0.04	4,500	0.01~0.04	20,000	0.01~0.035
D923X/D924X-2	2	5,000	0.03~0.07	5,000	0.03~0.07	5,000	0.03~0.07	3,800	0.03~0.07	2,200	0.03~0.07	12,000	0.03~0.063
D923X/D924X-3	3	7,500	0.04~0.085	7,500	0.04~0.085	7,500	0.04~0.085	2,500	0.04~0.085	1,500	0.04~0.085	8,000	0.05~0.095
D923X/D924X-4	4	5,700	0.05~0.12	5,700	0.05~0.12	5,700	0.05~0.12	1,900	0.05~0.12	1,100	0.05~0.12	6,500	0.07~0.15
D923X/D924X-6	6	3,800	0.06~0.13	3,800	0.06~0.13	3,800	0.06~0.13	1,300	0.06~0.13	750	0.06~0.13	4,300	0.12~0.2
D923X/D924X-8	8	2,800	0.08~0.16	2,800	0.08~0.16	2,800	0.08~0.16	1,000	0.08~0.16	550	0.08~0.16	3,200	0.15~0.2
D923X/D924X-10	10	2,300	0.1~0.2	2,300	0.1~0.2	2,300	0.1~0.2	750	0.1~0.2	450	0.1~0.2	2,600	0.1~0.25
D923X/D924X-12	12	1,900	0.15~0.25	1,900	0.15~0.25	1,900	0.15~0.25	650	0.15~0.25	370	0.15~0.25	2,200	0.2~0.3
D923X/D924X-16	16	1,400	0.15~0.3	1,400	0.15~0.3	1,400	0.15~0.3	480	0.15~0.3	280	0.15~0.3	1,600	0.25~0.35
D923X/D924X-20	20	1,150	0.18~0.35	1,150	0.18~0.35	1,150	0.18~0.35	380	0.18~0.35	220	0.18~0.35	1,300	0.28~0.4

1. Please work with good rigidity / high precison facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工狀況、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速值同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

D420HX 超微粒鎢鋼塗層微小徑鑽頭

Micro Precision Drills

Code No. D420HX

Dc $^{0}_{-0.005}$	Lc mm	L mm	d h6	AlTiCrN D420HX	Dc $^{0}_{-0.005}$	Lc mm	L mm	d h6	AlTiCrN D420HX	Dc $^{0}_{-0.005}$	Lc mm	L mm	d h6	AlTiCrN D420HX
0.1	0.6	38	3	●	0.7	4.5	38	3	●	1.3	8	42	3	●
0.11	0.6	38	3	●	0.71	4.5	38	3	●	1.31	8	42	3	●
0.12	0.8	38	3	●	0.72	4.5	38	3	●	1.32	8	42	3	●
0.13	0.8	38	3	●	0.73	4.5	38	3	●	1.33	9	42	3	●
0.14	0.8	38	3	●	0.74	4.5	38	3	●	1.34	9	42	3	●
0.15	1	38	3	●	0.75	4.5	38	3	●	1.35	9	42	3	●
0.16	1	38	3	●	0.76	5	38	3	●	1.36	9	42	3	●
0.17	1	38	3	●	0.77	5	38	3	●	1.37	9	42	3	●
0.18	1.2	38	3	●	0.78	5	38	3	●	1.38	9	42	3	●
0.19	1.2	38	3	●	0.79	5	38	3	●	1.39	9	42	3	●
0.2	1.5	38	3	●	0.8	5	38	3	●	1.4	9	42	3	●
0.21	1.5	38	3	●	0.81	5	38	3	●	1.41	9	42	3	●
0.22	1.5	38	3	●	0.82	5	38	3	●	1.42	9	42	3	●
0.23	1.5	38	3	●	0.83	5	38	3	●	1.43	9	42	3	●
0.24	1.5	38	3	●	0.84	5	38	3	●	1.44	9	42	3	●
0.25	1.5	38	3	●	0.85	5	38	3	●	1.45	9	42	3	●
0.26	1.5	38	3	●	0.86	5.5	38	3	●	1.46	9	42	3	●
0.27	1.5	38	3	●	0.87	5.5	38	3	●	1.47	9	42	3	●
0.28	1.5	38	3	●	0.88	5.5	38	3	●	1.48	9	42	3	●
0.29	1.5	38	3	●	0.89	5.5	38	3	●	1.49	9	42	3	●
0.3	1.5	38	3	●	0.9	5.5	38	3	●	1.5	9	42	3	●
0.31	2	38	3	●	0.91	5.5	38	3	●	1.51	10	42	3	●
0.32	2	38	3	●	0.92	5.5	38	3	●	1.52	10	42	3	●
0.33	2	38	3	●	0.93	5.5	38	3	●	1.53	10	42	3	●
0.34	2	38	3	●	0.94	5.5	38	3	●	1.54	10	42	3	●
0.35	2	38	3	●	0.95	5.5	38	3	●	1.55	10	42	3	●
0.36	2	38	3	●	0.96	6	38	3	●	1.56	10	42	3	●
0.37	2	38	3	●	0.97	6	38	3	●	1.57	10	42	3	●
0.38	2	38	3	●	0.98	6	38	3	●	1.58	10	42	3	●
0.39	2.5	38	3	●	0.99	6	38	3	●	1.59	10	42	3	●
0.4	2.5	38	3	●	1	6	38	3	●	1.6	10	42	3	●
0.41	2.5	38	3	●	1.01	6	38	3	●	1.61	10	42	3	●
0.42	2.5	38	3	●	1.02	6	38	3	●	1.62	10	42	3	●
0.43	2.5	38	3	●	1.03	6	38	3	●	1.63	10	42	3	●
0.44	2.5	38	3	●	1.04	6	38	3	●	1.64	10	42	3	●
0.45	2.5	38	3	●	1.05	6	38	3	●	1.65	10	42	3	●
0.46	2.5	38	3	●	1.06	6	38	3	●	1.66	10	42	3	●
0.47	2.5	38	3	●	1.07	7	42	3	●	1.67	10	42	3	●
0.48	2.5	38	3	●	1.08	7	42	3	●	1.68	10	42	3	●
0.49	3	38	3	●	1.09	7	42	3	●	1.69	10	42	3	●
0.5	3	38	3	●	1.1	7	42	3	●	1.7	10	42	3	●
0.51	3	38	3	●	1.11	7	42	3	●	1.71	11	42	3	●
0.52	3	38	3	●	1.12	7	42	3	●	1.72	11	42	3	●
0.53	3	38	3	●	1.13	7	42	3	●	1.73	11	42	3	●
0.54	3.5	38	3	●	1.14	7	42	3	●	1.74	11	42	3	●
0.55	3.5	38	3	●	1.15	7	42	3	●	1.75	11	42	3	●
0.56	3.5	38	3	●	1.16	7	42	3	●	1.76	11	42	3	●
0.57	3.5	38	3	●	1.17	7	42	3	●	1.77	11	42	3	●
0.58	3.5	38	3	●	1.18	7	42	3	●	1.78	11	42	3	●
0.59	3.5	38	3	●	1.19	8	42	3	●	1.79	11	42	3	●
0.6	3.5	38	3	●	1.2	8	42	3	●	1.8	11	42	3	●
0.61	4	38	3	●	1.21	8	42	3	●	1.81	11	42	3	●
0.62	4	38	3	●	1.22	8	42	3	●	1.82	11	42	3	●
0.63	4	38	3	●	1.23	8	42	3	●	1.83	11	42	3	●
0.64	4	38	3	●	1.24	8	42	3	●	1.84	11	42	3	●
0.65	4	38	3	●	1.25	8	42	3	●	1.85	11	42	3	●
0.66	4	38	3	●	1.26	8	42	3	●	1.86	11	42	3	●
0.67	4	38	3	●	1.27	8	42	3	●	1.87	11	42	3	●
0.68	4.5	38	3	●	1.28	8	42	3	●	1.88	11	42	3	●
0.69	4.5	38	3	●	1.29	8	42	3	●	1.89	11	42	3	●

Steel < 30HRC

P	H	M	K	N	S
●		●	●	●	

MG Carbide

AlTiCrN HX

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鋼<34HRC Low-alloyed Steel	●
	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	
	GR5	硬化鋼 38-48HRC Hardened Steel	
	GR6	硬化鋼 48-56HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	●
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminum	●
	GR11	銅 Copper	●
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

D420HX 切削條件參考表

Recommanded Milling Conditions

Borehole parameters 鑽孔參數

材料 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.8 不銹鋼 Stainless Steel		GR.9 鑄鐵 Cast Iron		GR.10 鋁 Aluminium		GR.11 銅 Copper	
切削速度 Vc m/min		37		37		34		31		37		37		20	
型號 Code No	刃徑 Dc	RPM 旋轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 旋轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 旋轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 旋轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 旋轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 旋轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 旋轉速度 [min-1]	Feed 進給速度 [mm/rev]
D420HX-0.2	0.2	25,000	0.002	25,000	0.002	25,000	0.002	25,000	0.002	25,000	0.002	25,000	0.004	25,000	0.002
D420HX-0.25	0.25	22,500	0.002	22,500	0.002	22,500	0.002	22,500	0.002	22,500	0.002	22,500	0.005	22,500	0.002
D420HX-0.3	0.3	20,000	0.003	20,000	0.003	20,000	0.003	20,000	0.003	20,000	0.003	20,000	0.007	20,000	0.003
D420HX-0.35	0.35	18,750	0.004	18,750	0.004	18,500	0.004	18,250	0.004	18,750	0.004	18,750	0.009	18,250	0.004
D420HX-0.4	0.4	17,500	0.005	17,500	0.005	17,000	0.005	16,500	0.005	17,500	0.005	17,500	0.011	16,500	0.005
D420HX-0.45	0.45	16,250	0.006	16,250	0.006	15,500	0.006	14,750	0.006	16,250	0.006	16,250	0.013	14,750	0.006
D420HX-0.5	0.5	15,000	0.007	15,000	0.007	14,000	0.007	13,000	0.007	15,000	0.007	15,000	0.015	13,000	0.007
D420HX-0.55	0.55	14,750	0.008	14,750	0.008	13,750	0.008	12,820	0.008	14,750	0.008	14,750	0.016	12,450	0.007
D420HX-0.6	0.6	14,500	0.008	14,500	0.008	13,500	0.008	12,660	0.008	14,500	0.008	14,500	0.017	11,900	0.007
D420HX-0.65	0.65	14,250	0.009	14,250	0.009	13,250	0.009	12,500	0.009	14,250	0.009	14,250	0.018	11,350	0.008
D420HX-0.7	0.7	14,000	0.009	14,000	0.009	13,000	0.009	12,320	0.009	14,000	0.009	14,000	0.018	10,800	0.008
D420HX-0.75	0.75	13,750	0.010	13,750	0.010	12,750	0.010	12,160	0.010	13,750	0.010	13,750	0.019	10,250	0.008
D420HX-0.8	0.8	13,500	0.010	13,500	0.010	12,500	0.010	12,000	0.010	13,500	0.010	13,500	0.020	9,700	0.009
D420HX-0.85	0.85	13,000	0.013	13,000	0.013	12,000	0.013	11,320	0.013	13,000	0.013	13,000	0.024	8,600	0.009
D420HX-0.9	0.9	12,500	0.016	12,500	0.016	11,500	0.016	10,660	0.016	12,500	0.016	12,500	0.037	7,500	0.010
D420HX-1	1	12,000	0.020	12,000	0.020	11,000	0.020	10,000	0.020	12,000	0.020	12,000	0.030	6,400	0.010
D420HX-1.05	1.05	11,200	0.020	11,200	0.020	10,800	0.020	9,400	0.020	11,200	0.020	11,200	0.030	6,350	0.010
D420HX-1.1	1.1	10,700	0.020	10,700	0.020	9,850	0.020	9,000	0.020	10,700	0.020	10,700	0.030	6,050	0.010
D420HX-1.15	1.15	10,250	0.025	10,250	0.025	9,400	0.025	8,550	0.025	10,250	0.025	10,250	0.030	5,500	0.010
D420HX-1.2	1.2	9,800	0.025	9,800	0.025	9,000	0.025	8,200	0.025	9,800	0.025	9,800	0.030	5,300	0.010
D420HX-1.25	1.25	9,400	0.025	9,400	0.025	8,650	0.025	7,900	0.025	9,400	0.025	9,400	0.040	5,100	0.015
D420HX-1.3	1.3	9,000	0.025	9,000	0.025	8,300	0.025	7,600	0.025	9,000	0.025	9,000	0.040	4,900	0.015
D420HX-1.35	1.35	8,700	0.030	8,700	0.030	8,000	0.030	7,300	0.030	8,700	0.030	8,700	0.040	4,700	0.015
D420HX-1.4	1.4	8,400	0.030	8,400	0.030	7,700	0.030	7,050	0.030	8,400	0.030	8,400	0.050	4,550	0.015
D420HX-1.45	1.45	8,100	0.030	8,100	0.030	7,450	0.030	6,800	0.030	8,100	0.030	8,100	0.050	4,400	0.015
D420HX-1.5	1.5	7,800	0.030	7,800	0.030	7,200	0.030	6,550	0.030	7,800	0.030	7,800	0.050	4,250	0.020
D420HX-1.55	1.55	7,600	0.035	7,600	0.035	7,000	0.035	6,350	0.035	7,600	0.035	7,600	0.050	4,100	0.020
D420HX-1.6	1.6	7,350	0.035	7,350	0.035	6,750	0.035	6,150	0.035	7,350	0.035	7,350	0.060	3,950	0.020
D420HX-1.65	1.65	7,150	0.035	7,150	0.035	6,550	0.035	5,950	0.035	7,150	0.035	7,150	0.060	3,850	0.020
D420HX-1.7	1.7	6,900	0.035	6,900	0.035	6,350	0.035	5,800	0.035	6,900	0.035	6,900	0.060	3,750	0.020
D420HX-1.75	1.75	6,700	0.035	6,700	0.035	6,200	0.035	5,650	0.035	6,700	0.035	6,700	0.060	3,650	0.025
D420HX-1.8	1.8	6,550	0.040	6,550	0.040	6,000	0.040	5,450	0.040	6,550	0.040	6,550	0.080	3,500	0.025
D420HX-1.85	1.85	6,350	0.040	6,350	0.040	5,850	0.040	5,300	0.040	6,350	0.040	6,350	0.080	3,450	0.025

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾頭。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數據為切削條件的參考值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，調降低切削條件。

D420HX 超微粒鎢鋼塗層微小徑鑽頭

Micro Precision Drills

Code No. D420HX

Dc $^{0}_{-0.005}$	Lc mm	L mm	d h6	AlTiCrN D420HX
1.9	11	42	3	●
1.91	12	50	3	●
1.92	12	50	3	●
1.93	12	50	3	●
1.94	12	50	3	●
1.95	12	50	3	●
1.96	12	50	3	●
1.97	12	50	3	●
1.98	12	50	3	●
1.99	12	50	3	●
2	12	50	3	●
2.01	12	50	3	—
2.02	12	50	3	—
2.03	12	50	3	—
2.04	12	50	3	—
2.05	12	50	3	●
2.06	12	50	3	—
2.07	12	50	3	—
2.08	12	50	3	—
2.09	12	50	3	—
2.1	12	50	3	●
2.11	12	50	3	—
2.12	12	50	3	—
2.13	13	50	3	—
2.14	13	50	3	—
2.15	13	50	3	●
2.16	13	50	3	—
2.17	13	50	3	—
2.18	13	50	3	—
2.19	13	50	3	—
2.2	13	50	3	●
2.21	13	50	3	—
2.22	13	50	3	—
2.23	13	50	3	—
2.24	13	50	3	—
2.25	13	50	3	●
2.26	13	50	3	—
2.27	13	50	3	—
2.28	13	50	3	—
2.29	13	50	3	—
2.3	13	50	3	●
2.31	13	50	3	—
2.32	13	50	3	—
2.33	13	50	3	—
2.34	13	50	3	—
2.35	13	50	3	●
2.36	13	50	3	—
2.37	14	50	3	—
2.38	14	50	3	—
2.39	14	50	3	—
2.4	14	50	3	●
2.41	14	50	3	—
2.42	14	50	3	—
2.43	14	50	3	—
2.44	14	50	3	—
2.45	14	50	3	●
2.46	14	50	3	—
2.47	14	50	3	—
2.48	14	50	3	—
2.49	14	50	3	—
2.5	14	50	3	●
2.51	14	50	3	—
2.52	14	50	3	—
2.53	14	50	3	—
2.54	14	50	3	—
2.55	14	50	3	●
2.56	14	50	3	—
2.57	14	50	3	—
2.58	14	50	3	—
2.59	14	50	3	—
2.6	14	50	3	●
2.61	14	50	3	—
2.62	14	50	3	—
2.63	14	50	3	—
2.64	14	50	3	—
2.65	14	50	3	●
2.66	16	50	3	—
2.67	16	50	3	—
2.68	16	50	3	—
2.69	16	50	3	—
2.7	16	50	3	●
2.71	16	50	3	—
2.72	16	50	3	—
2.73	16	50	3	—
2.74	16	50	3	—
2.75	16	50	3	●
2.76	16	50	3	—
2.77	16	50	3	—
2.78	16	50	3	—
2.79	16	50	3	—
2.8	16	50	3	●
2.81	16	50	3	—
2.82	16	50	3	—
2.83	16	50	3	—
2.84	16	50	3	—
2.85	16	50	3	●
2.86	16	50	3	—
2.87	16	50	3	—
2.88	16	50	3	—
2.89	16	50	3	—
2.9	16	50	3	●
2.91	16	50	3	—
2.92	16	50	3	—
2.93	16	50	3	—
2.94	16	50	3	—
2.95	16	50	3	●
2.96	16	50	3	—
2.97	16	50	3	—
2.98	16	50	3	—
2.99	16	50	3	—
3	16	50	3	●

※ Mark: —, On request, no stock

※ 記號 — ，可訂購規格，無現貨

Steel < 30HRC

P	H	M	K	N	S
●		●	●	●	

MG Carbide

AlTiCrN HX

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鐵<34HRC Low-alloyed Steel	●
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	
	GR5	硬化鋼 38-48HRC Hardened Steel	
	GR6	硬化鋼 48-56HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	●
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminum	●
	GR11	銅 Copper	●
	GR12	塑膠 Plastics	●
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Borehole parameters 鑽孔參數

材料 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.8 不銹鋼 Stainless Steel		GR.9 鑄鐵 Cast Iron		GR.10 鋁 Aluminium		GR.11 銅 Copper	
切削速度 Vc m/min		37		37		34		31		37		37		20	
型號 Code No	刃徑 Dc	RPM 旋轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 旋轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 旋轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 旋轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 旋轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 旋轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 旋轉速度 [min-1]	Feed 進給速度 [mm/rev]
D420HX-1.9	1.9	6,200	0.040	6,200	0.040	5,700	0.040	5,200	0.040	6,200	0.040	6,200	0.060	3350	0.020
D420HX-1.95	1.95	6,000	0.040	6,000	0.040	5,550	0.040	5,050	0.040	6,000	0.040	6,000	0.060	3250	0.020
D420HX-2	2	5,900	0.050	5,900	0.050	5,400	0.050	5,000	0.050	5,900	0.050	5,900	0.060	3150	0.020
D420HX-2.05	2.05	5,750	0.050	5,750	0.050	5,300	0.050	4,800	0.050	5,750	0.050	5,750	0.060	3100	0.020
D420HX-2.1	2.1	5,600	0.050	5,600	0.050	5,150	0.050	4,700	0.050	5,600	0.050	5,600	0.080	3000	0.020
D420HX-2.15	2.15	5,450	0.050	5,450	0.050	5,000	0.050	4,600	0.050	5,450	0.050	5,450	0.080	2950	0.030
D420HX-2.2	2.2	5,350	0.050	5,350	0.050	4,900	0.050	4,500	0.050	5,350	0.050	5,350	0.080	2900	0.030
D420HX-2.25	2.25	5,200	0.060	5,200	0.060	4,800	0.060	4,400	0.060	5,200	0.060	5,200	0.080	2800	0.030
D420HX-2.3	2.3	5,100	0.060	5,100	0.060	4,700	0.060	4,300	0.060	5,100	0.060	5,100	0.080	2750	0.030
D420HX-2.35	2.35	5,000	0.060	5,000	0.060	4,600	0.060	4,200	0.060	5,000	0.060	5,000	0.080	2700	0.030
D420HX-2.4	2.4	4,900	0.060	4,900	0.060	4,500	0.060	4,100	0.060	4,900	0.060	4,900	0.080	2650	0.030
D420HX-2.45	2.45	4,800	0.060	4,800	0.060	4,400	0.060	4,000	0.060	4,800	0.060	4,800	0.080	2600	0.030
D420HX-2.5	2.5	4,700	0.080	4,700	0.080	4,300	0.080	4,332	0.080	4,700	0.080	4,700	0.100	2550	0.040
D420HX-2.55	2.55	4,600	0.080	4,600	0.080	4,250	0.080	3850	0.080	4,600	0.080	4,600	0.100	2500	0.040
D420HX-2.6	2.6	4,500	0.080	4,500	0.080	4,150	0.080	3,800	0.080	4,500	0.080	4,500	0.100	2450	0.040
D420HX-2.65	2.65	4,450	0.080	4,450	0.080	4,050	0.080	3,700	0.080	4,450	0.080	4,450	0.100	2400	0.040
D420HX-2.7	2.7	4,350	0.080	4,350	0.080	4,000	0.080	3,650	0.080	4,350	0.080	4,350	0.100	2350	0.040
D420HX-2.75	2.75	4,300	0.090	4,300	0.090	4,000	0.090	3,600	0.090	4,300	0.090	4,300	0.100	2300	0.050
D420HX-2.8	2.8	4,200	0.090	4,200	0.090	3,800	0.090	3,500	0.090	4,200	0.090	4,200	0.120	2250	0.050
D420HX-2.85	2.85	4,100	0.090	4,100	0.090	3,800	0.090	3,400	0.090	4,100	0.090	4,100	0.120	2200	0.050
D420HX-2.9	2.9	4,050	0.090	4,050	0.090	3,700	0.090	3,400	0.090	4,050	0.090	4,050	0.120	2200	0.050
D420HX-2.95	2.95	4,000	0.090	4,000	0.090	3,650	0.090	3,350	0.090	4,000	0.090	4,000	0.120	2150	0.050
D420HX-3	3	4,000	0.090	4,000	0.090	3,600	0.090	3,300	0.090	4,000	0.090	4,000	0.120	2100	0.050

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工狀況、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度應按轉速的同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

D42ITX 超微粒鎢鋼塗層高速鑽頭
High Performance Drills

Code No. D42ITX-Dc

Dc h7	Lc mm	L mm	d h6	AlTiSiN D42ITX
1	6	50	3	•
1.1	6	50	3	•
1.2	6	50	3	•
1.3	6	50	3	•
1.4	6	50	3	•
1.5	6	50	3	•
1.6	8	50	3	•
1.7	8	50	3	•
1.8	8	50	3	•
1.9	8	50	3	•
2	8	50	3	•
2.1	10	62	3	•
2.2	10	62	3	•
2.3	10	62	3	•
2.4	10	62	3	•
2.5	10	62	3	•
2.6	13	62	3	•
2.7	13	62	3	•
2.8	13	62	3	•
2.9	13	62	3	•
3	13	62	3	•
3.1	19	66	4	•
3.2	19	66	4	•
3.3	19	66	4	•
3.4	19	66	4	•
3.5	19	66	4	•
3.6	21	66	4	•
3.7	21	66	4	•
3.8	21	66	4	•
3.9	21	66	4	•
4	21	66	4	•
4.1	23	66	5	•
4.2	23	66	5	•
4.3	23	66	5	•
4.4	23	66	5	•
4.5	23	66	5	•
4.6	25	66	5	•
4.7	25	66	5	•
4.8	25	66	5	•
4.9	25	66	5	•
5	25	66	5	•
5.1	28	66	6	•
5.2	28	66	6	•
5.3	28	66	6	•
5.4	28	66	6	•
5.5	28	66	6	•
5.6	28	66	6	•
5.7	28	66	6	•
5.8	28	66	6	•
5.9	28	66	6	•
6	28	66	6	•
6.1	34	79	7	•
6.2	34	79	7	•
6.3	34	79	7	•
6.4	34	79	7	•
6.5	34	79	7	•
6.6	34	79	7	•
6.7	34	79	7	•
6.8	34	79	7	•
6.9	34	79	7	•

Dc h7	Lc mm	L mm	d h6	AlTiSiN D42ITX
7	34	79	7	•
7.1	41	79	8	•
7.2	41	79	8	•
7.3	41	79	8	•
7.4	41	79	8	•
7.5	41	79	8	•
7.6	41	79	8	•
7.7	41	79	8	•
7.8	41	79	8	•
7.9	41	79	8	•
8	41	79	8	•
8.1	47	89	9	•
8.2	47	89	9	•
8.3	47	89	9	•
8.4	47	89	9	•
8.5	47	89	9	•
8.6	47	89	9	•
8.7	47	89	9	•
8.8	47	89	9	•
8.9	47	89	9	•
9	47	89	9	•
9.1	47	89	10	•
9.2	47	89	10	•
9.3	47	89	10	•
9.4	47	89	10	•
9.5	47	89	10	•
9.6	47	89	10	•
9.7	47	89	10	•
9.8	47	89	10	•
9.9	47	89	10	•
10	47	89	10	•
10.1	55	102	11	•
10.2	55	102	11	•
10.3	55	102	11	•
10.4	55	102	11	•
10.5	55	102	11	•
10.6	55	102	11	•
10.7	55	102	11	•
10.8	55	102	11	•
10.9	55	102	11	•
11	55	102	11	•
11.1	55	102	12	•
11.2	55	102	12	•
11.3	55	102	12	•
11.4	55	102	12	•
11.5	55	102	12	•
11.6	55	102	12	•
11.7	55	102	12	•
11.8	55	102	12	•
11.9	55	102	12	•
12	55	102	12	•
12.5	60	107	13	•
13	60	107	13	•
13.5	60	107	14	•
14	60	107	14	•
14.5	65	115	15	•
15	65	115	15	•
15.5	65	115	16	•
16	65	115	16	•

Steel < 48HRC

P	H	M	K	N	S
●	●	○	●		○

MG Carbide

AlTiSiN TX

3 XD

2

140°

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鋼<34HRC Low-alloyed Steel	●
	GR3	高合金鋼鋼<50HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-56HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	○
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminum	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	○
	GR16	鎳 Nickel	○
	GR17	耐熱鋼 Heat-resistant Steel	○

D42ITX 切削條件參考表

Recommended Milling Conditions

Borehole parameters 鑽孔參數

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.9 鑄鐵 Cast Iron	
切削速度 Vc m/min		60~100		60~100		60~100		40~65		30~45		60~100	
型號 Code No.	刃徑 Dc	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)
D421TX-1	1	19,000	0.03	19,000	0.03	19,000	0.03	12,000	0.02	10,000	0.02	19,000	0.03
D421TX-1.5	1.5	15,000	0.04	15,000	0.04	15,000	0.04	9,600	0.04	8,000	0.04	15,000	0.04
D421TX-2	2	11,000	0.06	11,000	0.06	11,000	0.06	7,600	0.06	6,000	0.06	11,000	0.06
D421TX-2.5	2.5	9,500	0.07	9,500	0.07	9,500	0.07	6,300	0.07	5,000	0.07	9,500	0.07
D421TX-3	3	8,000	0.09	8,000	0.09	8,000	0.09	5,000	0.09	4,000	0.09	8,000	0.09
D421TX-3.5	3.5	7,100	0.09	7,100	0.09	7,100	0.09	4,400	0.09	3,900	0.09	7,100	0.09
D421TX-4	4	6,300	0.10	6,300	0.10	6,300	0.10	3,800	0.10	3,800	0.10	6,300	0.10
D421TX-4.5	4.5	5,600	0.11	5,600	0.11	5,600	0.11	3,400	0.11	3,400	0.11	5,000	0.11
D421TX-5	5	5,000	0.12	5,000	0.12	5,000	0.12	3,000	0.12	3,000	0.12	5,000	0.12
D421TX-5.5	5.5	4,600	0.13	4,600	0.13	4,600	0.13	2,800	0.13	2,800	0.13	4,600	0.13
D421TX-6	6	4,200	0.14	4,200	0.14	4,200	0.14	2,600	0.14	2,600	0.14	4,200	0.14
D421TX-6.5	6.5	3,950	0.14	3,950	0.14	3,950	0.14	2,400	0.14	2,400	0.14	3,950	0.14
D421TX-7	7	3,700	0.15	3,700	0.15	3,700	0.15	2,250	0.15	2,250	0.15	3,700	0.15
D421TX-7.5	7.5	3,450	0.15	3,450	0.15	3,450	0.15	2,050	0.15	2,050	0.15	3,450	0.15
D421TX-8	8	3,200	0.16	3,200	0.16	3,200	0.16	1,900	0.16	1,900	0.16	3,200	0.16
D421TX-8.5	8.5	3,000	0.16	3,000	0.16	3,000	0.16	1,825	0.16	1,825	0.16	3,000	0.16
D421TX-9	9	2,870	0.17	2,870	0.17	2,870	0.17	1,750	0.17	1,750	0.17	2,870	0.17
D421TX-9.5	9.5	2,700	0.17	2,700	0.17	2,700	0.17	1,675	0.17	1,675	0.17	2,700	0.17
D421TX-10	10	2,550	0.18	2,550	0.18	2,550	0.18	1,600	0.18	1,600	0.18	2,550	0.18
D421TX-10.5	10.5	2,420	0.18	2,420	0.18	2,420	0.18	1,525	0.18	1,525	0.18	2,420	0.18
D421TX-11	11	2,320	0.19	2,320	0.19	2,320	0.19	1,450	0.19	1,450	0.19	2,320	0.19
D421TX-11.5	11.5	2,200	0.19	2,200	0.19	2,200	0.19	1,375	0.19	1,375	0.19	2,200	0.19
D421TX-12	12	2,100	0.20	2,100	0.20	2,100	0.20	1,300	0.20	1,300	0.20	2,100	0.20
D421TX-12.5	12.5	2,025	0.20	2,025	0.20	2,025	0.20	1,250	0.20	1,250	0.20	2,025	0.20
D421TX-13	13	1,950	0.21	1,950	0.21	1,950	0.21	1,200	0.21	1,200	0.21	1,950	0.21
D421TX-13.5	13.5	1,875	0.21	1,875	0.21	1,875	0.21	1,150	0.21	1,150	0.21	1,875	0.21
D421TX-14	14	1,800	0.22	1,800	0.22	1,800	0.22	1,100	0.22	1,100	0.22	1,800	0.22
D421TX-14.5	14.5	1,750	0.22	1,750	0.22	1,750	0.22	1,055	0.22	1,055	0.22	1,750	0.22
D421TX-15	15	1,700	0.23	1,700	0.23	1,700	0.23	1,025	0.23	1,025	0.23	1,700	0.23
D421TX-15.5	15.5	1,650	0.23	1,650	0.23	1,650	0.23	980	0.24	980	0.24	1,650	0.23
D421TX-16	16	1,600	0.25	1,600	0.25	1,600	0.25	950	0.25	950	0.25	1,600	0.25

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

D422TX 超微粒鎢鋼塗層高速鑽頭
High Performance Drills

Code No. D422TX-Dc

Dc h7	Lc mm	L mm	d h6	AlTiSiN D422TX
1	12	62	3	●
1.1	12	62	3	●
1.2	12	62	3	●
1.3	12	62	3	●
1.4	12	62	3	●
1.5	12	62	3	●
1.6	15	62	3	●
1.7	15	62	3	●
1.8	15	62	3	●
1.9	15	62	3	●
2	15	62	3	●
2.1	18	66	3	●
2.2	18	66	3	●
2.3	18	66	3	●
2.4	18	66	3	●
2.5	18	66	3	●
2.6	20	66	3	●
2.7	20	66	3	●
2.8	20	66	3	●
2.9	20	66	3	●
3	20	66	3	●
3.1	24	74	4	●
3.2	24	74	4	●
3.3	24	74	4	●
3.4	24	74	4	●
3.5	24	74	4	●
3.6	28	74	4	●
3.7	28	74	4	●
3.8	28	74	4	●
3.9	28	74	4	●
4	28	74	4	●
4.1	32	74	5	●
4.2	32	74	5	●
4.3	32	74	5	●
4.4	32	74	5	●
4.5	32	74	5	●
4.6	38	74	5	●
4.7	38	74	5	●
4.8	38	74	5	●
4.9	38	74	5	●
5	38	74	5	●
5.1	44	82	6	●
5.2	44	82	6	●
5.3	44	82	6	●
5.4	44	82	6	●
5.5	44	82	6	●
5.6	44	82	6	●
5.7	44	82	6	●
5.8	44	82	6	●
5.9	44	82	6	●
6	44	82	6	●
6.1	53	91	7	●
6.2	53	91	7	●
6.3	53	91	7	●
6.4	53	91	7	●
6.5	53	91	7	●
6.6	53	91	7	●
6.7	53	91	7	●
6.8	53	91	7	●
6.9	53	91	7	●
7	53	91	7	●
7.1	53	91	8	●
7.2	53	91	8	●
7.3	53	91	8	●
7.4	53	91	8	●
7.5	53	91	8	●
7.6	53	91	8	●
7.7	53	91	8	●
7.8	53	91	8	●
7.9	53	91	8	●
8	53	91	8	●
8.1	61	103	9	●
8.2	61	103	9	●
8.3	61	103	9	●
8.4	61	103	9	●
8.5	61	103	9	●
8.6	61	103	9	●
8.7	61	103	9	●
8.8	61	103	9	●
8.9	61	103	9	●
9	61	103	9	●
9.1	61	103	10	●
9.2	61	103	10	●
9.3	61	103	10	●
9.4	61	103	10	●
9.5	61	103	10	●
9.6	61	103	10	●
9.7	61	103	10	●
9.8	61	103	10	●
9.9	61	103	10	●
10	61	103	10	●
10.1	71	118	11	●
10.2	71	118	11	●
10.3	71	118	11	●
10.4	71	118	11	●
10.5	71	118	11	●
10.6	71	118	11	●
10.7	71	118	11	●
10.8	71	118	11	●
10.9	71	118	11	●
11	71	118	11	●
11.1	71	118	12	●
11.2	71	118	12	●
11.3	71	118	12	●
11.4	71	118	12	●
11.5	71	118	12	●
11.6	71	118	12	●
11.7	71	118	12	●
11.8	71	118	12	●
11.9	71	118	12	●
12	71	118	12	●
12.5	77	124	13	●
13	77	124	13	●
13.5	77	124	14	●
14	77	124	14	●
14.5	83	133	15	●
15	83	133	15	●
15.5	83	133	16	●
16	83	133	16	●

Steel < 48HRC

P	H	M	K	N	S
●	●	○	●		○

MG Carbide

AlTiSiN TX

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鋼<34HRC Low-alloyed Steel	●
	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-56HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	○
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminum	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	○
	GR16	鎳 Nickel	○
	GR17	耐熱鋼 Heat-resistant Steel	○

D422TX 切削條件參考表

Recommanded Milling Conditions

Borehole parameters 鑽孔參數

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.9 鑄鐵 Cast Iron	
切削速度 Vc m/min		60~100		60~100		60~100		40~65		30~45		60~100	
型號 Code No.	刃徑 Dc	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)
D422TX-1	1	19,000	0.03	19,000	0.03	19,000	0.03	12,000	0.02	10,000	0.02	19,000	0.03
D422TX-1.5	1.5	15,000	0.04	15,000	0.04	15,000	0.04	9,600	0.04	8,000	0.04	15,000	0.04
D422TX-2	2	11,000	0.06	11,000	0.06	11,000	0.06	7,600	0.06	6,000	0.06	11,000	0.06
D422TX-2.5	2.5	9,500	0.07	9,500	0.07	9,500	0.07	6,300	0.07	5,000	0.07	9,500	0.07
D422TX-3	3	8,000	0.09	8,000	0.09	8,000	0.09	5,000	0.09	4,000	0.09	8,000	0.09
D422TX-3.5	3.5	7,100	0.09	7,100	0.09	7,100	0.09	4,400	0.09	3,900	0.09	7,100	0.09
D422TX-4	4	6,300	0.10	6,300	0.10	6,300	0.10	3,800	0.10	3,800	0.10	6,300	0.10
D422TX-4.5	4.5	5,600	0.11	5,600	0.11	5,600	0.11	3,400	0.11	3,400	0.11	5,000	0.11
D422TX-5	5	5,000	0.12	5,000	0.12	5,000	0.12	3,000	0.12	3,000	0.12	5,000	0.12
D422TX-5.5	5.5	4,600	0.13	4,600	0.13	4,600	0.13	2,800	0.13	2,800	0.13	4,600	0.13
D422TX-6	6	4,200	0.14	4,200	0.14	4,200	0.14	2,600	0.14	2,600	0.14	4,200	0.14
D422TX-6.5	6.5	3,950	0.14	3,950	0.14	3,950	0.14	2,400	0.14	2,400	0.14	3,950	0.14
D422TX-7	7	3,700	0.15	3,700	0.15	3,700	0.15	2,250	0.15	2,250	0.15	3,700	0.15
D422TX-7.5	7.5	3,450	0.15	3,450	0.15	3,450	0.15	2,050	0.15	2,050	0.15	3,450	0.15
D422TX-8	8	3,200	0.16	3,200	0.16	3,200	0.16	1,900	0.16	1,900	0.16	3,200	0.16
D422TX-8.5	8.5	3,000	0.16	3,000	0.16	3,000	0.16	1,825	0.16	1,825	0.16	3,000	0.16
D422TX-9	9	2,870	0.17	2,870	0.17	2,870	0.17	1,750	0.17	1,750	0.17	2,870	0.17
D422TX-9.5	9.5	2,700	0.17	2,700	0.17	2,700	0.17	1,675	0.17	1,675	0.17	2,700	0.17
D422TX-10	10	2,550	0.18	2,550	0.18	2,550	0.18	1,600	0.18	1,600	0.18	2,550	0.18
D422TX-10.5	10.5	2,420	0.18	2,420	0.18	2,420	0.18	1,525	0.18	1,525	0.18	2,420	0.18
D422TX-11	11	2,320	0.19	2,320	0.19	2,320	0.19	1,450	0.19	1,450	0.19	2,320	0.19
D422TX-11.5	11.5	2,200	0.19	2,200	0.19	2,200	0.19	1,375	0.19	1,375	0.19	2,200	0.19
D422TX-12	12	2,100	0.20	2,100	0.20	2,100	0.20	1,300	0.20	1,300	0.20	2,100	0.20
D422TX-12.5	12.5	2,025	0.20	2,025	0.20	2,025	0.20	1,250	0.20	1,250	0.20	2,025	0.20
D422TX-13	13	1,950	0.21	1,950	0.21	1,950	0.21	1,200	0.21	1,200	0.21	1,950	0.21
D422TX-13.5	13.5	1,875	0.21	1,875	0.21	1,875	0.21	1,150	0.21	1,150	0.21	1,875	0.21
D422TX-14	14	1,800	0.22	1,800	0.22	1,800	0.22	1,100	0.22	1,100	0.22	1,800	0.22
D422TX-14.5	14.5	1,750	0.22	1,750	0.22	1,750	0.22	1,055	0.22	1,055	0.22	1,750	0.22
D422TX-15	15	1,700	0.23	1,700	0.23	1,700	0.23	1,025	0.23	1,025	0.23	1,700	0.23
D422TX-15.5	15.5	1,650	0.23	1,650	0.23	1,650	0.23	980	0.24	980	0.24	1,650	0.23
D422TX-16	16	1,600	0.25	1,600	0.25	1,600	0.25	950	0.25	950	0.25	1,600	0.25

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

D423TX-3 超微粒鎢鋼塗層內冷高速鑽頭

Oil-Feed High Performance Drills

Code No. D423TX-3-Dc

Dc h7	Lc mm	L mm	d h6	AITISIN D423TX-3
3	18	66	3	●
3.1	20	74	4	●
3.2	20	74	4	●
3.3	20	74	4	●
3.4	20	74	4	●
3.5	20	74	4	●
3.6	23	74	4	●
3.7	23	74	4	●
3.8	23	74	4	●
3.9	23	74	4	●
4	23	74	4	●
4.1	25	80	5	●
4.2	25	80	5	●
4.3	25	80	5	●
4.4	25	80	5	●
4.5	25	80	5	●
4.6	28	80	5	●
4.7	28	80	5	●
4.8	28	80	5	●
4.9	28	80	5	●
5	28	80	5	●
5.1	28	82	6	●
5.2	28	82	6	●
5.3	28	82	6	●
5.4	28	82	6	●
5.5	28	82	6	●
5.6	30	82	6	●
5.7	30	82	6	●
5.8	30	82	6	●
5.9	30	82	6	●
6	30	82	6	●
6.1	33	88	7	●
6.2	33	88	7	●
6.3	33	88	7	●
6.4	33	88	7	●
6.5	33	88	7	●
6.6	35	88	7	●
6.7	35	88	7	●
6.8	35	88	7	●
6.9	35	88	7	●
7	35	88	7	●
7.1	38	91	8	●
7.2	38	91	8	●
7.3	38	91	8	●
7.4	38	91	8	●
7.5	38	91	8	●
7.6	40	91	8	●
7.7	40	91	8	●
7.8	40	91	8	●
7.9	40	91	8	●
8	40	91	8	●
8.1	43	100	9	●
8.2	43	100	9	●
8.3	43	100	9	●
8.4	43	100	9	●
8.5	43	100	9	●
8.6	45	100	9	●
8.7	45	100	9	●
8.8	45	100	9	●
8.9	45	100	9	●
9	45	100	9	●
9.1	48	103	10	●
9.2	48	103	10	●
9.3	48	103	10	●
9.4	48	103	10	●
9.5	48	103	10	●
9.6	50	103	10	●
9.7	50	103	10	●
9.8	50	103	10	●
9.9	50	103	10	●
10	50	103	10	●
10.1	53	116	11	●
10.2	53	116	11	●
10.3	53	116	11	●
10.4	53	116	11	●
10.5	53	116	11	●
10.6	55	116	11	●
10.7	55	116	11	●
10.8	55	116	11	●
10.9	55	116	11	●
11	55	116	11	●
11.1	58	118	12	●
11.2	58	118	12	●
11.3	58	118	12	●
11.4	58	118	12	●
11.5	58	118	12	●
11.6	60	118	12	●
11.7	60	118	12	●
11.8	60	118	12	●
11.9	60	118	12	●
12	60	118	12	●
12.5	63	128	13	●
13	65	128	13	●
13.5	68	134	14	●
14	70	134	14	●
14.5	73	140	15	●
15	75	140	15	●
15.5	78	146	16	●
16	80	146	16	●

Steel < 52HRC

P	H	M	K	N	S
●	●	●	●		○

MG Carbide

AITISIN TX

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼硬<34HRC Low-alloyed Steel	●
	GR3	高合金鋼硬<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-54HRC Hardened Steel	○
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	●
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	○
	GR16	鎳 Nickel	○
	GR17	耐熱鋼 Heat-resistant Steel	○

D423TX-3 切削條件參考表

Recommanded Milling Conditions

Borehole parameters 鑽孔參數

材料別 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.8 不鏽鋼 Stainless Steel		GR.9 鑄鐵 Castiron	
切削速度 Vc m/min		80~150		80~150		60~150		40~70		32~50		50~80		80~150	
型號 Code No.	刃徑 Dc	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)
D423TX-3-3	3	13,000	0.09	13,000	0.09	13,000	0.09	8,400	0.09	5,300	0.07	6,300	0.09	13,000	0.09
D423TX-3-3.5	3.5	11,250	0.09	11,250	0.09	11,500	0.09	5,600	0.09	4,600	0.07	5,500	0.09	11,250	0.09
D423TX-3-4	4	9,500	0.10	9,500	0.10	10,000	0.10	4,800	0.10	4,000	0.08	4,700	0.10	9,500	0.10
D423TX-3-4.5	4.5	8,550	0.11	8,550	0.11	9,000	0.11	4,300	0.11	3,600	0.09	4,250	0.11	8,550	0.11
D423TX-3-5	5	7,600	0.12	7,600	0.12	8,000	0.12	3,800	0.12	3,200	0.10	3,800	0.12	7,600	0.12
D423TX-3-5.5	5.5	7,000	0.13	7,000	0.13	7,300	0.13	3,500	0.13	2,900	0.11	3,500	0.13	7,000	0.13
D423TX-3-6	6	6,400	0.14	6,400	0.14	6,600	0.14	3,200	0.14	2,650	0.12	3,200	0.14	6,400	0.14
D423TX-3-6.5	6.5	6,000	0.14	6,000	0.14	6,200	0.14	3,000	0.14	2,450	0.12	3,000	0.14	6,000	0.14
D423TX-3-7	7	5,600	0.15	5,600	0.15	5,800	0.15	2,800	0.15	2,300	0.13	2,800	0.15	5,600	0.15
D423TX-3-7.5	7.5	5,200	0.15	5,200	0.15	5,400	0.15	2,600	0.15	2,150	0.13	2,600	0.15	5,200	0.15
D423TX-3-8	8	4,800	0.16	4,800	0.16	5,000	0.16	2,400	0.16	2,000	0.14	2,400	0.16	4,800	0.16
D423TX-3-8.5	8.5	4,550	0.16	4,550	0.16	4,750	0.16	2,275	0.16	1,900	0.14	2,275	0.16	4,550	0.16
D423TX-3-9	9	4,300	0.17	4,300	0.17	4,500	0.17	2,150	0.17	1,800	0.15	2,150	0.17	4,300	0.17
D423TX-3-9.5	9.5	4,050	0.17	4,050	0.17	4,250	0.17	2,025	0.17	1,700	0.15	2,025	0.17	4,050	0.17
D423TX-3-10	10	3,800	0.18	3,800	0.18	4,000	0.18	1,900	0.18	1,600	0.15	1,900	0.18	3,800	0.18
D423TX-3-10.5	10.5	3,650	0.18	3,650	0.18	3,800	0.18	1,825	0.18	1,525	0.15	1,825	0.18	3,650	0.18
D423TX-3-11	11	3,500	0.19	3,500	0.19	3,650	0.19	1,750	0.19	1,450	0.16	1,750	0.19	3,500	0.19
D423TX-3-11.5	11.5	3,350	0.19	3,350	0.19	3,450	0.19	1,675	0.19	1,375	0.16	1,675	0.19	3,350	0.19
D423TX-3-12	12	3,200	0.20	3,200	0.20	3,300	0.20	1,600	0.20	1,300	0.17	1,600	0.20	3,200	0.20
D423TX-3-12.5	12.5	3,075	0.20	3,075	0.20	3,175	0.20	1,535	0.20	1,275	0.17	1,535	0.20	3,075	0.20
D423TX-3-13	13	2,950	0.21	2,950	0.21	3,050	0.21	1,475	0.21	1,250	0.18	1,475	0.21	2,950	0.21
D423TX-3-13.5	13.5	2,775	0.21	2,775	0.21	2,975	0.21	1,400	0.21	1,225	0.18	1,400	0.21	2,775	0.21
D423TX-3-14	14	2,700	0.22	2,700	0.22	2,800	0.22	1,350	0.22	1,200	0.18	1,350	0.22	2,700	0.22
D423TX-3-14.5	14.5	2,625	0.23	2,625	0.23	2,725	0.23	1,310	0.23	1,150	0.18	1,310	0.23	2,625	0.23
D423TX-3-15	15	2,550	0.24	2,550	0.24	2,650	0.24	1,275	0.24	1,100	0.19	1,275	0.24	2,550	0.24
D423TX-3-15.5	15.5	2,475	0.24	2,475	0.24	2,575	0.24	1,235	0.24	1,050	0.19	1,235	0.24	2,475	0.24
D423TX-3-16	16	2,400	0.25	2,400	0.25	2,500	0.25	1,200	0.25	1,000	0.20	1,200	0.25	2,400	0.25

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

D423TX-5 超微粒鎢鋼塗層內冷高速鑽頭
Oil-Feed High Performance Drills

Code No. D423TX-5-Dc

Dc h7	Lc mm	L mm	d h6	AITISIN D423TX-5
3	28	78	3	●
3.1	32	86	4	●
3.2	32	86	4	●
3.3	32	86	4	●
3.4	32	86	4	●
3.5	32	86	4	●
3.6	36	86	4	●
3.7	36	86	4	●
3.8	36	86	4	●
3.9	36	86	4	●
4	36	86	4	●
4.1	40	95	5	●
4.2	40	95	5	●
4.3	40	95	5	●
4.4	40	95	5	●
4.5	40	95	5	●
4.6	44	95	5	●
4.7	44	95	5	●
4.8	44	95	5	●
4.9	44	95	5	●
5	44	95	5	●
5.1	44	97	6	●
5.2	44	97	6	●
5.3	44	97	6	●
5.4	44	97	6	●
5.5	44	97	6	●
5.6	48	97	6	●
5.7	48	97	6	●
5.8	48	97	6	●
5.9	48	97	6	●
6	48	97	6	●
6.1	52	109	7	●
6.2	52	109	7	●
6.3	52	109	7	●
6.4	52	109	7	●
6.5	52	109	7	●
6.6	56	109	7	●
6.7	56	109	7	●
6.8	56	109	7	●
6.9	56	109	7	●
7	56	109	7	●
7.1	60	116	8	●
7.2	60	116	8	●
7.3	60	116	8	●
7.4	60	116	8	●
7.5	60	116	8	●
7.6	64	116	8	●
7.7	64	116	8	●
7.8	64	116	8	●
7.9	64	116	8	●
8	64	116	8	●
8.1	68	127	9	●
8.2	68	127	9	●
8.3	68	127	9	●
8.4	68	127	9	●
8.5	68	127	9	●
8.6	72	127	9	●
8.7	72	127	9	●
8.8	72	127	9	●
8.9	72	127	9	●
9	72	127	9	●
9.1	76	139	10	●
9.2	76	139	10	●
9.3	76	139	10	●
9.4	76	139	10	●
9.5	76	139	10	●
9.6	80	139	10	●
9.7	80	139	10	●
9.8	80	139	10	●
9.9	80	139	10	●
10	80	139	10	●
10.1	84	149	11	●
10.2	84	149	11	●
10.3	84	149	11	●
10.4	84	149	11	●
10.5	84	149	11	●
10.6	88	149	11	●
10.7	88	149	11	●
10.8	88	149	11	●
10.9	88	149	11	●
11	88	149	11	●
11.1	92	163	12	●
11.2	92	163	12	●
11.3	92	163	12	●
11.4	92	163	12	●
11.5	92	163	12	●
11.6	96	163	12	●
11.7	96	163	12	●
11.8	96	163	12	●
11.9	96	163	12	●
12	96	163	12	●
12.5	100	167	13	●
13	104	167	13	●
13.5	108	176	14	●
14	112	176	14	●
14.5	116	185	15	●
15	120	185	15	●
15.5	124	194	16	●
16	128	194	16	●

Steel < 52HRC

P	H	M	K	N	S
●	●	●	●		○

MG Carbide

AITISIN TX

4XD

2

140°

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼硬<24HRC Low-alloyed Steel	●
	GR3	高合金鋼硬<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-54HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不鏽鋼 Stainless Steel	●
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	○
	GR16	鎳 Nickel	○
	GR17	耐熱鋼 Heat-resistant Steel	○

D423TX-5 切削條件參考表

Recommanded Milling Conditions

Borehole parameters 鑽孔參數

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.8 不鏽鋼 Stainless Steel		GR.9 鑄鐵 Castiron	
切削速度 Vc m/min		80~150		80~150		60~150		40~70		32~50		50~80		80~150	
型號 Code No.	刃徑 Dc	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)
D423TX-5-3	3	13,000	0.09	13,000	0.09	13,000	0.09	8,400	0.09	5,300	0.07	6,300	0.09	13,000	0.09
D423TX-5-3.5	3.5	11,250	0.09	11,250	0.09	11,500	0.09	5,600	0.09	4,600	0.07	5,500	0.09	11,250	0.09
D423TX-5-4	4	9,500	0.10	9,500	0.10	10,000	0.10	4,800	0.10	4,000	0.08	4,700	0.10	9,500	0.10
D423TX-5-4.5	4.5	8,550	0.11	8,550	0.11	9,000	0.11	4,300	0.11	3,600	0.09	4,250	0.11	8,550	0.11
D423TX-5-5	5	7,600	0.12	7,600	0.12	8,000	0.12	3,800	0.12	3,200	0.10	3,800	0.12	7,600	0.12
D423TX-5-5.5	5.5	7,000	0.13	7,000	0.13	7,300	0.13	3,500	0.13	2,900	0.11	3,500	0.13	7,000	0.13
D423TX-5-6	6	6,400	0.14	6,400	0.14	6,600	0.14	3,200	0.14	2,650	0.12	3,200	0.14	6,400	0.14
D423TX-5-6.5	6.5	6,000	0.14	6,000	0.14	6,200	0.14	3,000	0.14	2,450	0.12	3,000	0.14	6,000	0.14
D423TX-5-7	7	5,600	0.15	5,600	0.15	5,800	0.15	2,800	0.15	2,300	0.13	2,800	0.15	5,600	0.15
D423TX-5-7.5	7.5	5,200	0.15	5,200	0.15	5,400	0.15	2,600	0.15	2,150	0.13	2,600	0.15	5,200	0.15
D423TX-5-8	8	4,800	0.16	4,800	0.16	5,000	0.16	2,400	0.16	2,000	0.14	2,400	0.16	4,800	0.16
D423TX-5-8.5	8.5	4,550	0.16	4,550	0.16	4,750	0.16	2,275	0.16	1,900	0.14	2,275	0.16	4,550	0.16
D423TX-5-9	9	4,300	0.17	4,300	0.17	4,500	0.17	2,150	0.17	1,800	0.15	2,150	0.17	4,300	0.17
D423TX-5-9.5	9.5	4,050	0.17	4,050	0.17	4,250	0.17	2,025	0.17	1,700	0.15	2,025	0.17	4,050	0.17
D423TX-5-10	10	3,800	0.18	3,800	0.18	4,000	0.18	1,900	0.18	1,600	0.15	1,900	0.18	3,800	0.18
D423TX-5-10.5	10.5	3,650	0.18	3,650	0.18	3,800	0.18	1,825	0.18	1,525	0.15	1,825	0.18	3,650	0.18
D423TX-5-11	11	3,500	0.19	3,500	0.19	3,650	0.19	1,750	0.19	1,450	0.16	1,750	0.19	3,500	0.19
D423TX-5-11.5	11.5	3,350	0.19	3,350	0.19	3,450	0.19	1,675	0.19	1,375	0.16	1,675	0.19	3,350	0.19
D423TX-5-12	12	3,200	0.20	3,200	0.20	3,300	0.20	1,600	0.20	1,300	0.17	1,600	0.20	3,200	0.20
D423TX-5-12.5	12.5	3,075	0.20	3,075	0.20	3,175	0.20	1,535	0.20	1,275	0.17	1,535	0.20	3,075	0.20
D423TX-5-13	13	2,950	0.21	2,950	0.21	3,050	0.21	1,475	0.21	1,250	0.18	1,475	0.21	2,950	0.21
D423TX-5-13.5	13.5	2,775	0.21	2,775	0.21	2,975	0.21	1,400	0.21	1,225	0.18	1,400	0.21	2,775	0.21
D423TX-5-14	14	2,700	0.22	2,700	0.22	2,800	0.22	1,350	0.22	1,200	0.18	1,350	0.22	2,700	0.22
D423TX-5-14.5	14.5	2,625	0.23	2,625	0.23	2,725	0.23	1,310	0.23	1,150	0.18	1,310	0.23	2,625	0.23
D423TX-5-15	15	2,550	0.24	2,550	0.24	2,650	0.24	1,275	0.24	1,100	0.19	1,275	0.24	2,550	0.24
D423TX-5-15.5	15.5	2,475	0.24	2,475	0.24	2,575	0.24	1,235	0.24	1,050	0.19	1,235	0.24	2,475	0.24
D423TX-5-16	16	2,400	0.25	2,400	0.25	2,500	0.25	1,200	0.25	1,000	0.20	1,200	0.25	2,400	0.25

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

D423TX-8 超微粒鎢鋼塗層內冷高速鑽頭

Oil-Feed High Performance Drills

Code No. D423TX-8-Dc

Dc h7	Lc mm	L mm	d h6	AITISIN D423TX-8
3	31	80	3	●
3.1	39	95	4	●
3.2	39	95	4	●
3.3	39	95	4	●
3.4	39	95	4	●
3.5	39	95	4	●
3.6	44	95	4	●
3.7	44	95	4	●
3.8	44	95	4	●
3.9	44	95	4	●
4	44	95	4	●
4.1	50	105	5	●
4.2	50	105	5	●
4.3	50	105	5	●
4.4	50	105	5	●
4.5	50	105	5	●
4.6	55	105	5	●
4.7	55	105	5	●
4.8	55	105	5	●
4.9	55	105	5	●
5	55	105	5	●
5.1	61	118	6	●
5.2	61	118	6	●
5.3	61	118	6	●
5.4	61	118	6	●
5.5	61	118	6	●
5.6	66	118	6	●
5.7	66	118	6	●
5.8	66	118	6	●
5.9	66	118	6	●
6	66	118	6	●
6.1	72	130	7	●
6.2	72	130	7	●
6.3	72	130	7	●
6.4	72	130	7	●
6.5	72	130	7	●
6.6	77	130	7	●
6.7	77	130	7	●
6.8	77	130	7	●
6.9	77	130	7	●
7	77	130	7	●
7.1	83	142	8	●
7.2	83	142	8	●
7.3	83	142	8	●
7.4	83	142	8	●
7.5	83	142	8	●
7.6	88	142	8	●
7.7	88	142	8	●
7.8	88	142	8	●
7.9	88	142	8	●
8	88	142	8	●
8.1	94	154	9	●
8.2	94	154	9	●
8.3	94	154	9	●
8.4	94	154	9	●
8.5	94	154	9	●
8.6	99	154	9	●
8.7	99	154	9	●
8.8	99	154	9	●
8.9	99	154	9	●
9	99	154	9	●
9.1	105	166	10	●
9.2	105	166	10	●
9.3	105	166	10	●
9.4	105	166	10	●
9.5	105	166	10	●
9.6	110	166	10	●
9.7	110	166	10	●
9.8	110	166	10	●
9.9	110	166	10	●
10	110	166	10	●
10.1	116	182	11	●
10.2	116	182	11	●
10.3	116	182	11	●
10.4	116	182	11	●
10.5	116	182	11	●
10.6	121	182	11	●
10.7	121	182	11	●
10.8	121	182	11	●
10.9	121	182	11	●
11	121	182	11	●
11.1	127	194	12	●
11.2	127	194	12	●
11.3	127	194	12	●
11.4	127	194	12	●
11.5	127	194	12	●
11.6	132	194	12	●
11.7	132	194	12	●
11.8	132	194	12	●
11.9	132	194	12	●
12	132	194	12	●
12.5	138	206	13	●
13	143	206	13	●
13.5	149	218	14	●
14	154	218	14	●
14.5	160	230	15	●
15	165	230	15	●
15.5	171	242	16	●
16	176	242	16	●

Steel < 52HRC

P	H	M	K	N	S
●	●	●	●		○

MG Carbide

AITISIN TX

6XD

2

140°

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鋼<34HRC Low-alloyed Steel	●
	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-54HRC Hardened Steel	○
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	●
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	○
	GR16	鎳 Nickel	○
	GR17	耐熱鋼 Heat-resistant Steel	○

D423TX-8 切削條件參考表

Recommanded Milling Conditions

Borehole parameters 鑽孔參數

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.8 不鏽鋼 Stainless Steel		GR.9 鑄鐵 Castiron	
切削速度 Vc m/min		80~150		80~150		80~150		40~70		32~50		50~80		80~150	
型號 Code No.	刃徑 Dc	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)
D423TX-8-3	3	13,000	0.09	13,000	0.09	13,000	0.09	8,400	0.09	5,300	0.07	6,300	0.09	13,000	0.09
D423TX-8-3.5	3.5	11,250	0.09	11,250	0.09	11,500	0.09	5,600	0.09	4,600	0.07	5,500	0.09	11,250	0.09
D423TX-8-4	4	9,500	0.10	9,500	0.10	10,000	0.10	4,800	0.10	4,000	0.08	4,700	0.10	9,500	0.10
D423TX-8-4.5	4.5	8,550	0.11	8,550	0.11	9,000	0.11	4,300	0.11	3,600	0.09	4,250	0.11	8,550	0.11
D423TX-8-5	5	7,600	0.12	7,600	0.12	8,000	0.12	3,800	0.12	3,200	0.10	3,800	0.12	7,600	0.12
D423TX-8-5.5	5.5	7,000	0.13	7,000	0.13	7,300	0.13	3,500	0.13	2,900	0.11	3,500	0.13	7,000	0.13
D423TX-8-6	6	6,400	0.14	6,400	0.14	6,600	0.14	3,200	0.14	2,650	0.12	3,200	0.14	6,400	0.14
D423TX-8-6.5	6.5	6,000	0.14	6,000	0.14	6,200	0.14	3,000	0.14	2,450	0.12	3,000	0.14	6,000	0.14
D423TX-8-7	7	5,600	0.15	5,600	0.15	5,800	0.15	2,800	0.15	2,300	0.13	2,800	0.15	5,600	0.15
D423TX-8-7.5	7.5	5,200	0.15	5,200	0.15	5,400	0.15	2,600	0.15	2,150	0.13	2,600	0.15	5,200	0.15
D423TX-8-8	8	4,800	0.16	4,800	0.16	5,000	0.16	2,400	0.16	2,000	0.14	2,400	0.16	4,800	0.16
D423TX-8-8.5	8.5	4,550	0.16	4,550	0.16	4,750	0.16	2,275	0.16	1,900	0.14	2,275	0.16	4,550	0.16
D423TX-8-9	9	4,300	0.17	4,300	0.17	4,500	0.17	2,150	0.17	1,800	0.15	2,150	0.17	4,300	0.17
D423TX-8-9.5	9.5	4,050	0.17	4,050	0.17	4,250	0.17	2,025	0.17	1,700	0.15	2,025	0.17	4,050	0.17
D423TX-8-10	10	3,800	0.18	3,800	0.18	4,000	0.18	1,900	0.18	1,600	0.15	1,900	0.18	3,800	0.18
D423TX-8-10.5	10.5	3,650	0.18	3,650	0.18	3,800	0.18	1,825	0.18	1,525	0.15	1,825	0.18	3,650	0.18
D423TX-8-11	11	3,500	0.19	3,500	0.19	3,650	0.19	1,750	0.19	1,450	0.16	1,750	0.19	3,500	0.19
D423TX-8-11.5	11.5	3,350	0.19	3,350	0.19	3,450	0.19	1,675	0.19	1,375	0.16	1,675	0.19	3,350	0.19
D423TX-8-12	12	3,200	0.20	3,200	0.20	3,300	0.20	1,600	0.20	1,300	0.17	1,600	0.20	3,200	0.20
D423TX-8-12.5	12.5	3,075	0.20	3,075	0.20	3,175	0.20	1,535	0.20	1,275	0.17	1,535	0.20	3,075	0.20
D423TX-8-13	13	2,950	0.21	2,950	0.21	3,050	0.21	1,475	0.21	1,250	0.18	1,475	0.21	2,950	0.21
D423TX-8-13.5	13.5	2,775	0.21	2,775	0.21	2,975	0.21	1,400	0.21	1,225	0.18	1,400	0.21	2,775	0.21
D423TX-8-14	14	2,700	0.22	2,700	0.22	2,800	0.22	1,350	0.22	1,200	0.18	1,350	0.22	2,700	0.22
D423TX-8-14.5	14.5	2,625	0.23	2,625	0.23	2,725	0.23	1,310	0.23	1,150	0.18	1,310	0.23	2,625	0.23
D423TX-8-15	15	2,550	0.24	2,550	0.24	2,650	0.24	1,275	0.24	1,100	0.19	1,275	0.24	2,550	0.24
D423TX-8-15.5	15.5	2,475	0.24	2,475	0.24	2,575	0.24	1,235	0.24	1,050	0.19	1,235	0.24	2,475	0.24
D423TX-8-16	16	2,400	0.25	2,400	0.25	2,500	0.25	1,200	0.25	1,000	0.20	1,200	0.25	2,400	0.25

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度和轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

D423TX-12 / 16 超微粒鎢鋼塗層內冷高速鑽頭
Oil-Feed High Performance Drills

Code No. D423TX-12-Dc
D423TX-16-Dc

Dc h7	Lc mm	L mm	d h6	12XD D423TX-12	Dc h7	Lc mm	L mm	d h6	16XD D423TX-16
3	51	99	3	●	3	60	108	3	●
3.1	60	108	4	●	3.1	70	118	4	●
3.2	60	108	4	●	3.2	70	118	4	●
3.3	60	108	4	●	3.3	70	118	4	●
3.4	60	108	4	●	3.4	70	118	4	●
3.5	60	108	4	●	3.5	70	118	4	●
3.6	68	116	4	●	3.6	80	128	4	●
3.7	68	116	4	●	3.7	80	128	4	●
3.8	68	116	4	●	3.8	80	128	4	●
3.9	68	116	4	●	3.9	80	128	4	●
4	68	116	4	●	4	80	128	4	●
4.1	77	127	5	●	4.1	90	140	5	●
4.2	77	127	5	●	4.2	90	140	5	●
4.3	77	127	5	●	4.3	90	140	5	●
4.4	77	127	5	●	4.4	90	140	5	●
4.5	77	127	5	●	4.5	90	140	5	●
4.6	85	135	5	●	4.6	100	150	5	●
4.7	85	135	5	●	4.7	100	150	5	●
4.8	85	135	5	●	4.8	100	150	5	●
4.9	85	135	5	●	4.9	100	150	5	●
5	85	135	5	●	5	100	150	5	●
5.1	94	146	6	●	5.1	110	162	6	●
5.2	94	146	6	●	5.2	110	162	6	●
5.3	94	146	6	●	5.3	110	162	6	●
5.4	94	146	6	●	5.4	110	162	6	●
5.5	94	146	6	●	5.5	110	162	6	●
5.6	102	154	6	●	5.6	120	172	6	●
5.7	102	154	6	●	5.7	120	172	6	●
5.8	102	154	6	●	5.8	120	172	6	●
5.9	102	154	6	●	5.9	120	172	6	●
6	102	154	6	●	6	120	172	6	●
6.1	111	164	7	●	6.1	130	183	7	●
6.2	111	164	7	●	6.2	130	183	7	●
6.3	111	164	7	●	6.3	130	183	7	●
6.4	111	164	7	●	6.4	130	183	7	●
6.5	111	164	7	●	6.5	130	183	7	●
6.6	119	172	7	●	6.6	140	193	7	●
6.7	119	172	7	●	6.7	140	193	7	●
6.8	119	172	7	●	6.8	140	193	7	●
6.9	119	172	7	●	6.9	140	193	7	●
7	119	172	7	●	7	140	193	7	●
7.1	128	182	8	●	7.1	150	204	8	●
7.2	128	182	8	●	7.2	150	204	8	●
7.3	128	182	8	●	7.3	150	204	8	●
7.4	128	182	8	●	7.4	150	204	8	●
7.5	128	182	8	●	7.5	150	204	8	●
7.6	136	190	8	●	7.6	160	214	8	●
7.7	136	190	8	●	7.7	160	214	8	●
7.8	136	190	8	●	7.8	160	214	8	●
7.9	136	190	8	●	7.9	160	214	8	●
8	136	190	8	●	8	160	214	8	●
8.5	145	200	9	●	8.5	170	225	9	●
9	153	208	9	●	9	180	235	9	●
9.5	162	218	10	●	9.5	190	246	10	●
10	170	226	10	●	10	200	256	10	●
10.5	179	240	11	●	10.5	210	271	11	●
11	187	248	11	●	11	220	281	11	●
11.5	196	258	12	●	11.5	230	292	12	●
12	204	266	12	●	12	240	302	12	●

Steel < 52HRC

P	H	M	K	N	S
●	●	●	●		○

MG Carbide

AlTiSiN TX

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鐵<30HRC Low-alloyed Steel	●
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30~38HRC Hardened Steel	●
	GR5	硬化鋼 39~48HRC Hardened Steel	●
	GR6	硬化鋼 49~56HRC Hardened Steel	○
	GR7	硬化鋼 56~68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	●
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminum	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	○
	GR16	鎳 Nickel	○
	GR17	耐熱鋼 Heat-resistant Steel	○

※Out of stock in production ※庫存整理中，沒有現貨

Borehole parameters 鑽孔參數

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 不銹鋼 Stainless Steel		GR.9 鑄鐵 Cast Iron	
切削速度 Vc m/min		60~125		60~125		60~125		40~80		40~80		50~80	
型號 Code No.	切徑 Dc	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)
D423TX-12-16-3	3	7,500	0.06	7,500	0.06	7,500	0.06	5,300	0.06	5,300	0.06	5,300	0.06
D423TX-12-16-3.5	3.5	6,950	0.07	6,950	0.07	6,950	0.07	5,150	0.07	5,150	0.07	5,150	0.07
D423TX-12-16-4	4	6,400	0.08	6,400	0.08	6,400	0.08	5,000	0.08	5,000	0.08	5,000	0.08
D423TX-12-16-4.5	4.5	6,100	0.09	6,100	0.09	6,100	0.09	4,750	0.09	4,750	0.09	4,750	0.09
D423TX-12-16-5	5	5,800	0.10	5,800	0.10	5,800	0.10	4,500	0.10	4,500	0.10	4,500	0.10
D423TX-12-16-5.5	5.5	5,300	0.11	5,300	0.11	5,300	0.11	4,150	0.11	4,150	0.11	4,150	0.11
D423TX-12-16-6	6	4,800	0.12	4,800	0.12	4,800	0.12	3,800	0.12	3,800	0.12	3,800	0.12
D423TX-12-16-6.5	6.5	4,500	0.13	4,500	0.13	4,500	0.13	3,550	0.13	3,550	0.13	3,550	0.13
D423TX-12-16-7	7	4,200	0.14	4,200	0.14	4,200	0.14	3,300	0.14	3,300	0.14	3,300	0.14
D423TX-12-16-7.5	7.5	3,900	0.15	3,900	0.15	3,900	0.15	3,050	0.15	3,050	0.15	3,050	0.15
D423TX-12-16-8	8	3,600	0.16	3,600	0.16	3,600	0.16	2,800	0.16	2,800	0.16	2,800	0.16
D423TX-12-16-8.5	8.5	3,410	0.17	3,410	0.17	3,410	0.17	2,675	0.17	2,675	0.17	2,675	0.17
D423TX-12-16-9	9	3,250	0.18	3,250	0.18	3,250	0.18	2,550	0.18	2,550	0.18	2,550	0.18
D423TX-12-16-9.5	9.5	3,060	0.19	3,060	0.19	3,060	0.19	2,425	0.19	2,425	0.19	2,425	0.19
D423TX-12-16-10	10	2,900	0.20	2,900	0.20	2,900	0.20	2,300	0.20	2,300	0.20	2,300	0.20
D423TX-12-16-10.5	10.5	2,775	0.21	2,775	0.21	2,775	0.21	2,200	0.21	2,200	0.21	2,200	0.21
D423TX-12-16-11	11	2,650	0.22	2,650	0.22	2,650	0.22	2,100	0.22	2,100	0.22	2,100	0.22
D423TX-12-16-11.5	11.5	2,525	0.23	2,525	0.23	2,525	0.23	2,000	0.23	2,000	0.23	2,000	0.23
D423TX-12-16-12	12	2,400	0.24	2,400	0.24	2,400	0.24	1,900	0.24	1,900	0.24	1,900	0.24

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

D423TX-20 / 25 / 30 超微粒鎢鋼塗層內冷高速鑽頭
Oil-Feed High Performance Drills

Code No. D423TX-20-Dc
D423TX-25-Dc

Dc h7	Lc mm	L mm	d h6	20XD D423TX-20
3	75	123	3	●
3.1	88	136	4	●
3.2	88	136	4	●
3.3	88	136	4	●
3.4	88	136	4	●
3.5	88	136	4	●
3.6	100	148	4	●
3.7	100	148	4	●
3.8	100	148	4	●
3.9	100	148	4	●
4	100	148	4	●
4.1	113	163	5	●
4.2	113	163	5	●
4.3	113	163	5	●
4.4	113	163	5	●
4.5	113	163	5	●
4.6	125	175	5	●
4.7	125	175	5	●
4.8	125	175	5	●
4.9	125	175	5	●
5	125	175	5	●
5.1	140	192	6	●
5.2	140	192	6	●
5.3	140	192	6	●
5.4	140	192	6	●
5.5	140	192	6	●
5.6	150	202	6	●
5.7	150	202	6	●
5.8	150	202	6	●
5.9	150	202	6	●
6	150	202	6	●
6.1	163	216	7	●
6.2	163	216	7	●
6.3	163	216	7	●
6.4	163	216	7	●
6.5	163	216	7	●
6.6	175	228	7	●
6.7	175	228	7	●
6.8	175	228	7	●
6.9	175	228	7	●
7	175	228	7	●
7.1	188	242	8	●
7.2	188	242	8	●
7.3	188	242	8	●
7.4	188	242	8	●
7.5	188	242	8	●
7.6	200	254	8	●
7.7	200	254	8	●
7.8	200	254	8	●
7.9	200	254	8	●
8	200	254	8	●
8.5	213	268	9	●
9	225	280	9	●
9.5	238	294	10	●
10	250	306	10	●
10.5	263	324	11	—
11	275	336	11	—
11.5	288	350	12	—
12	300	362	12	—

Dc h7	Lc mm	L mm	d h6	25XD D423TX-25
3	90	138	3	—
3.5	105	153	4	—
4	120	168	4	—
4.5	135	185	5	—
5	150	200	5	—
5.5	165	217	6	—
6	180	232	6	—
6.5	195	248	7	—
7	210	263	7	—
7.5	225	279	8	—
8	240	294	8	—
8.5	255	310	9	—
9	270	325	9	—
9.5	285	341	10	—
10	300	356	10	—
10.5	315	376	11	—
11	330	391	11	—
11.5	345	407	12	—
12	360	422	12	—

Code No. D423TX-30-Dc

Dc h7	Lc mm	L mm	d h6	30XD D423TX-30
3	105	153	3	—
3.5	123	171	4	—
4	140	188	4	—
4.5	158	208	5	—
5	175	225	5	—
5.5	193	245	6	—
6	210	262	6	—
6.5	228	281	7	—
7	245	298	7	—
7.5	263	317	8	—
8	280	334	8	—
8.5	298	353	9	—
9	315	370	9	—
9.5	333	389	10	—
10	350	406	10	—
10.5	368	429	11	—
11	385	446	11	—
11.5	403	465	12	—
12	420	482	12	—

※ Mark: ——, Have not produced yet, no stock
※ Out of stock, in production

※ 記號 —— ，尚未製造，無庫存
※ 庫存建立中，沒有現貨

Steel < 52HRC

P	H	M	K	N	S
●	●	●	●		○

MG Carbide

AlTiSiN TX

Work Material

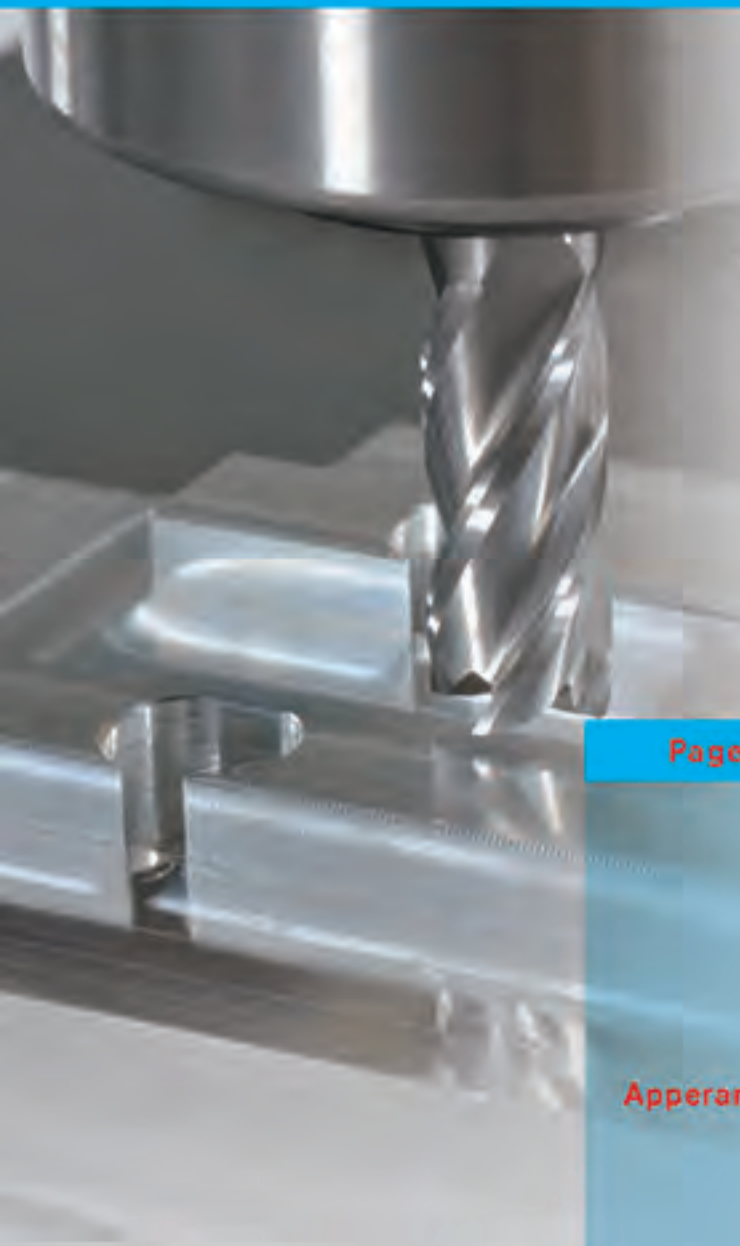
P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鐵<30HRC Low-alloyed Steel	●
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30~38HRC Hardened Steel	●
	GR5	硬化鋼 39~48HRC Hardened Steel	●
	GR6	硬化鋼 49~56HRC Hardened Steel	○
	GR7	硬化鋼 56~68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	●
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminum	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	○
	GR16	鎳 Nickel	○
	GR17	耐熱鋼 Heat-resistant Steel	○

Borehole parameters 鑽孔參數

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 淬火鋼 Hardened Steel (30~38HRC)		GR.8 不銹鋼 Stainless Steel		GR.9 鑄鐵 Cast Iron	
切削速度 Vc m/min		60~125		60~125		60~125		40~80		40~80		50~80	
型號 Code No.	刃徑 Dc	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)
D423TX-20-25-30-3	3	7,500	0.06	7,500	0.06	7,500	0.06	5,300	0.06	5,300	0.06	5,300	0.06
D423TX-20-25-30-3.5	3.5	6,950	0.07	6,950	0.07	6,950	0.07	5,150	0.07	5,150	0.07	5,150	0.07
D423TX-20-25-30-4	4	6,400	0.08	6,400	0.08	6,400	0.08	5,000	0.08	5,000	0.08	5,000	0.08
D423TX-20-25-30-4.5	4.5	6,100	0.09	6,100	0.09	6,100	0.09	4,750	0.09	4,750	0.09	4,750	0.09
D423TX-20-25-30-5	5	5,800	0.10	5,800	0.10	5,800	0.10	4,500	0.10	4,500	0.10	4,500	0.10
D423TX-20-25-30-5.5	5.5	5,300	0.11	5,300	0.11	5,300	0.11	4,150	0.11	4,150	0.11	4,150	0.11
D423TX-20-25-30-6	6	4,800	0.12	4,800	0.12	4,800	0.12	3,800	0.12	3,800	0.12	3,600	0.12
D423TX-20-25-30-6.5	6.5	4,500	0.13	4,500	0.13	4,500	0.13	3,550	0.13	3,550	0.13	3,550	0.13
D423TX-20-25-30-7	7	4,200	0.14	4,200	0.14	4,200	0.14	3,300	0.14	3,300	0.14	3,300	0.14
D423TX-20-25-30-7.5	7.5	3,900	0.15	3,900	0.15	3,900	0.15	3,050	0.15	3,050	0.15	3,050	0.15
D423TX-20-25-30-8	8	3,600	0.16	3,600	0.16	3,600	0.16	2,800	0.16	2,800	0.16	2,800	0.16
D423TX-20-25-30-8.5	8.5	3,410	0.17	3,410	0.17	3,410	0.17	2,675	0.17	2,675	0.17	2,675	0.17
D423TX-20-25-30-9	9	3,250	0.18	3,250	0.18	3,250	0.18	2,550	0.18	2,550	0.18	2,550	0.18
D423TX-20-25-30-9.5	9.5	3,060	0.19	3,060	0.19	3,060	0.19	2,425	0.19	2,425	0.19	2,425	0.19
D423TX-20-25-30-10	10	2,900	0.20	2,900	0.20	2,900	0.20	2,300	0.20	2,300	0.20	2,300	0.20
D423TX-20-25-30-10.5	10.5	2,775	0.21	2,775	0.21	2,775	0.21	2,200	0.21	2,200	0.21	2,200	0.21
D423TX-20-25-30-11	11	2,650	0.22	2,650	0.22	2,650	0.22	2,100	0.22	2,100	0.22	2,100	0.22
D423TX-20-25-30-11.5	11.5	2,525	0.23	2,525	0.23	2,525	0.23	2,000	0.23	2,000	0.23	2,000	0.23
D423TX-20-25-30-12	12	2,400	0.24	2,400	0.24	2,400	0.24	1,900	0.24	1,900	0.24	1,900	0.24

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工狀況、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

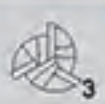
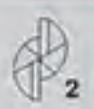


立銑刀
Drills

Page	199	201	203	205	207	209
Apperance						
Code No	E172	E182 E185 E187	E174	E184 E186 E188	B212	B280 B282
Carbide	MG Carbide	MG Carbide	MG Carbide	MG Carbide	MG Carbide	MG Carbide
Coating	Uncoated Blank	Uncoated Blank	Uncoated Blank	Uncoated Blank	Uncoated Blank	Uncoated Blank
Helix Angle						
No.of Flutes						

美標
ANSI

7leaders®
The Art of Cutting

211	213	215	217	219	219
					
B214	B281 B284	E133	E135 E136 E137	E192	E193
MG Carbide	MG Carbide	MG Carbide	MG Carbide	MG Carbide	MG Carbide
Uncoated Blank	Uncoated Blank	Uncoated Blank	Uncoated Blank	Uncoated Blank	Uncoated Blank
					
					

E172 超微粒鎢鋼通用立銑刀
Universal End Mills

Code No.E172-Dc

Dc	Lc	L	d	Blank	TiAlN
	mm	mm	h6	E172	E172F
0.2	0.5	38	3	●	—
0.3	0.8	38	3	●	—
0.4	1	38	3	●	—
0.5	1.2	38	3	●	—
0.6	1.5	38	3	●	—
0.7	1.8	38	3	●	—
0.8	2	38	3	●	—
0.9	2.5	38	3	●	—
1	3	38	3	●	—
1.5	5	38	3	●	—
2	6	38	3	●	—
2.5	7	38	3	●	—
3	9	38	3	●	—
3.5	12	50	4	●	—
4	14	50	4	●	—
4.5	14	50	5	●	—
5	16	50	5	●	—
5.5	16	50	6	●	—
6	20	63	6	●	—
6.5	20	63	8	●	—
7	20	63	8	●	—
7.5	20	63	8	●	—
8	20	63	8	●	—
8.5	22	72	10	●	—
9	22	72	10	●	—
9.5	22	72	10	●	—
10	22	72	10	●	—
11	26	75	12	●	—
12	26	75	12	●	—
13	32	89	14	●	—
14	32	89	14	●	—
15	32	89	16	●	—
16	32	89	16	●	—
17	38	100	18	●	—
18	38	100	18	●	—
20	38	100	20	●	—

※ Mark: —, On request, no stock
※ 記號 — : 可訂購規格，無現貨

Steel < 30HRC

P	H	M	K	N	S
●			○	●	

MG Carbide

Uncoated Blank

Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel	●
P	GR2	低合金鋼鋼<24HRC Low-alloyed Steel	●
P	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	
H	GR5	硬化鋼 38-48HRC Hardened Steel	
H	GR6	硬化鋼 48-54HRC Hardened Steel	
H	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	○
N	GR10	鋁 Aluminium	●
N	GR11	銅 Copper	●
N	GR12	塑膠 Plastics	●
N	GR13	複合材料 FRP CFRP Composite Material	
N	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
S	GR16	鎳 Nickel	
S	GR17	耐熱鋼 Heat-resistant Steel	

Slotting 滿切削

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.10 鋁 Aluminum		GR.11 銅 Copper		GR.12 塑料 Plastics	
切削速度 Vc m/min		40		40		34		100		40		34	
型號 Code No.	刃徑 Dc	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/min)
E172-0.2	0.2	25,000	30	25,000	30	22,000	25	32,000	35	25,000	30	22,000	25
E172-0.3	0.3	25,000	50	25,000	50	22,000	40	32,000	70	25,000	50	22,000	40
E172-0.5	0.5	25,000	50	25,000	50	22,000	40	32,000	80	25,000	50	22,000	40
E172-0.6	0.6	25,000	50	25,000	50	22,000	40	32,000	80	25,000	50	22,000	40
E172-0.8	0.8	25,000	50	25,000	50	22,000	40	32,000	80	25,000	50	22,000	40
E172-0.9	0.9	25,000	95	25,000	95	22,000	40	32,000	80	25,000	95	22,000	40
E172-1	1	12,500	95	12,500	95	10,500	40	31,500	200	12,500	95	10,500	40
E172-1.5	1.5	8,450	95	8,450	95	7,200	40	21,000	200	8,450	95	7,200	40
E172-2	2	6,350	95	6,350	95	5,400	40	15,500	200	6,350	95	5,400	40
E172-2.5	2.5	6,350	125	6,350	125	5,400	80	15,500	300	6,350	125	5,400	80
E172-3	3	4,200	125	4,200	125	3,600	80	10,500	300	4,200	125	3,600	80
E172-3.5	3.5	3,650	125	3,650	125	3,150	80	9,220	300	3,650	125	3,150	80
E172-4	4	3,150	125	3,150	125	2,700	80	7,950	300	3,150	125	2,700	80
E172-4.5	4.5	2,800	125	2,800	125	2,400	80	7,150	300	2,800	125	2,400	80
E172-5	5	2,500	125	2,500	125	2,150	80	6,350	300	2,500	125	2,150	80
E172-5.5	5.5	2,300	125	2,300	125	1,960	80	5,800	300	2,300	125	1,960	80
E172-6	6	2,100	125	2,100	125	1,800	80	5,300	300	2,100	125	1,800	80
E172-7	7	1,800	125	1,800	125	1,575	80	4,650	300	1,800	125	1,575	80
E172-8	8	1,550	125	1,550	125	1,350	80	3,950	300	1,550	125	1,350	80
E172-9	9	1,400	125	1,400	125	1,150	80	3,550	300	1,400	125	1,150	80
E172-10	10	1,250	125	1,250	125	1,050	80	3,150	300	1,250	125	1,050	80
E172-11	11	1,150	125	1,150	125	975	80	2,900	300	1,150	125	975	80
E172-12	12	1,050	125	1,050	125	900	80	2,650	300	1,050	125	900	80
E172-13	13	975	125	975	125	830	80	2,450	300	975	125	830	80
E172-14	14	900	125	900	125	770	80	2,250	300	900	125	770	80
E172-15	15	850	135	850	135	720	90	2,100	300	850	135	720	90
E172-16	16	800	150	800	150	675	100	1,950	300	800	150	675	100
E172-17	17	750	150	750	150	635	100	1,850	300	750	150	635	100
E172-18	18	705	150	705	150	600	100	1,750	300	705	150	600	100
E172-20	20	635	150	635	150	540	100	1,550	300	635	150	540	100
切入深度 (mm)		Dc<Ø1 AP=0.1D Dc<Ø3 AP=0.3D Dc>Ø3 AP=0.5D		Dc<Ø1 AP=0.1D Dc<Ø3 AP=0.3D Dc>Ø3 AP=0.5D		Dc<Ø1 AP=0.1D Dc<Ø3 AP=0.3D Dc>Ø3 AP=0.5D		Dc<Ø1 AP=0.1D Dc<Ø3 AP=0.3D Dc>Ø3 AP=0.5D		Dc<Ø1 AP=0.1D Dc<Ø3 AP=0.3D Dc>Ø3 AP=0.5D		Dc<Ø1 AP=0.1D Dc<Ø3 AP=0.3D Dc>Ø3 AP=0.5D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾頭。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的標準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

E182 / E185 / E187 超微粒鎢鋼通用立銑刀
Universal End Mills

Code No. EI82-Dc

Dc	Lc	L	d	Blank	TiAlN
	mm	mm	h6	EI82	EI82F
3	20	57	3	●	—
4	20	57	4	●	—
5	25	63	5	●	—
6	28	75	6	●	—
7	30	75	8	●	—
8	30	75	8	●	—
9	32	75	10	●	—
10	32	75	10	●	—
12	50	100	12	●	—
14	57	127	14	●	—
16	57	127	16	●	—
20	57	127	20	●	—

Code No. EI85-Dc

Dc	Lc	L	d	Blank	TiAlN
	mm	mm	h6	EI85	EI85F
3	25	75	3	●	—
4	28	75	4	●	—
5	32	75	5	●	—
6	38	100	6	●	—
8	42	100	8	●	—
10	45	100	10	●	—
12	75	150	12	●	—
14	80	150	14	●	—
16	80	150	16	●	—
20	80	150	20	●	—

Code No. EI87-Dc

Dc	Lc	L	d	Blank	TiAlN
	mm	mm	h6	EI87	EI87F
5	45	100	6	●	—
6	50	100	6	●	—
8	75	150	8	●	—
10	75	150	10	●	—
12	75	200	12	●	—
16	80	200	16	●	—
20	80	200	20	●	—

※ Mark: —, On request, no stock
※ 記號 —，可訂購規格，無現貨

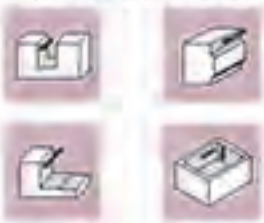
Steel < 30HRC

P	H	M	K	N	S
●			○	●	

MG Carbide

Uncoated Blank

Type of Operation



Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	
	GR5	硬化鋼 38-48HRC Hardened Steel	
	GR6	硬化鋼 48-54HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	○
N	GR10	鋁 Aluminium	●
	GR11	銅 Copper	●
	GR12	塑膠 Plastics	●
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Side Milling 側面切削

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.10 鋁 Aluminium		GR.11 銅 Copper		GR.12 塑料 Plastics	
切削速度 Vc m/min		40		35		35		80		50		40	
型號 Code No.	刃徑 Dc	RPM 回轉速度 [min-1]	Feed 進給速度 (mm/min)	RPM 回轉速度 [min-1]	Feed 進給速度 (mm/min)	RPM 回轉速度 [min-1]	Feed 進給速度 (mm/min)	RPM 回轉速度 [min-1]	Feed 進給速度 (mm/min)	RPM 回轉速度 [min-1]	Feed 進給速度 (mm/min)	RPM 回轉速度 [min-1]	Feed 進給速度 (mm/min)
E182/E185-3	3	2,300	55	2,100	50	2,100	50	3,700	110	2,650	75	2,300	55
E182/E185-4	4	1,750	55	1,550	50	1,550	50	2,750	110	1,050	75	1,750	55
E182/E185/E187-5	5	1,400	55	1,250	50	1,250	50	2,200	110	1,550	75	1,400	55
E182/E185/E187-6	6	1,150	55	1,050	50	1,050	50	1,850	110	1,300	75	1,150	55
E182-7	7	955	55	865	50	865	50	1,590	110	1,135	75	955	55
E182/E185/E187-8	8	875	55	795	50	795	50	1,350	110	995	75	875	55
E182-9	9	745	55	675	50	675	50	1,235	110	875	75	745	55
E182/E185/E187-10	10	700	55	635	50	635	50	1,100	110	705	75	700	55
E182/E185/E187-12	12	580	55	530	50	530	50	925	110	660	75	580	55
E182/E185/-14	14	475	55	435	50	435	50	795	110	575	75	475	55
E182/E185/E187-16	16	415	55	420	50	420	50	695	110	475	75	415	55
E182/E185/E187-20	20	330	55	305	50	305	50	555	110	385	75	330	55
切入深度 (mm) 		ap:4D		ap:4D		ap:4D		ap:4D		ap:4D		ap:4D	

⚠ Notice: E185、E187 is Long Length series End Mills. Please adjust the parameter according

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

⚠注意E185、E187為加長柄系列銑刀，請按照適當的伸長度調整刀具的參數。

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

E174 超微粒鎢鋼精加工立銑刀
Finishing End Mills

Code No. E174-Dc

Dc $^{0}_{-0.03}$	Lc mm	L mm	d h6	Blank E174	TIAIN E174F
1	3	38	3	●	—
1.5	5	38	3	●	—
2	6	38	3	●	—
2.5	7	38	3	●	—
3	9	38	3	●	—
3.5	12	50	4	●	—
4	14	50	4	●	—
4.5	14	50	5	●	—
5	16	50	5	●	—
5.5	16	50	6	●	—
6	20	63	6	●	—
6.5	20	63	8	●	—
7	20	63	8	●	—
7.5	20	63	8	●	—
8	20	63	8	●	—
8.5	22	72	10	●	—
9	22	72	10	●	—
9.5	22	72	10	●	—
10	22	72	10	●	—
11	26	75	12	●	—
12	26	75	12	●	—
13	32	89	14	●	—
14	32	89	14	●	—
15	32	89	16	●	—
16	32	89	16	●	—
17	38	100	18	●	—
18	38	100	18	●	—
20	38	100	20	●	—

※ Mark: —, On request, no stock

※ 記號 —，可訂購規格，無現貨

Steel < 30HRC

P	H	M	K	N	S
●			○	●	

Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel	●
P	GR2	低合金鋼鋼<24HRC Low-alloyed Steel	●
P	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	
H	GR5	硬化鋼 38-48HRC Hardened Steel	
H	GR6	硬化鋼 49-54HRC Hardened Steel	
H	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	○
N	GR10	鋁 Aluminium	●
N	GR11	銅 Copper	●
N	GR12	塑膠 Plastics	●
N	GR13	複合材料 FRP CFRP Composite Material	
N	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
S	GR16	鎳 Nickel	
S	GR17	耐熱鋼 Heat-resistant Steel	

Side Milling 側面切削

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.10 鋁 Aluminium		GR.11 銅 Copper		GR.12 塑料 Plastics	
切削速度 Vc m/min		80		60		50		150		100		60	
型號 Code No.	刃徑 Dc	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)
E174-1	1	14,000	140	14,000	140	10,500	120	38,000	400	25,000	140	10,500	120
E174-1.5	1.5	9,850	200	9,650	200	7,000	180	25,000	450	17,000	200	7,000	180
E174-2	2	7,000	250	7,000	250	5,250	230	19,000	835	12,700	250	5,250	230
E174-2.5	2.5	5,600	250	5,600	250	4,200	230	15,000	835	10,100	250	4,200	230
E174-3	3	4,650	295	4,650	295	3,500	230	12,700	900	8,500	295	3,500	230
E174-3.5	3.5	4,050	320	4,050	320	3,000	230	11,100	925	7,400	320	3,000	230
E174-4	4	3,500	350	3,500	350	2,620	230	9,500	950	6,300	350	2,620	230
E174-4.5	4.5	3,150	360	3,150	360	2,350	240	8,500	960	5,700	360	2,350	240
E174-5	5	2,800	370	2,800	370	2,100	250	7,600	970	5,100	370	2,100	250
E174-5.5	5.5	2,550	375	2,550	375	1,920	250	6,900	980	4,650	375	1,920	250
E174-6	6	2,300	385	2,300	385	1,750	250	6,300	990	4,200	385	1,750	250
E174-7	7	2,025	385	2,025	385	1,525	250	5,520	995	3,650	385	1,525	250
E174-8	8	1,750	390	1,750	390	1,300	250	4,775	1,000	3,100	390	1,300	250
E174-9	9	1,570	415	1,570	415	1,175	250	4,270	1,000	2,800	415	1,175	250
E174-10	10	1,400	445	1,400	445	1,050	250	3,800	1,000	2,500	445	1,050	250
E174-11	11	1,280	445	1,280	445	960	250	3,485	1,050	2,300	445	960	250
E174-12	12	1,165	450	1,165	450	875	250	3,185	1,100	2,100	450	875	250
E174-13	13	1,080	485	1,080	485	810	260	2,950	1,100	1,950	485	810	260
E174-14	14	1,000	525	1,000	525	750	275	2,730	1,100	1,800	525	750	275
E174-15	15	935	535	935	535	700	285	2,560	1,100	1,700	535	700	285
E174-16	16	875	545	875	545	660	295	2,400	1,100	1,600	545	650	295
E174-17	17	825	545	825	545	615	295	2,250	1,100	1,500	545	615	295
E174-18	18	775	550	775	550	580	295	2,100	1,100	1,400	550	580	295
E174-20	20	700	560	700	560	525	295	1,900	1,100	1,200	560	525	295
切入深度 (mm)		ap:1.5		ap:1.5		ap:1.5		ap:1.5		ap:1.5		ap:1.5	
		ae:0.05		ae:0.05		ae:0.05		ae:0.1		ae:0.05		ae:0.05	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

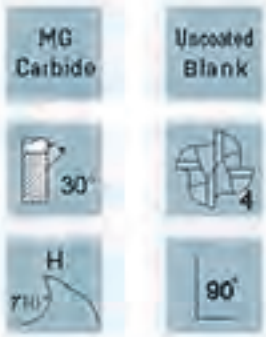
1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度和轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

Code No. E184-Dc

Dc	Lc	L	d	Blank	TiAlN
	mm	mm	h6	E184	E184F
3	20	57	3	●	—
4	20	57	4	●	—
5	25	63	5	●	—
6	28	75	6	●	—
7	30	75	8	●	—
8	30	75	8	●	—
9	32	75	10	●	—
10	32	75	10	●	—
12	50	100	12	●	—
14	57	127	14	●	—
16	57	127	16	●	—
20	57	127	20	●	—

Steel < 30HRC

P	H	M	K	N	S
●			○	●	



Type of Operation

Code No. E186-Dc

Dc	Lc	L	d	Blank	TiAlN
	mm	mm	h6	E186	E186F
3	25	75	3	●	—
4	28	75	4	●	—
5	32	75	5	●	—
6	38	100	6	●	—
8	42	100	8	●	—
10	45	100	10	●	—
12	75	150	12	●	—
14	80	150	14	●	—
16	80	150	16	●	—
20	80	150	20	●	—

Code No. E188-Dc

Dc	Lc	L	d	Blank	TiAlN
	mm	mm	h6	E188	E188F
5	45	100	6	●	—
6	50	100	6	●	—
8	75	150	8	●	—
10	75	150	10	●	—
12	75	200	12	●	—
16	80	200	16	●	—
20	80	200	20	●	—

※ Mark: —, On request, no stock
※ 記號 — ，可訂購規格，無現貨

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	
	GR5	硬化鋼 38-48HRC Hardened Steel	
	GR6	硬化鋼 48-54HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	○
N	GR10	鋁 Aluminium	●
	GR11	銅 Copper	●
	GR12	塑膠 Plastics	●
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Side Milling 側面切削

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.10 鋁 Aluminium		GR.11 銅 Copper		GR.12 塑料 Plastics	
切削速度 Vc m/min		30		30		20		45		40		20	
型號 Code No.	刃數 Dc	RPM 迴轉速度 [min-1]	Feed 進給速度 [mm/min]	RPM 迴轉速度 [min-1]	Feed 進給速度 [mm/min]	RPM 迴轉速度 [min-1]	Feed 進給速度 [mm/min]	RPM 迴轉速度 [min-1]	Feed 進給速度 [mm/min]	RPM 迴轉速度 [min-1]	Feed 進給速度 [mm/min]	RPM 迴轉速度 [min-1]	Feed 進給速度 [mm/min]
E184/E186-3	3	2,300	80	2,300	80	2,000	70	3,700	175	2,650	80	2,000	70
E184/E186-4	4	1,700	80	1,700	80	1,400	75	2,750	175	1,950	80	1,400	75
E184/E186/E188-5	5	1,400	80	1,400	80	1,100	75	2,230	175	1,590	80	1,100	75
E184/E186/E188-6	6	1,100	80	1,100	80	955	75	1,850	175	1,300	80	955	75
E184-7	7	985	80	985	80	825	75	1,640	175	1,150	80	825	75
E184/E186/E188-8	8	875	80	875	80	700	75	1,390	175	995	80	700	75
E184-9	9	780	80	780	80	630	75	1,250	175	885	80	630	75
E184/E186/E188-10	10	700	80	700	80	570	75	1,110	175	795	80	570	75
E184/E186/E188-12	12	580	80	580	80	470	75	930	175	660	80	470	75
E184/E186-14	14	500	90	500	90	400	80	800	185	570	90	400	80
E184/E186/E188-16	16	435	90	435	90	350	80	700	185	500	90	350	80
E184/E186/E188-20	20	350	90	350	90	280	80	560	185	400	90	280	80
切入深度 (mm) 		ap:4D		ap:4D		ap:4D		ap:4D		ap:4D		ap:4D	
		ae:0.01D		ae:0.01D		ae:0.01D		ae:0.01D		ae:0.01D		ae:0.01D	

※ Notice: E186、E188 is Long Length series End Mills. Please adjust the parameter according

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

※注意E186、E188為加長柄系列刀具，請按照適當的伸長量調整刀具的參數。

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

B212 超微粒鎢鋼圓頭立銑刀
Ball Nose End Mills

Code No. B212-Dc

Dc 0 -0.03	R ±0.01	Lc mm	L mm	d h6	Blank B212	TIAIN B212F
0.2	0.1R	0.4	38	3	●	—
0.3	0.15R	0.6	38	3	●	—
0.4	0.2R	0.8	38	3	●	—
0.5	0.25R	1	38	3	●	—
0.6	0.3R	1.2	38	3	●	—
0.7	0.35R	1.4	38	3	●	—
0.8	0.4R	1.6	38	3	●	—
0.9	0.45R	2	38	3	●	—
1	0.5R	3	38	3	●	—
1.5	0.75R	5	38	3	●	—
2	1R	6	38	3	●	—
2.5	1.25R	7	38	3	●	—
3	1.5R	9	38	3	●	—
3.5	1.75R	12	50	4	●	—
4	2R	14	50	4	●	—
4.5	2.25R	16	50	5	●	—
5	2.5R	16	50	5	●	—
5.5	2.75R	16	50	6	●	—
6	3R	20	63	6	●	—
6.5	3.25R	20	63	8	●	—
7	3.5R	20	63	8	●	—
7.5	3.75R	20	63	8	●	—
8	4R	20	63	8	●	—
8.5	4.25R	22	72	10	●	—
9	4.5R	22	72	10	●	—
9.5	4.75R	22	72	10	●	—
10	5R	22	72	10	●	—
11	5.5R	26	75	12	●	—
12	6R	26	75	12	●	—
13	6.5R	32	89	14	●	—
14	7R	32	89	14	●	—
15	7.5R	32	89	16	●	—
16	8R	32	89	16	●	—
17	8.5R	38	100	18	●	—
18	9R	38	100	18	●	—
20	10R	38	100	20	●	—

※ Mark: —, On request, no stock

※ 記號 — : 可訂購規格，無現貨

Steel < 30HRC

P	H	M	K	N	S
●			○	●	

Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel	●
P	GR2	低合金鋼鋼<24HRC Low-alloyed Steel	●
P	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	
H	GR5	硬化鋼 38-48HRC Hardened Steel	
H	GR6	硬化鋼 48-54HRC Hardened Steel	
H	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	○
N	GR10	鋁 Aluminium	●
N	GR11	銅 Copper	●
N	GR12	塑膠 Plastics	●
N	GR13	複合材料 FRP CFRP Composite Material	
N	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
S	GR16	鎳 Nickel	
S	GR17	耐熱鋼 Heat-resistant Steel	

B212 切削條件參考表

Recommended Milling Conditions

General processing 普通加工

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.10 鋁 Aluminium		GR.11 銅 Copper		GR.12 塑料 Plastics	
切削速度 Vc m/min		40		40		35		100		40		35	
型號 Code No.	切深 Dc	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)
B212-0.2	0.2	25,000	30	25,000	30	22,000	25	32,000	35	25,000	30	22,000	25
B212-0.3	0.3	25,000	50	25,000	50	22,000	40	32,000	70	25,000	50	22,000	40
B212-0.5	0.5	25,000	50	25,000	50	22,000	40	32,000	80	25,000	50	22,000	40
B212-0.8	0.8	25,000	50	25,000	50	22,000	40	32,000	80	25,000	50	22,000	40
B212-1	1	12,500	95	12,500	95	10,500	40	31,500	200	12,500	95	10,500	40
B212-1.5	1.5	9,400	95	9,400	95	7,900	40	23,500	200	9,400	95	7,900	40
B212-2	2	6,350	95	6,350	95	5,400	40	15,500	200	6,350	95	5,400	40
B212-2.5	2.5	5,200	110	5,200	110	4,500	60	13,000	250	5,200	110	4,500	60
B212-3	3	4,200	125	4,200	125	3,600	80	10,500	300	4,200	125	3,600	80
B212-3.5	3.5	3,650	125	3,650	125	3,150	80	9,225	300	3,650	125	3,150	80
B212-4	4	3,150	125	3,150	125	2,700	80	7,950	300	3,150	125	2,700	80
B212-4.5	4.5	2,800	125	2,800	125	2,350	80	7,150	300	2,800	125	2,350	80
B212-5	5	2,500	125	2,500	125	2,150	80	6,350	300	2,500	125	2,150	80
B212-5.5	5.5	2,300	125	2,300	125	1,970	80	5,800	300	2,300	125	1,970	80
B212-6	6	2,100	125	2,100	125	1,800	80	5,300	300	2,100	125	1,800	80
B212-7	7	1,800	125	1,800	125	1,570	80	4,600	300	1,800	125	1,570	80
B212-8	8	1,550	125	1,550	125	1,350	80	3,950	300	1,550	125	1,350	80
B212-9	9	1,400	125	1,400	125	1,150	80	3,550	300	1,400	125	1,150	80
B212-10	10	1,250	125	1,250	125	1,050	80	3,150	300	1,250	125	1,050	80
B212-11	11	1,150	125	1,150	125	950	80	2,850	300	1,150	125	950	80
B212-12	12	1,050	125	1,050	125	900	80	2,650	300	1,050	125	900	80
B212-13	13	950	125	950	125	830	80	2,450	300	950	125	830	80
B212-14	14	900	125	900	125	770	80	2,250	300	900	125	770	80
B212-15	15	850	137	850	137	720	90	2,100	300	850	137	720	90
B212-16	16	800	150	800	150	675	100	1,950	300	800	150	675	100
B212-17	17	750	150	750	150	635	100	1,850	300	750	150	635	100
B212-18	18	705	150	705	150	600	100	1,750	300	705	150	600	100
B212-20	20	635	150	635	150	540	100	1,550	300	635	150	540	100
切入深度 (mm)		ap:0.1D Dc<Ø1 ae:0.1D Dc≥Ø1 ae:0.2D		ap:0.1D Dc<Ø1 ae:0.1D Dc≥Ø1 ae:0.2D		ap:0.1D Dc<Ø1 ae:0.1D Dc≥Ø1 ae:0.2D		ap:0.1D Dc<Ø1 ae:0.1D Dc≥Ø1 ae:0.2D		ap:0.1D Dc<Ø1 ae:0.1D Dc≥Ø1 ae:0.2D		ap:0.1D Dc<Ø1 ae:0.1D Dc≥Ø1 ae:0.2D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中加工數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振顫，請降低切削條件。

B280 / B282 超微粒鎢鋼圓頭立銑刀
Ball Nose End Mills

Code No. B280-Dc

Dc $^{0}_{-0.03}$	R ±0.01	Lc mm	L mm	d h6	Blank B280	TIAIN B280F
3	1.5R	20	57	3	●	—
4	2R	20	57	4	●	—
5	2.5R	25	63	5	●	—
6	3R	28	75	6	●	—
7	3.5R	30	75	8	●	—
8	4R	30	75	8	●	—
9	4.5R	32	75	10	●	—
10	5R	32	75	10	●	—
12	6R	50	100	12	●	—
14	7R	57	127	14	●	—
16	8R	57	127	16	●	—
20	10R	57	127	20	●	—

Steel < 48HRC

P	H	M	K	N	S
●			○	●	

MG Carbide

Uncoated Blank

Type of Operation

Code No. B282-Dc

Dc $^{0}_{-0.03}$	R ±0.01	Lc mm	L mm	d h6	Blank B282	TIAIN B282F
3	1.5R	25	75	3	●	—
4	2R	28	75	4	●	—
5	2.5R	32	75	5	●	—
6	3R	38	100	6	●	—
8	4R	42	100	8	●	—
10	5R	45	100	10	●	—
12	6R	75	150	12	●	—
14	7R	80	150	14	●	—
16	8R	80	150	16	●	—
20	10R	80	150	20	●	—

※ Mark: —, On request, no stock

※ 記號 —，可訂購規格，無現貨

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鋼<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	
	GR5	硬化鋼 38-48HRC Hardened Steel	
	GR6	硬化鋼 48-54HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	○
N	GR10	鋁 Aluminium	●
	GR11	銅 Copper	●
	GR12	塑膠 Plastics	●
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Side Milling 側面切削

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.10 鋁 Aluminium		GR.11 銅 Copper		GR.12 塑膠 Plastics	
切削速度 Vc m/min		40		40		35		80		50		40	
型號 Code No.	刃徑 Dc	RPM 回轉速度 [min-1]	Feed 進給速度 (mm/min)	RPM 回轉速度 [min-1]	Feed 進給速度 (mm/min)	RPM 回轉速度 [min-1]	Feed 進給速度 (mm/min)	RPM 回轉速度 [min-1]	Feed 進給速度 (mm/min)	RPM 回轉速度 [min-1]	Feed 進給速度 (mm/min)	RPM 回轉速度 [min-1]	Feed 進給速度 (mm/min)
B280/B282-3	3	2,300	55	2,100	50	2,100	50	3,700	110	2,650	75	2,300	55
B280/B282-4	4	1,750	55	1,550	50	1,550	50	2,750	110	1,050	75	1,750	55
B280/B282-5	5	1,400	55	1,250	50	1,250	50	2,200	110	1,550	75	1,400	55
B280/B282-6	6	1,150	55	1,050	50	1,050	50	1,850	110	1,300	75	1,150	55
B280/B282-7	7	955	55	865	50	865	50	1,590	110	1,135	75	955	55
B280/B282-8	8	875	55	795	50	795	50	1,350	110	995	75	875	55
B280/B282-9	9	745	55	675	50	675	50	1,235	110	875	75	745	55
B280/B282-10	10	700	55	635	50	635	50	1,100	110	795	75	700	55
B280/B282-12	12	580	55	530	50	530	50	925	110	660	75	580	55
B280/B282-14	14	475	55	435	50	435	50	795	110	575	75	475	55
B280/B282-16	16	415	55	420	50	420	50	695	110	475	75	415	55
B280/B282-20	20	330	55	305	50	305	50	555	110	385	75	330	55
切入深度 (mm)		ap:4D		ap:4D		ap:4D		ap:4D		ap:4D		ap:4D	
		ae:0.01D		ae:0.01D		ae:0.01D		ae:0.01D		ae:0.01D		ae:0.01D	

※ Notice: B282 is Long Length series End Mills. Please adjust the parameter according

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate [fz] and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

※注意B282為加長柄系列銑刀，請按照適當的比例調整刀具的參數。

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

B214 超微粒鎢鋼圓頭立銑刀
Ball Nose End Mills

Code No. B214-Dc

Dc 0 -0.03	R ±0.01	Lc mm	L mm	d h6	Blank B214	TiAlN B214F
1	0.5R	3	38	3	●	—
1.5	0.75R	5	38	3	●	—
2	1R	6	38	3	●	—
2.5	1.25R	7	38	3	●	—
3	1.5R	9	38	3	●	—
3.5	1.75R	12	50	4	●	—
4	2R	14	50	4	●	—
4.5	2.25R	16	50	5	●	—
5	2.5R	16	50	5	●	—
5.5	2.75R	16	50	6	●	—
6	3R	20	63	6	●	—
6.5	3.25R	20	63	8	●	—
7	3.5R	20	63	8	●	—
7.5	3.75R	20	63	8	●	—
8	4R	20	63	8	●	—
8.5	4.25R	22	72	10	●	—
9	4.5R	22	72	10	●	—
9.5	4.75R	22	72	10	●	—
10	5R	22	72	10	●	—
11	5.5R	26	75	12	●	—
12	6R	26	75	12	●	—
13	6.5R	32	89	14	●	—
14	7R	32	89	14	●	—
15	7.5R	32	89	16	●	—
16	8R	32	89	16	●	—
17	8.5R	38	100	18	●	—
18	9R	38	100	18	●	—
20	10R	38	100	20	●	—

※ Mark: —, On request, no stock

※ 記號 —，可訂購規格，無現貨

Steel < 30HRC

P	H	M	K	N	S
●			○	●	

MG Carbide

Uncoated Blank

Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鋼<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	
	GR5	硬化鋼 38-48HRC Hardened Steel	
	GR6	硬化鋼 48-54HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	○
N	GR10	鋁 Aluminium	●
	GR11	銅 Copper	●
	GR12	塑膠 Plastics	●
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

B214 切削條件參考表

Recommended Milling Conditions

General processing 普通加工

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.10 鋁 Aluminium		GR.11 銅 Copper		GR.12 塑料 Plastics	
切削速度 Vc m/min		60		60		50		150		100		60	
型號 Code No.	刃徑 Dc	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)
B214-R0.5	1	14,000	140	14,000	140	10,500	120	38,000	400	25,000	140	10,500	120
B214-R0.75	1.5	9,650	200	9,650	200	7,000	180	25,000	450	17,000	200	7,000	180
B214-R1	2	7,900	250	7,000	250	5,250	230	19,000	835	12,700	250	5,250	230
B214-R1.25	2.5	5,600	250	5,600	250	4,200	230	15,000	835	10,100	250	4,200	230
B214-R1.5	3	4,650	295	4,650	295	3,500	230	12,700	900	8,500	295	3,500	230
B214-R1.75	3.5	4,000	295	4,000	295	3,000	230	11,000	900	7,200	295	3,000	230
B214-R2	4	3,500	350	3,500	350	2,620	230	9,500	950	6,300	350	2,620	230
B214-R2.25	4.5	3,100	350	3,100	350	2,335	230	8,500	950	5,600	350	2,335	230
B214-R2.5	5	2,800	370	2,800	370	2,100	250	7,600	970	5,100	370	2,100	250
B214-R2.75	5.5	2,550	375	2,550	375	1,920	250	6,950	980	4,650	375	1,920	250
B214-R3	6	2,300	385	2,300	385	1,750	250	6,300	990	4,200	385	1,750	250
B214-R3.5	7	2,000	385	2,000	385	1,520	250	5,520	990	3,650	385	1,520	250
B214-R4	8	1,750	390	1,750	390	1,300	250	4,775	1,000	3,100	390	1,300	250
B214-R4.5	9	1,570	415	1,570	415	1,175	250	4,280	1,000	2,800	415	1,175	250
B214-R5	10	1,400	445	1,400	445	1,050	250	3,800	1,000	2,500	445	1,050	250
B214-R5.5	11	1,280	445	1,280	445	965	250	3,485	1,050	2,300	445	965	250
B214-R6	12	1,165	450	1,165	450	875	250	3,185	1,100	2,100	450	875	250
B214-R6.5	13	1,080	485	1,080	485	810	260	2,950	1,100	1,950	485	810	260
B214-R7	14	1,000	525	1,000	525	750	275	2,730	1,100	1,800	525	750	275
B214-R7.5	15	935	535	935	535	700	285	2,550	1,100	1,700	535	700	285
B214-R8	16	875	545	875	545	650	295	2,400	1,100	1,600	545	650	295
B214-R8.5	17	825	545	825	545	615	295	2,250	1,100	1,500	545	615	295
B214-R9	18	775	550	775	550	580	295	2,100	1,100	1,400	550	580	295
B214-R10	20	700	560	700	560	525	295	1,900	1,100	1,200	560	525	295
切入深度 (mm)		ap:0.1D		ap:0.1D		ap:0.1D		ap:0.1D		ap:0.1D		ap:0.1D	
		Dc≤Ø1 ae:0.1D Dc>Ø1 ae:0.2D		Dc≤Ø1 ae:0.1D Dc>Ø1 ae:0.2D		Dc≤Ø1 ae:0.1D Dc>Ø1 ae:0.2D		Dc≤Ø1 ae:0.1D Dc>Ø1 ae:0.2D		Dc≤Ø1 ae:0.1D Dc>Ø1 ae:0.2D		Dc≤Ø1 ae:0.1D Dc>Ø1 ae:0.2D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

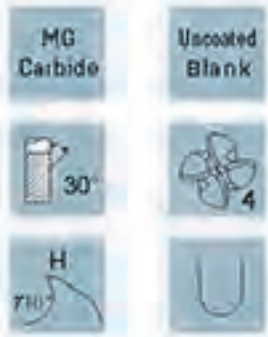
B281 / B284 超微粒鎢鋼圓頭立銑刀
Ball Nose End Mills

Code No. B281-Dc

Dc $^{0}_{-0.03}$	R ±0.01	Lc mm	L mm	d h6	Blank B281	TIAIN B281F
3	1.5R	20	57	3	●	—
4	2R	20	57	4	●	—
5	2.5R	25	63	5	●	—
6	3R	28	75	6	●	—
7	3.5R	30	75	8	●	—
8	4R	30	75	8	●	—
9	4.5R	32	75	10	●	—
10	5R	32	75	10	●	—
12	6R	50	100	12	●	—
14	7R	57	127	14	●	—
16	8R	57	127	16	●	—
20	10R	57	127	20	●	—

Steel < 30HRC

P	H	M	K	N	S
●			○	●	



Type of Operation

Code No. B284-Dc

Dc $^{0}_{-0.03}$	R ±0.01	Lc mm	L mm	d h6	Blank B284	TIAIN B284F
3	1.5R	25	75	3	●	—
4	2R	28	75	4	●	—
5	2.5R	32	75	5	●	—
6	3R	38	100	6	●	—
8	4R	42	100	8	●	—
10	5R	45	100	10	●	—
12	6R	75	150	12	●	—
14	7R	80	150	14	●	—
16	8R	80	150	16	●	—
20	10R	80	150	20	●	—

※ Mark —: On request, no stock
※ 記號 —：可訂購規格，無現貨

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	
	GR5	硬化鋼 38-48HRC Hardened Steel	
	GR6	硬化鋼 48-54HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	○
N	GR10	鋁 Aluminium	●
	GR11	銅 Copper	●
	GR12	塑膠 Plastics	●
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Side Milling 側面切削

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.10 鋁 Aluminium		GR.11 銅 Copper		GR.12 塑膠 Plastics	
切削速度 Vc m/min		30		30		20		45		40		20	
型號 Code No.	刃徑 Dc	RPM 回轉速度 [min-1]	Feed 進給速度 [mm/min]	RPM 回轉速度 [min-1]	Feed 進給速度 [mm/min]	RPM 回轉速度 [min-1]	Feed 進給速度 [mm/min]	RPM 回轉速度 [min-1]	Feed 進給速度 [mm/min]	RPM 回轉速度 [min-1]	Feed 進給速度 [mm/min]	RPM 回轉速度 [min-1]	Feed 進給速度 [mm/min]
B281/B284-3	3	2,300	80	2,300	80	2,000	70	3,700	175	2,650	80	2,000	70
B281/B284-4	4	1,700	80	1,700	80	1,400	75	2,750	175	1,950	80	1,400	75
B281/B284-5	5	1,400	80	1,400	80	1,100	75	2,230	175	1,590	80	1,100	75
B281/B284-6	6	1,100	80	1,100	80	955	75	1,850	175	1,300	80	955	75
B281-7	7	985	80	985	80	825	75	1,620	175	1,150	80	825	75
B281/B284-8	8	875	80	875	80	700	75	1,380	175	985	80	700	75
B281-9	9	780	80	780	80	630	75	1,250	175	695	80	630	75
B281/B284-10	10	700	80	700	80	570	75	1,110	175	705	80	570	75
B281/B284-12	12	580	80	580	80	470	75	900	175	660	80	470	75
B281/B284-14	14	500	90	500	90	400	80	800	185	570	90	400	80
B281/B284-16	16	435	90	435	90	350	80	700	185	500	90	350	80
B281/B284-20	20	350	90	350	90	280	80	550	185	400	90	280	80
切入深度 (mm)		ap:4D		ap:4D		ap:4D		ap:4D		ap:4D		ap:4D	
		ae:0.01D		ae:0.01D		ae:0.01D		ae:0.01D		ae:0.01D		ae:0.01D	

☆ Notice: B284 is Long Length series End Mills. Please adjust the parameter according.

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

☆注意B284為加長柄系列銑刀，請依照適當的條件調整刀具的參數。

1. 請使用剛性好、精度高的設備和夾頭。
2. 需選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

EI33 超微粒鎢鋼鋁用立銑刀
End Mills For Aluminum

Code No. EI33-Dc

Dc $^{0}_{-0.03}$	Lc mm	L mm	d h6	Blank EI33
1	3	38	3	●
1.5	5	38	3	●
2	6	38	3	●
2.5	7	38	3	●
3	9	38	3	●
4	14	50	4	●
5	16	50	5	●
6	20	63	6	●
7	20	63	8	●
8	20	63	8	●
9	22	72	10	●
10	22	72	10	●
12	26	75	12	●
14	32	89	14	●
16	32	89	16	●
18	38	100	18	●
20	38	100	20	●

Aluminium

P	H	M	K	N	S
				●	

MG Carbide

Uncoated Blank

Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel	
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	
H	GR4	硬化鋼 30-38HRC Hardened Steel	
	GR5	硬化鋼 38-48HRC Hardened Steel	
	GR6	硬化鋼 48-54HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	
N	GR10	鋁 Aluminium	●
	GR11	銅 Copper	○
	GR12	塑膠 Plastics	○
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Side Milling 側面切削

被削材 Work Material		GR.10 鋁 Aluminium	
切削速度 Vc m/min		200	
型號 Code No.	刃徑 Dc	RPM 主軸轉速 [min-1]	Feed 進給速度 [mm/min]
E133-1	1	30,000	880
E133-1.5	1.5	22,500	600
E133-2	2	22,500	800
E133-2.5	2.5	23,400	1,100
E133-3	3	21,000	950
E133-4	4	15,500	1,000
E133-5	5	12,500	1,100
E133-6	6	10,500	1,200
E133-7	7	9,250	1,250
E133-8	8	8,000	1,300
E133-9	9	7,150	1,400
E133-10	10	6,350	1,500
E133-12	12	5,300	1,550
E133-14	14	4,600	1,550
E133-16	16	4,000	1,550
E133-18	18	3,570	1,500
E133-20	20	3,150	1,500
切入深度 (mm) 		ap:1.5D	
		ae:0.1D	

Slotting 溝切削

被削材 Work Material		GR.10 鋁 Aluminium	
切削速度 Vc m/min		200	
型號 Code No.	刃徑 Dc	RPM 主軸轉速 [min-1]	Feed 進給速度 [mm/min]
E133-1	1	30,000	400
E133-1.5	1.5	22,500	500
E133-2	2	22,500	800
E133-2.5	2.5	23,400	900
E133-3	3	21,000	670
E133-4	4	15,500	700
E133-5	5	12,500	745
E133-6	6	10,500	820
E133-7	7	9,250	840
E133-8	8	8,000	860
E133-9	9	7,150	910
E133-10	10	6,350	960
E133-12	12	5,300	1,050
E133-14	14	4,600	1,050
E133-16	16	4,000	1,050
E133-18	18	3,570	1,050
E133-20	20	3,150	1,050
切入深度 (mm) 		ap:0.5D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 高使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度和轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

EI35 / EI36 / EI37 超微粒鎢鋼鋁用立銑刀

End Mills For Aluminum

Code No. EI35-Dc

Dc $^{0}_{-0.03}$	Lc mm	L mm	d h6	Blank EI35
3	20	57	3	●
4	20	57	4	●
5	25	63	5	●
6	28	75	6	●
7	30	75	8	●
8	30	75	8	●
9	32	75	10	●
10	32	75	10	●
12	50	100	12	●
14	57	127	14	●
16	57	127	16	●
20	57	127	20	●

Code No. EI36-Dc

Dc $^{0}_{-0.03}$	Lc mm	L mm	d h6	Blank EI36
3	25	75	3	●
4	28	75	4	●
5	32	75	5	●
6	38	100	6	●
8	42	100	8	●
10	45	100	10	●
12	75	150	12	●
14	80	150	14	●
16	80	150	16	●
20	80	150	20	●

Code No. EI37-Dc

Dc $^{0}_{-0.03}$	Lc mm	L mm	d h6	Blank EI37
5	45	100	6	●
6	50	100	6	●
8	75	150	8	●
10	75	150	10	●
12	75	200	12	●
16	80	200	16	●
20	80	200	20	●

Aluminium

P	H	M	K	N	S
				●	

MG Carbide

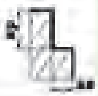
Uncoated Blank

Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel	
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	
H	GR4	硬化鋼 30-38HRC Hardened Steel	
	GR5	硬化鋼 38-48HRC Hardened Steel	
	GR6	硬化鋼 48-54HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	
N	GR10	鋁 Aluminium	●
	GR11	銅 Copper	○
	GR12	塑膠 Plastics	○
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Side Milling 側面切削

被削材 Work Material		GR.30 鋁 Aluminium	
切削速度 Vc m/min		100	
型號 Code No.	刃徑 Dc	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/min)
E135/E136-3	3	10,500	475
E135/E136-4	4	7,750	500
E135/E136/E137-5	5	6,250	550
E135/E136/E137-6	6	5,250	600
E135-7	7	4,500	625
E135/E136/E137-8	8	4,000	650
E135-9	9	3,550	700
E135/E136/E137-10	10	3,175	750
E135/E136/E137-12	12	2,650	775
E135/E136-14	14	2,325	775
E135/E136/E137-16	16	2,000	775
E135/E136/E137-20	20	1,575	750
切入深度 (mm) 		ap:3.0D	
		ae:0.05D	

⚠ Notice: E136、E137 is Long Length series End Mills. Please adjust the parameter according.

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

⚠注意E136、E137為加長柄系列銑刀，請按照適當的伸長量調整刀具的參數。

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

E192 超微粒鎢鋼粗加工鋁用立銑刀

Roughing End Mills For Aluminium

MG Carbide | Uncoated Blank | 55° | 2 | W 7.5° | 90°

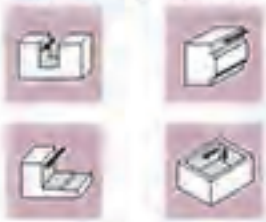
Code No. E192-Dc

Dc $^{0}_{-0.03}$	Lc mm	L mm	d h6	Blank E192
3	9	38	3	●
4	14	50	4	●
5	16	50	5	●
6	20	63	6	●
8	22	63	8	●
10	30	72	10	●
12	30	75	12	●
16	40	100	16	●
20	45	100	20	●

Aluminium

P	H	M	K	N	S
				●	

Type of Operation



Work Material

P	GR1	碳鋼 Carbon Steel	
	GR2	低合金鋼鋼<30HRC Low-alloyed Steel	
	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	
H	GR4	硬化鋼 30-38HRC Hardened Steel	
	GR5	硬化鋼 38-48HRC Hardened Steel	
	GR6	硬化鋼 48-54HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	
N	GR10	鋁 Aluminium	●
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Tranium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

E193 超微粒鎢鋼精加工鋁用立銑刀

Finishing End Mills For Aluminium

MG Carbide | Uncoated Blank | 50° | 3 | W 7.5° | 90°

Code No. E193-Dc

Dc $^{0}_{-0.03}$	Lc mm	L mm	d h6	Blank E193
3	9	50	6	●
4	14	50	6	●
5	16	50	6	●
6	20	63	6	●
8	22	63	8	●
10	30	72	10	●
12	30	75	12	●
16	40	100	16	●
20	45	100	20	●

E192 / Slotting 溝切削

被削材 Work Material		GR鋁合金 Aluminium	
切削速度 Vc m/min		200	
型號 Code No.	切徑 Dc	RPM 主軸速度 (min-1)	Feed 進給速度 (mm/min)
E192-3	3	21,000	470
E192-4	4	15,500	490
E192-5	5	12,500	520
E192-6	6	10,500	570
E192-8	8	8,000	600
E192-10	10	6,350	670
E192-12	12	5,300	735
E192-16	16	4,000	735
E192-20	20	3,150	735
切入深度 (mm) 		ap:0.5D	

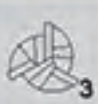
E193 / Side Milling 側面切削

被削材 Work Material		GR鋁合金 Aluminium	
切削速度 Vc m/min		200	
型號 Code No.	切徑 Dc	RPM 主軸速度 (min-1)	Feed 進給速度 (mm/min)
E193-3	3	21,000	950
E193-4	4	15,500	1,000
E193-5	5	12,500	1,100
E193-6	6	10,500	1,200
E193-8	8	8,000	1,300
E193-10	10	6,350	1,500
E193-12	12	5,300	1,550
E193-16	16	4,000	1,550
E193-20	20	3,150	1,500
切入深度 (mm) 		ap:1.5D	
		ae:0.1D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

立銑刀
End Mills

Page	223	225	227	229	231	233
Apperance						
Code No	E102HX	F500HX F501HX	F602TX	F503HX F504HX	F603TX	E104HX
Carbide	MG Carbide	MG Carbide	UMG Carbide	MG Carbide	UMG Carbide	MG Carbide
Coating	AlTiCrN HX	AlTiCrN HX	AlTiSiN TX	AlTiCrN HX	AlTiSiN TX	AlTiCrN HX
Helix Angle	 30°	 30°	 35°	 30°	 35°	 30°
No.of Flutes	 2	 2	 2	 3	 3	 4

歐規
DIN

7leaders®
The Art of Cutting

235	237	239	241	243	245	247
						
F506HX F507HX	F604TX F606TX	F660TX F661TX	B202HX	F520HX F521HX	F623HX F624HX	F625TX F626TX
MG Carbide	UMG Carbide	SMG Carbide	MG Carbide	MG Carbide	MG Carbide	SMG Carbide
AlTiCrN HX	AlTiSiN TX	AlTiSiN TX	AlTiCrN HX	AlTiCrN HX	AlTiCrN HX	AlTiSiN TX
						
						

EI02HX 超微粒鎢鋼塗層通用立銑刀

Universal End Mills

Code No. EI02HX-Dc

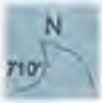
Dc $^{0}_{-0.02}$	Lc mm	L mm	d h5	AlTiCrN EI02HX
0.2	0.5	38	3	●
0.3	0.8	38	3	●
0.4	1	38	3	●
0.5	1.2	38	3	●
0.6	1.5	38	3	●
0.7	1.8	38	3	●
0.8	2	38	3	●
0.9	2.5	38	3	●
1	3	38	3	●
1.1	3	38	3	●
1.2	4	38	3	●
1.3	4	38	3	●
1.4	4	38	3	●
1.5	5	38	3	●
1.6	5	38	3	●
1.7	5	38	3	●
1.8	5	38	3	●
1.9	5	38	3	●
2	6	38	3	●
2.1	6	38	3	●
2.2	6	38	3	●
2.3	6	38	3	●
2.4	8	38	3	●
2.5	8	38	3	●
2.6	8	38	3	●
2.7	8	38	3	●
2.8	8	38	3	●
2.9	8	38	3	●
3	8	38	3	●

Steel < 48HRC

P	H	M	K	N	S
●	●	○	●	○	

MG Carbide

AlTiCrN HX



Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鋼<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-55HRC Hardened Steel	
	GR7	硬化鋼 55-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	○
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	
	GR11	銅 Copper	○
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Slotting 溝切削

材料 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (35~43HRC)		GR.6 不鏽鋼 Stainless Steel		GR.7 鑄鐵 Cast Iron		GR.8 銅 Copper	
切削速度 Vc m/min		Ø0.2~0.7 20~50 Ø0.8~3.0 35~65		Ø0.2~0.7 20~90 Ø0.8~3.0 55~65		Ø0.2~0.7 20~50 Ø0.8~3.0 55~65		Ø0.2~0.7 20~36 Ø0.8~3.0 40~50		Ø0.2~0.7 20~34 Ø0.8~3.0 35~45		Ø0.2~0.7 20~36 Ø0.8~3.0 40~50		Ø0.2~0.7 20~50 Ø0.8~3.0 55~65		Ø0.2~0.7 30~25 Ø0.8~3.0 125~150	
型號 Code No.	切徑 Dc	RPM 轉速 (min-1)	Feed 進給速度 (mm/tooth)	RPM 轉速 (min-1)	Feed 進給速度 (mm/tooth)	RPM 轉速 (min-1)	Feed 進給速度 (mm/tooth)	RPM 轉速 (min-1)	Feed 進給速度 (mm/tooth)	RPM 轉速 (min-1)	Feed 進給速度 (mm/tooth)	RPM 轉速 (min-1)	Feed 進給速度 (mm/tooth)	RPM 轉速 (min-1)	Feed 進給速度 (mm/tooth)	RPM 轉速 (min-1)	Feed 進給速度 (mm/tooth)
E102HX-0.2	0.2	32,000	85	32,000	85	32,000	60	32,000	75	32,000	30	32,000	75	32,000	85	50,000	140
E102HX-0.3	0.3	32,000	100	32,000	100	32,000	90	32,000	80	32,000	55	32,000	80	32,000	100	50,000	170
E102HX-0.4	0.4	32,000	110	32,000	110	32,000	100	32,000	90	27,500	60	32,000	90	32,000	110	50,000	190
E102HX-0.5	0.5	31,000	115	31,000	115	31,000	105	25,000	90	22,000	60	25,000	90	31,000	115	50,000	200
E102HX-0.6	0.6	27,000	118	27,000	118	27,000	105	19,500	90	17,000	60	19,500	90	27,000	118	50,000	230
E102HX-0.8	0.8	21,500	120	21,500	120	21,500	110	15,500	90	13,500	60	15,500	90	21,500	120	50,000	280
E102HX-1	1	17,500	120	17,500	120	17,500	110	12,500	90	11,000	60	12,500	90	17,500	120	47,500	300
E102HX-1.2	1.2	15,000	118	15,000	118	15,000	105	10,500	90	9,300	60	10,500	90	15,000	118	40,500	300
E102HX-1.5	1.5	12,500	122	12,500	122	12,500	110	8,900	90	7,900	60	8,900	90	12,500	122	32,000	300
E102HX-1.8	1.8	10,500	125	10,500	125	10,500	115	7,500	90	6,800	60	7,500	90	10,500	125	28,000	300
E102HX-2	2	9,700	130	9,700	130	9,700	120	7,000	90	6,300	70	7,000	90	9,700	130	24,000	300
E102HX-2.5	2.5	8,200	155	8,200	155	8,200	140	6,100	90	5,300	70	6,100	90	8,200	155	20,000	350
E102HX-3	3	6,900	170	6,900	170	6,900	155	5,300	100	4,400	70	5,300	100	6,900	170	16,000	400
切入深度 (mm) 		ap<1 0.1D <3 0.3D ≥3 0.5D				ap<1 0.1D <3 0.3D ≥3 0.5D		ap<1 0.1D <3 0.3D ≥3 0.5D		ap<1 0.01D <3 0.02D ≥3 0.05D		ap<1 0.1D <3 0.3D ≥3 0.5D		ap<1 0.1D <3 0.3D ≥3 0.5D		ap<1 0.1D <3 0.3D ≥3 0.5D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate [fz] and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工形狀、刃長、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生顫動，請降低切削條件。

F500HX / F501HX 超微粒鎢鋼塗層通用立銑刀
Universal End Mills

Code No. F500HX-Dc

Dc $^{0}_{-0.02}$	Lc mm	L mm	d h5	AlTiCrN F500HX
2	3	50	6	●
3	4	50	6	●
4	5	54	6	●
5	6	54	6	●
6	7	54	6	●
8	9	58	8	●
10	11	66	10	●
12	12	73	12	●
14	14	75	14	●
16	16	82	16	●
18	18	84	18	●
20	20	92	20	●

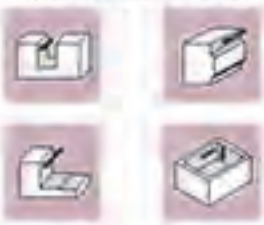
Steel < 48HRC

P	H	M	K	N	S
●	●	○	●	○	

MG Carbide

AlTiCrN HX

Type of Operation



Work Material

P	GR1	碳鋼 Carbon Steel	●
P	GR2	低合金鋼硬<24HRC Low-alloyed Steel	●
P	GR3	高合金鋼硬<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
H	GR5	硬化鋼 38-48HRC Hardened Steel	●
H	GR6	硬化鋼 48-54HRC Hardened Steel	
H	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	○
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	
N	GR11	銅 Copper	○
N	GR12	塑膠 Plastics	
N	GR13	複合材料 FRP CFRP Composite Material	
N	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
S	GR16	鎳 Nickel	
S	GR17	耐熱鋼 Heat-resistant Steel	

Code No. F501HX-Dc

Dc $^{0}_{-0.02}$	Lc mm	L mm	d h5	AlTiCrN F501HX
3	7	57	6	●
4	8	57	6	●
5	10	57	6	●
6	10	57	6	●
8	16	63	8	●
10	19	72	10	●
12	22	83	12	●
14	22	83	14	●
16	26	92	16	●
18	26	92	18	●
20	32	104	20	●

Slotting 滿切削

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (-24HRC)		GR.3 合金鋼 Hi-alloyed Steel (-30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.8 不銹鋼 Stainless Steel ※切削液使用		GR.9 鑄鐵 Cast Iron		GR.11 銅 Copper	
切削速度 Vc m/min		65~80		65~80		65~80		53~60		44~50		53~80		65~80		125~150	
型號 Code No.	刃徑 Dc	轉速 RPM	進給速度 Feed mm/min	轉速 RPM	進給速度 Feed mm/min	轉速 RPM	進給速度 Feed mm/min	轉速 RPM	進給速度 Feed mm/min	轉速 RPM	進給速度 Feed mm/min	轉速 RPM	進給速度 Feed mm/min	轉速 RPM	進給速度 Feed mm/min	轉速 RPM	進給速度 Feed mm/min
F500HX/F501HX-2	2	9,700	130	9,700	130	9,700	117	7,000	90	6,300	70	7,000	90	9,700	130	24,000	300
F500HX/F501HX-3	3	6,900	170	6,900	170	6,900	153	5,300	100	4,400	70	5,300	100	6,900	170	16,000	400
F500HX/F501HX-4	4	5,400	210	5,400	210	5,400	190	4,200	120	3,500	90	4,200	120	5,400	210	12,000	430
F500HX/F501HX-5	5	4,500	265	4,500	265	4,500	240	3,500	130	3,000	95	3,500	130	4,500	265	9,500	500
F500HX/F501HX-6	6	4,000	270	4,000	270	4,000	243	2,900	130	2,500	100	2,900	130	4,000	270	7,900	520
F500HX/F501HX-8	8	3,000	265	3,000	265	3,000	240	2,200	120	1,900	100	2,200	120	3,000	265	5,900	520
F500HX/F501HX-10	10	2,400	255	2,400	255	2,400	230	1,700	120	1,400	95	1,700	120	2,400	255	4,700	500
F500HX/F501HX-12	12	2,000	240	2,000	240	2,000	220	1,400	120	1,200	95	1,400	120	2,000	240	4,000	500
F500HX/F501HX-14	14	1,700	240	1,700	240	1,700	215	1,200	90	1,000	80	1,200	90	1,700	240	3,500	400
F500HX/F501HX-16	16	1,500	200	1,500	200	1,500	180	1,100	90	800	80	1,100	90	1,500	200	3,000	400
F500HX/F501HX-18	18	1,300	180	1,300	180	1,300	165	900	90	700	70	900	90	1,300	180	2,700	350
F500HX/F501HX-20	20	1,200	155	1,200	155	1,200	140	800	90	600	60	800	90	1,200	155	2,400	300
切入深度 (mm)		ap:<3 0.3D ≥3 0.5D				ap:<3 0.3D ≥3 0.5D		ap:<3 0.3D ≥3 0.5D		ap:<3 0.02D ≥3 0.05D		ap:<3 0.3D ≥3 0.5D		ap:<3 0.3D ≥3 0.5D		ap:<3 0.3D ≥3 0.5D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精密高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工形狀、回避、使用機台等因素，對切削條件做調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

F602TX 極超微粒鎢鋼塗層通用立銑刀

Universal End Mills

Code No. F602TX-Dc

Dc $^{0}_{-0.02}$	Lc mm	L mm	d h5	AlTiSiN F602TX
3	7	57	6	●
4	8	57	6	●
5	10	57	6	●
6	10	57	6	●
8	16	63	8	●
10	19	72	10	●
12	22	83	12	●
16	26	92	16	●
20	32	104	20	●

DIN 6535 HB

Steel < 62HRC

P	H	M	K	N	S
●	●				

UMG Carbide

AlTiSiN TX

Type of Operation

Work Material

P	GR1	鈑鋼 Carbon Steel	●
	GR2	低合金鋼鈑<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鈑<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-56HRC Hardened Steel	●
	GR7	硬化鋼 56-68HRC Hardened Steel	○
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	
N	GR10	鋁 Aluminum	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Slotting 滿切削

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (-24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (-30HRC)		GR.4 硬化鋼 Hardened Steel (30-38HRC)		GR.5 硬化鋼 Hardened Steel (38-48HRC)		GR.6 硬化鋼 Hardened Steel (48-56HRC)	
切削速度 Vc m/min		80		80		80		55		50		30	
型號 Code No.	刃徑 Dc	RPM 轉速 (min-1)	Feed 進給速度 (mm/min)	RPM 轉速 (min-1)	Feed 進給速度 (mm/min)	RPM 轉速 (min-1)	Feed 進給速度 (mm/min)	RPM 轉速 (min-1)	Feed 進給速度 (mm/min)	RPM 轉速 (min-1)	Feed 進給速度 (mm/min)	RPM 轉速 (min-1)	Feed 進給速度 (mm/min)
F602TX-3	3	7,500	190	7,500	190	6,350	150	5,300	100	4,350	75	2,700	40
F602TX-4	4	6,000	225	6,000	225	4,900	180	4,200	120	3,500	90	2,200	50
F602TX-5	5	5,200	300	5,200	300	4,300	230	3,500	125	3,000	100	1,900	55
F602TX-6	6	4,500	300	4,500	300	3,600	230	2,900	120	2,500	100	1,600	55
F602TX-8	8	3,300	280	3,300	280	2,700	230	2,200	120	1,900	100	1,100	50
F602TX-10	10	2,600	270	2,600	270	2,100	220	1,700	120	1,500	90	950	50
F602TX-12	12	2,200	270	2,200	270	1,800	210	1,450	125	1,200	95	800	45
F602TX-16	16	1,600	250	1,600	250	1,350	190	1,100	100	950	85	600	35
F602TX-20	20	1,300	200	1,300	200	1,050	150	880	75	750	65	480	30
切入深度 (mm)		ap 0.5D		ap 0.5D		ap 0.5D		ap 0.5D		ap 0.5D		ap 0.05D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速也需一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

F503HX / F504HX 超微粒鎢鋼塗層通用立銑刀
Universal End Mills

Code No. F503HX-Dc

Dc $^{0}_{-0.02}$	Lc mm	L mm	d h5	AlTiCrN F503HX
2	3	50	6	●
3	4	50	6	●
4	5	54	6	●
5	6	54	6	●
6	7	54	6	●
8	9	58	8	●
10	11	66	10	●
12	12	73	12	●
14	14	75	14	●
16	16	82	16	●
18	18	84	18	●
20	20	92	20	●

Code No. F504HX-Dc

Dc $^{0}_{-0.02}$	Lc mm	L mm	d h5	AlTiCrN F504HX
3	7	57	6	●
4	8	57	6	●
5	10	57	6	●
6	10	57	6	●
8	16	63	8	●
10	19	72	10	●
12	22	83	12	●
14	22	83	14	●
16	26	92	16	●
18	26	92	18	●
20	32	104	20	●

Steel < 48HRC

P	H	M	K	N	S
●	●	○	●	○	

MG Carbide

AlTiCrN HX

Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel	●
P	GR2	低合金鋼硬<34HRC Low-alloyed Steel	●
P	GR3	高合金鋼硬<33HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
H	GR5	硬化鋼 38-48HRC Hardened Steel	●
H	GR6	硬化鋼 48-54HRC Hardened Steel	
H	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	○
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	
N	GR11	銅 Copper	○
N	GR12	塑膠 Plastics	
N	GR13	複合材料 FRP CFRP Composite Material	
N	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
S	GR16	鎳 Nickel	
S	GR17	耐熱鋼 Heat-resistant Steel	

F503HX / F504HX 切削條件參考表

Recommanded Milling Conditions

Slotting 滿切削

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (-24HRC)		GR.3 合金鋼 Hi-alloyed Steel (-30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.8 不銹鋼 Stainless Steel ※切削液使用		GR.9 鑄鐵 Cast Iron		GR.11 銅 Copper	
切削速度 Vc m/min		65~80		65~80		65~80		53~60		44~50		53~80		65~80		125~150	
型號 Code No.	刃徑 Dc	轉速 RPM	進給速度 Vf mm/min	轉速 RPM	進給速度 Vf mm/min	轉速 RPM	進給速度 Vf mm/min	轉速 RPM	進給速度 Vf mm/min	轉速 RPM	進給速度 Vf mm/min	轉速 RPM	進給速度 Vf mm/min	轉速 RPM	進給速度 Vf mm/min	轉速 RPM	進給速度 Vf mm/min
F503HX-2	2	9,700	220	9,700	286	9,700	152	7,000	117	6,300	91	7,000	117	9,700	169	24,000	396
F503HX/F504HX-3	3	6,900	287	6,900	373	6,900	199	5,300	130	4,400	91	5,300	130	6,900	221	16,000	520
F503HX/F504HX-4	4	5,400	355	5,400	461	5,400	247	4,200	156	3,500	117	4,200	156	5,400	273	12,000	559
F503HX/F504HX-5	5	4,500	448	4,500	582	4,500	312	3,500	169	3,000	124	3,500	169	4,500	345	9,500	650
F503HX/F504HX-6	6	4,000	456	4,000	593	4,000	316	2,900	169	2,500	130	2,900	169	4,000	351	7,900	676
F503HX/F504HX-8	8	3,000	448	3,000	582	3,000	312	2,200	156	1,900	130	2,200	156	3,000	345	5,900	676
F503HX/F504HX-10	10	2,400	431	2,400	560	2,400	298	1,700	156	1,400	124	1,700	156	2,400	332	4,700	650
F503HX/F504HX-12	12	2,000	416	2,000	540	2,000	288	1,400	156	1,200	124	1,400	156	2,000	320	4,000	650
F503HX/F504HX-14	14	1,700	408	1,700	527	1,700	280	1,200	117	1,000	104	1,200	117	1,700	312	3,500	520
F503HX/F504HX-16	16	1,500	338	1,500	439	1,500	234	1,100	117	800	104	1,100	117	1,500	260	3,000	520
F503HX/F504HX-18	18	1,300	304	1,300	395	1,300	215	900	117	700	91	900	117	1,300	234	2,700	455
F503HX/F504HX-20	20	1,200	202	1,200	262	1,200	181	800	117	600	78	800	117	1,200	202	2,400	390
切入深度 (mm)		ap:<3 0.3D ≥3 0.5D		ap:<3 0.3D ≥3 0.5D		ap:<3 0.3D ≥3 0.5D		ap:<3 0.3D ≥3 0.5D		ap:<3 0.02D ≥3 0.05D		ap:<3 0.3D ≥3 0.5D		ap:<3 0.3D ≥3 0.5D		ap:<3 0.3D ≥3 0.5D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精密高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件做調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

F603TX 極超微粒鎢鋼塗層通用立銑刀

Universal End Mills

Code No. F603TX-Dc

Dc $^{0}_{-0.02}$	Lc mm	L mm	d h5	AlTiSiN F603TX
3	7	57	6	●
4	8	57	6	●
5	10	57	6	●
6	10	57	6	●
8	16	63	8	●
10	19	72	10	●
12	22	83	12	●
16	26	92	16	●
20	32	104	20	●

Steel < 62HRC

P	H	M	K	N	S
●	●				

UMG Carbide

AlTiSiN TX

Type of Operation

Work Material

P	GR1	鋼 Carbon Steel	●
	GR2	低合金鋼鋼<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-56HRC Hardened Steel	●
	GR7	硬化鋼 56-68HRC Hardened Steel	○
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	
N	GR10	鋁 Aluminum	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Slotting 滿切削

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.6 硬化鋼 Hardened Steel (48~56HRC)	
切削速度 Vc m/min		80		80		80		55		50		30	
型號 Code No.	切徑 Dc	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)
F603TX-3	3	7,500	247	7,500	247	6,350	185	5,300	130	4,350	98	2,700	92
F603TX-4	4	6,000	283	6,000	283	4,900	234	4,200	156	3,500	117	2,200	65
F603TX-5	5	5,200	390	5,200	390	4,300	299	3,500	163	3,000	130	1,900	72
F603TX-6	6	4,500	390	4,500	390	3,600	299	2,900	156	2,500	130	1,600	72
F603TX-8	8	3,300	364	3,300	364	2,700	299	2,200	156	1,900	130	1,100	65
F603TX-10	10	2,600	351	2,600	351	2,100	286	1,700	156	1,500	117	950	85
F603TX-12	12	2,200	351	2,200	351	1,800	273	1,450	163	1,200	124	800	59
F603TX-16	16	1,600	325	1,600	325	1,350	247	1,100	130	950	111	600	46
F603TX-20	20	1,300	260	1,300	260	1,050	195	880	98	750	85	480	39
切入深度 (mm)		ap 0.5D		ap 0.5D		ap 0.5D		ap 0.5D		ap 0.5D		ap < 0.05D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 需選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

EI04HX 超微粒鎢鋼塗層精加工立銑刀

Finishing End Mills

Code No. EI04HX-Dc

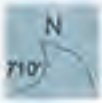
Dc $^{0}_{-0.02}$	Lc mm	L mm	d h5	AlTiCrN EI04HX
1	3	38	3	●
1.1	3	38	3	●
1.2	4	38	3	●
1.3	4	38	3	●
1.4	4	38	3	●
1.5	5	38	3	●
1.6	5	38	3	●
1.7	5	38	3	●
1.8	5	38	3	●
1.9	5	38	3	●
2	6	38	3	●
2.1	6	38	3	●
2.2	6	38	3	●
2.3	6	38	3	●
2.4	8	38	3	●
2.5	8	38	3	●
2.6	8	38	3	●
2.7	8	38	3	●
2.8	8	38	3	●
2.9	8	38	3	●
3	8	38	3	●

Steel < 48HRC

P	H	M	K	N	S
●	●	○	●	○	

MG Carbide

AlTiCrN HX



Type of Operation

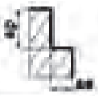
Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鋼<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-55HRC Hardened Steel	
	GR7	硬化鋼 55-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	○
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	
	GR11	銅 Copper	○
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

E104HX 切削條件參考表

Recommended Milling Conditions

Side Milling 側面切削

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (24-30HRC)		GR.3 高合金鋼 Hi-alloyed Steel (30HRC-38HRC)		GR.4 硬化鋼 Hardened Steel (35-45HRC)		GR.5 硬化鋼 Hardened Steel (45-50HRC)		GR.8 不銹鋼 Stainless Steel ※切削液使用		GR.9 鑄鐵 Cast Iron		GR.11 銅 Copper	
切削速度 Vc m/min		85		85		75		60		50		60		85		150	
型號 Code No.	刃徑 Dc	RPM 迴轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 迴轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 迴轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 迴轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 迴轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 迴轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 迴轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 迴轉速度 (min-1)	Feed 進給速度 (mm/min)
E104HX-1	1	20,000	240	20,000	240	15,000	210	11,000	85	7,100	40	11,000	85	20,000	240	47,600	420
E104HX-1.5	1.5	13,500	250	13,500	250	12,500	215	8,000	90	6,900	80	8,000	90	13,500	250	31,800	620
E104HX-2	2	13,000	300	13,000	300	11,000	280	7,000	110	6,350	100	7,000	110	13,000	300	24,000	500
E104HX-2.5	2.5	11,000	370	11,000	370	9,500	245	6,300	110	5,500	105	6,300	110	11,000	370	19,200	960
E104HX-3	3	9,000	480	9,000	480	7,400	350	5,300	120	4,800	110	5,300	120	9,000	480	15,800	860
切入深度 (mm) 		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D	
		ae:<3 0.05D ≥3 0.1D		ae:<3 0.05D ≥3 0.1D		ae:<3 0.05D ≥3 0.1D		ae:<3 0.05D ≥3 0.1D		ae:<3 0.01D ≥3 0.02D		ae:<3 0.05D ≥3 0.1D		ae:<3 0.05D ≥3 0.1D		ae:<3 0.05D ≥3 0.1D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數據為切削條件的參考值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

Code No. F506HX-Dc

Dc $^{0}_{-0.02}$	Lc mm	L mm	d h5	AlTiCrN F506HX
2	4	50	6	●
3	5	50	6	●
4	8	54	6	●
5	9	54	6	●
6	10	54	6	●
8	12	58	8	●
10	14	66	10	●
12	16	73	12	●
14	18	75	14	●
16	22	82	16	●
18	24	84	18	●
20	26	92	20	●

Steel < 48HRC

P	H	M	K	N	S
●	●	○	●	○	

Type of Operation

Code No. F507HX-Dc

Dc $^{0}_{-0.02}$	Lc mm	L mm	d h5	AlTiCrN F507HX
3	8	57	6	●
4	11	57	6	●
5	13	57	6	●
6	13	57	6	●
8	19	63	8	●
10	22	72	10	●
12	26	83	12	●
14	26	83	14	●
16	32	92	16	●
18	32	92	18	●
20	38	104	20	●

Work Material

P	GR1	鋼 Carbon Steel	●
	GR2	低合金鋼鋼<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-56HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	○
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminum	
	GR11	銅 Copper	○
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

F506HX / F507HX 切削條件參考表

Recommanded Milling Conditions

Side Milling 側面切削

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (-24HRC)		GR.3 合金鋼 Hi-alloyed Steel (-30HRC)		GR.4 硬化鋼 Hardened Steel (30-38HRC)		GR.5 硬化鋼 Hardened Steel (38-48HRC)		GR.8 不鏽鋼 Stainless Steel		GR.9 鑄鐵 Cast Iron		GR.11 銅 Copper	
切削速度 Vc m/min		85		85		75		60		50		60		85		150	
型號 Code No.	刃徑 Dc	轉速 (rpm)	進給速度 (mm/min)	轉速 (rpm)	進給速度 (mm/min)	轉速 (rpm)	進給速度 (mm/min)	轉速 (rpm)	進給速度 (mm/min)	轉速 (rpm)	進給速度 (mm/min)	轉速 (rpm)	進給速度 (mm/min)	轉速 (rpm)	進給速度 (mm/min)	轉速 (rpm)	進給速度 (mm/min)
F506HX-2	2	13,000	300	13,000	300	11,000	280	7,000	110	6,350	100	7,000	110	13,000	300	24,000	560
F506HX/F507HX-3	3	9,000	460	9,000	460	7,400	350	5,300	120	4,800	110	5,300	120	9,000	460	15,800	800
F506HX/F507HX-4	4	6,650	500	6,650	500	5,500	350	4,250	135	3,700	115	4,250	135	6,650	500	12,000	900
F506HX/F507HX-5	5	5,300	600	5,300	600	4,500	420	3,500	130	3,200	120	3,500	130	5,300	600	9,400	1,040
F506HX/F507HX-6	6	4,500	600	4,500	600	3,700	425	3,000	140	2,650	125	3,000	140	4,500	600	7,800	1,040
F506HX/F507HX-8	8	3,300	550	3,300	550	2,600	410	1,850	120	1,900	125	1,850	120	3,300	550	5,600	1,010
F506HX/F507HX-10	10	2,600	520	2,600	520	2,100	400	1,500	125	1,500	130	1,500	125	2,600	520	4,800	1,010
F506HX/F507HX-12	12	2,200	520	2,200	520	1,800	405	1,200	120	1,200	120	1,200	120	2,200	520	4,000	1,010
F506HX/F507HX-14	14	1,900	550	1,900	550	1,600	410	1,200	140	1,100	120	1,200	140	1,900	550	3,400	990
F506HX/F507HX-16	16	1,700	530	1,700	530	1,400	410	1,100	130	1,000	100	1,100	130	1,700	530	3,000	950
F506HX/F507HX-18	18	1,500	520	1,500	520	1,200	405	950	100	880	95	950	100	1,500	520	2,600	940
F506HX/F507HX-20	20	1,300	500	1,300	500	1,100	370	900	90	800	90	900	90	1,300	500	2,400	880
切入深度 (mm)		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D	
		ae:<3 0.05D ≥3 0.1D		ae:<3 0.05D ≥3 0.1D		ae:<3 0.05D ≥3 0.1D		ae:<3 0.05D ≥3 0.1D		ae:<3 0.01D ≥3 0.02D		ae:<3 0.05D ≥3 0.1D		ae:<3 0.05D ≥3 0.1D		ae:<3 0.05D ≥3 0.1D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精密高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件做調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

Code No. F604TX-Dc

Dc $^{0}_{-0.02}$	Lc mm	L mm	d h5	AlTiSiN F604TX
3	8	57	6	•
4	11	57	6	•
5	13	57	6	•
6	13	57	6	•
8	19	63	8	•
10	22	72	10	•
12	26	83	12	•
16	32	92	16	•
20	38	104	20	•

DIN 8535 HB

Code No. F606TX-Dc

Dc $^{0}_{-0.02}$	Lc mm	L mm	d h5	AlTiSiN F606TX
3	12	63	6	•
4	17	63	6	•
5	19	63	6	•
6	19	63	6	•
8	28	72	8	•
10	34	84	10	•
12	40	97	12	•
16	48	108	16	•
20	56	122	20	•

DIN 8535 HB

Steel < 62HRC

P	H	M	K	N	S
•	•				

UMG Carbide

AlTiSiN TX

Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel	•
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	•
	GR3	高合金鋼鐵<36HRC Hi-alloyed Steel	•
H	GR4	硬化鋼 30-38HRC Hardened Steel	•
	GR5	硬化鋼 38-48HRC Hardened Steel	•
	GR6	硬化鋼 48-56HRC Hardened Steel	•
	GR7	硬化鋼 56-68HRC Hardened Steel	○
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	
N	GR10	鋁 Aluminium	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

F604TX / F606TX 切削條件參考表

Recommended Milling Conditions

Side Milling 側面切削

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (-24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (-30HRC)		GR.4 硬化鋼 Hardened Steel (30-38HRC)		GR.5 硬化鋼 Hardened Steel (38-48HRC)		GR.6 硬化鋼 Hardened Steel (48-56HRC)	
切削速度 Vc m/min		120		120		80		65		60		45	
型號 Code No.	刃徑 Dc	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)
F604TX/F606TX-3	3	10,600	683	10,600	683	8,280	530	6,550	389	6,400	105	4,800	220
F604TX/F606TX-4	4	8,350	735	8,350	735	4,950	590	3,950	413	3,800	120	3,600	250
F604TX/F606TX-5	5	4,550	875	4,550	875	3,550	625	2,800	448	2,730	125	2,900	280
F604TX/F606TX-6	6	3,540	875	3,540	875	2,760	600	2,200	413	2,100	125	2,400	300
F604TX/F606TX-8	8	3,185	770	3,185	770	2,480	600	1,975	413	1,900	125	1,800	310
F604TX/F606TX-10	10	3,650	770	3,650	770	2,070	595	1,645	375	1,595	120	1,400	300
F604TX/F606TX-12	12	2,275	670	2,275	670	1,770	580	1,410	350	1,365	120	1,200	300
F604TX/F606TX-16	16	1,990	670	1,990	670	1,550	520	1,230	312	1,190	100	900	230
F604TX/F606TX-20	20	1,590	535	1,590	535	1,240	415	985	277	950	90	720	210
切入深度 (mm)		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D	
		ae:0.2D		ae:0.2D		ae:0.2D		ae:0.2D		ae:0.1D		ae:0.07D	

Slotting 溝切削

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (-24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (-30HRC)		GR.4 硬化鋼 Hardened Steel (30-38HRC)		GR.5 硬化鋼 Hardened Steel (38-48HRC)		GR.6 硬化鋼 Hardened Steel (48-56HRC)	
切削速度 Vc m/min		120		120		80		65		60		45	
型號 Code No.	刃徑 Dc	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)
F604TX/F606TX-3	3	10,600	600	10,600	600	8,280	430	6,550	290	6,400	105	4,800	88
F604TX/F606TX-4	4	8,350	635	8,350	635	4,950	500	3,950	325	3,800	120	3,600	100
F604TX/F606TX-5	5	4,550	775	4,550	775	3,550	525	2,800	348	2,730	125	2,900	112
F604TX/F606TX-6	6	3,540	775	3,540	775	2,760	500	2,200	313	2,100	125	2,400	120
F604TX/F606TX-8	8	3,185	650	3,185	650	2,480	500	1,975	313	1,900	125	1,800	124
F604TX/F606TX-10	10	3,650	670	3,650	670	2,070	490	1,645	288	1,595	120	1,400	120
F604TX/F606TX-12	12	2,275	560	2,275	560	1,770	460	1,410	275	1,365	120	1,200	120
F604TX/F606TX-16	16	1,990	680	1,990	650	1,550	420	1,230	240	1,190	100	900	92
F604TX/F606TX-20	20	1,590	500	1,590	500	1,240	360	985	200	950	90	720	84
切入深度 (mm)		ap:0.5D		ap:0.5D		ap:0.5D		ap:0.5D		ap:0.05D		ap:0.05D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用的工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

F660TX / F661TX 極超微粒鎢鋼塗層精加工立銑刀

Finishing End Mills

Code No. F660TX-Dc

Dc $^{0}_{-0.02}$	Lc mm	L mm	d h5	Z	AlTiSiN F660TX
6	13	57	6	6	•
8	19	63	8	6	•
10	22	72	10	6	•
12	26	83	12	6	•
16	32	92	16	8	•
20	38	104	20	10	•

Hardened Steel 40-70HRC

P	H	M	K	N	S
	•		○		

SMG Carbide

AlTiSiN TX

Type of Operation

Code No. F661TX-Dc

Dc $^{0}_{-0.02}$	Lc mm	L mm	d h5	Z	AlTiSiN F661TX
6	19	63	6	6	•
8	28	72	8	6	•
10	34	84	10	6	•
12	40	97	12	6	•
16	48	108	16	8	•
20	56	122	20	10	•

Work Material

P	GR1	軟鋼 Carbon Steel	
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	
H	GR4	硬化鋼 30-38HRC Hardened Steel	
	GR5	硬化鋼 38-48HRC Hardened Steel	•
	GR6	硬化鋼 48-56HRC Hardened Steel	•
	GR7	硬化鋼 56-68HRC Hardened Steel	•
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	○
N	GR10	鋁 Aluminium	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Side Milling 側面切削

被削材 Work Material		GR.5 硬化鋼 Hardened Steel (38-48HRC)		GR.6 硬化鋼 Hardened Steel (48-56HRC)		GR.7 硬化鋼 Hardened Steel (56-68HRC)		GR.9 鑄鐵 Cast Iron	
切削速度 Vc m/min		150		100		90		145	
型號 Code No.	刃徑 Dc	RPM 回轉速度 [min-1]	Feed 進給速度 [mm/min]	RPM 回轉速度 [min-1]	Feed 進給速度 [mm/min]	RPM 回轉速度 [min-1]	Feed 進給速度 [mm/min]	RPM 回轉速度 [min-1]	Feed 進給速度 [mm/min]
F660TX/F661TX-6	6	6,600	2,300	5,300	1,800	4,000	1,000	7,400	2,600
F660TX/F661TX-8	8	4,900	2,350	4,000	1,850	3,000	1,000	5,500	2,600
F660TX/F661TX-10	10	4,000	2,400	3,200	1,900	2,400	1,000	4,500	2,600
F660TX/F661TX-12	12	3,300	2,400	2,600	1,900	2,000	1,000	3,700	2,600
F660TX/F661TX-16	16	2,500	2,100	2,000	1,700	1,500	900	2,800	2,400
F660GX/F661TX-20	20	2,000	1,900	1,600	1,400	1,200	830	2,300	2,100
切入深度 (mm)		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.6D	
		ae:0.1D		ae:0.05D		ae:0.03D		ae:0.1D	

※ Notice: F661TX is Long Length series End Mills. Please adjust the parameter according.

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

※注意F661TX為加長柄系列銑刀，請依照適當的轉速進給調整刀具的參數。

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的標準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工如果發生振動，請降低切削條件。

B202HX 超微粒鎢鋼塗層圓頭立銑刀

Ball Nose End Mills

Code No. B202HX-Dc

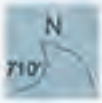
Dc $^{0}_{-0.02}$	R ±0.01	Lc mm	L mm	d h5	AlTiCrN B202HX
0.2	0.1R	0.4	38	3	●
0.3	0.15R	0.6	38	3	●
0.4	0.2R	0.8	38	3	●
0.5	0.25R	1	38	3	●
0.6	0.3R	1.2	38	3	●
0.7	0.35R	1.4	38	3	●
0.8	0.4R	1.6	38	3	●
0.9	0.45R	1.8	38	3	●
1	0.5R	2	38	3	●
1.1	0.55R	2.2	38	3	●
1.2	0.6R	2.4	38	3	●
1.4	0.7R	2.8	38	3	●
1.5	0.75R	3	38	3	●
1.6	0.8R	3.2	38	3	●
1.8	0.9R	3.6	38	3	●
2	1R	4	38	3	●
2.5	1.25R	5	38	3	●
3	1.5R	6	38	3	●

Steel < 48HRC

P	H	M	K	N	S
●	●	○	●	○	

MG Carbide

AlTiCrN HX



Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鋼<42HRC Low-alloyed Steel	●
	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-55HRC Hardened Steel	
	GR7	硬化鋼 55-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	○
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	
	GR11	銅 Copper	○
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

B202HX 切削條件參考表

Recommanded Milling Condition

General processing 普通加工

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.8 不銹鋼 Stainless Steel		GR.9 鑄鐵 Cast Iron		GR.11 銅 Copper	
切削速度 Vc m/min		Ø0.2~0.8 20~80 Ø0.8~3.0 80~120		Ø0.2~0.8 20~80 Ø0.8~3.0 80~120		Ø0.2~0.8 20~80 Ø0.8~3.0 80~100		Ø0.2~0.8 20~80 Ø0.8~3.0 60~80		Ø0.2~0.8 20~80 Ø0.8~3.0 60~70		Ø0.2~0.8 20~80 Ø0.8~3.0 60~80		Ø0.2~0.8 20~80 Ø0.8~3.0 80~120		Ø0.2~0.8 25~75 Ø0.8~3.0 100~120	
型號 Code No.	刃徑 Dc	RPM 轉速 [min-1]	Feed 進給速度 [mm/min]	RPM 轉速 [min-1]	Feed 進給速度 [mm/min]	RPM 轉速 [min-1]	Feed 進給速度 [mm/min]	RPM 轉速 [min-1]	Feed 進給速度 [mm/min]	RPM 轉速 [min-1]	Feed 進給速度 [mm/min]	RPM 轉速 [min-1]	Feed 進給速度 [mm/min]	RPM 轉速 [min-1]	Feed 進給速度 [mm/min]	RPM 轉速 [min-1]	Feed 進給速度 [mm/min]
B202HX-R0.1	0.2	32,000	200	32,000	200	32,000	200	32,000	200	32,000	200	32,000	200	32,000	200	40,000	300
B202HX-R0.15	0.3	32,000	200	32,000	200	32,000	200	32,000	200	32,000	200	32,000	200	32,000	200	40,000	300
B202HX-R0.2	0.4	32,000	410	32,000	410	32,000	330	32,000	330	32,000	265	32,000	330	32,000	410	40,000	490
B202HX-R0.25	0.5	32,000	410	32,000	410	32,000	330	32,000	330	32,000	265	32,000	330	32,000	410	40,000	490
B202HX-R0.3	0.6	32,000	490	32,000	490	32,000	400	32,000	400	32,000	265	32,000	400	32,000	490	40,000	560
B202HX-R0.4	0.8	32,000	550	32,000	550	31,500	400	31,500	400	27,500	290	31,500	400	32,000	550	40,000	600
B202HX-R0.5	1	31,500	600	31,500	600	25,000	400	25,000	400	22,000	285	25,000	400	31,500	600	32,000	700
B202HX-R0.6	1.2	31,500	600	31,500	600	25,000	400	25,000	400	22,000	285	25,000	400	31,500	600	32,000	700
B202HX-R0.75	1.5	20,800	600	20,800	600	17,000	400	17,000	400	14,800	285	17,000	400	20,800	600	25,500	700
B202HX-R0.9	1.8	20,800	600	20,800	600	17,000	400	17,000	400	14,800	285	17,000	400	20,800	600	25,500	700
B202HX-R1	2	15,500	600	15,500	600	12,500	400	12,500	400	11,000	290	12,500	400	15,500	600	19,000	700
B202HX-R1.25	2.5	15,500	600	15,500	600	10,200	400	10,200	400	8,900	290	10,200	400	15,500	600	12,700	700
B202HX-R1.5	3	10,500	620	10,500	620	8,450	405	8,450	405	7,400	290	8,450	405	10,500	620	12,500	760
切入深度 (mm)		ap:0.1D ae:<1 0.1D ≥1 0.2D		ap:0.1D ae:<1 0.1D ≥1 0.2D		ap:0.1D ae:<1 0.1D ≥1 0.2D		ap:0.1D ae:<1 0.1D ≥1 0.2D		ap:0.1D ae:<1 0.05D ≥1 0.1D		ap:0.1D ae:<1 0.05D ≥1 0.1D		ap:0.1D ae:<1 0.1D ≥1 0.2D		ap:0.1D ae:<1 0.1D ≥1 0.2D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 需使用剛性好、精度高的設備和夾具。
2. 需選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工形狀、刃徑、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速在同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

F520HX / F521HX 超微粒鎢鋼塗層圓頭立銑刀

Ball Nose End Mills

Code No. F520HX-Dc

Dc $^{0}_{-0.02}$	R ±0.01	Lc mm	L mm	d h5	AlTiCrN F520HX
2	R1	3	50	6	●
3	R1.5	4	50	6	●
4	R2	5	54	6	●
5	R2.5	6	54	6	●
6	R3	7	54	6	●
8	R4	9	58	8	●
10	R5	11	66	10	●
12	R6	12	73	12	●
14	R7	14	75	14	●
16	R8	16	82	16	●
18	R9	18	84	18	●
20	R10	20	92	20	●

DIN 6535 HB

Code No. F521HX-Dc

Dc $^{0}_{-0.02}$	R ±0.01	Lc mm	L mm	d h5	AlTiCrN F521HX
2	R1	6	57	6	●
3	R1.5	7	57	6	●
4	R2	8	57	6	●
5	R2.5	10	57	6	●
6	R3	10	57	6	●
8	R4	16	63	8	●
10	R5	19	72	10	●
12	R6	22	83	12	●
14	R7	22	83	14	●
16	R8	26	92	16	●
18	R9	26	92	18	●
20	R10	32	104	20	●

DIN 6535 HB

Steel < 48HRC

P	H	M	K	N	S
●	●	○	●	○	

Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼硬<24HRC Low-alloyed Steel	●
	GR3	高合金鋼硬<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-54HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	○
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	
	GR11	銅 Copper	○
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

F520HX / F521HX 切削條件參考表

Recommanded Milling Condition

General processing 普通加工

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.8 不銹鋼 Stainless Steel		GR.9 鑄鐵 Cast Iron		GR.11 銅 Copper	
切削速度 Vc m/min		120		120		100		80		70		60~80		120		120	
型號 Code No.	刃徑 Dc	轉速 (m/min)	進給速度 (mm/tooth)	轉速 (m/min)	進給速度 (mm/tooth)	轉速 (m/min)	進給速度 (mm/tooth)	轉速 (m/min)	進給速度 (mm/tooth)	轉速 (m/min)	進給速度 (mm/tooth)	轉速 (m/min)	進給速度 (mm/tooth)	轉速 (m/min)	進給速度 (mm/tooth)	轉速 (m/min)	進給速度 (mm/tooth)
F520HX/F521HX-R1	2	15,500	600	15,500	600	12,500	400	12,500	400	11,000	290	12,500	400	15,500	600	19,000	700
F520HX/F521HX-R1.5	3	10,500	620	10,500	620	8,450	405	8,450	405	7,400	290	8,450	405	10,500	620	12,500	760
F520HX/F521HX-R2	4	7,950	620	7,950	620	6,350	445	6,350	445	5,560	370	6,350	445	7,950	620	9,500	760
F520HX/F521HX-R2.5	5	7,950	620	7,950	620	5,095	445	5,095	445	4,460	370	5,095	445	7,950	620	7,650	760
F520HX/F521HX-R3	6	5,300	670	5,300	670	4,200	465	4,200	465	3,700	390	4,200	465	5,300	670	6,300	800
F520HX/F521HX-R4	8	3,950	790	3,950	790	3,150	555	3,150	555	2,750	455	3,150	555	3,950	790	4,750	950
F520HX/F521HX-R5	10	3,150	745	3,150	745	2,500	525	2,500	525	2,200	430	2,500	525	3,150	745	3,800	890
F520HX/F521HX-R6	12	2,650	700	2,650	700	2,100	490	2,100	490	1,850	430	2,100	490	2,650	700	3,170	840
F520HX/F521HX-R7	14	2,320	600	2,320	600	1,840	430	1,840	430	1,620	375	1,840	430	2,320	600	2,750	690
F520HX/F521HX-R8	16	1,990	525	1,990	525	1,580	370	1,580	370	1,390	325	1,580	370	1,990	525	2,400	630
F520HX/F521HX-R9	18	1,790	470	1,790	470	1,420	330	1,420	330	1,250	290	1,420	330	1,790	470	2,150	580
F520HX/F521HX-R10	20	1,590	420	1,590	420	1,260	290	1,260	290	1,110	260	1,260	290	1,590	420	1,900	500
切入深度 (mm)		ap:0.1D		ap:0.1D		ap:0.1D		ap:0.1D		ap:0.1D		ap:0.1D		ap:0.1D		ap:0.1D	
		ae:0.2D		ae:0.2D		ae:0.2D		ae:0.2D		ae:<1.0.05D ≥1 0.1D		ae:0.1D		ae:0.2D		ae:0.2D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件做調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

F623HX / F624HX 超微粒鎢鋼塗層圓頭立銑刀

Ball Nose End Mills

Code No. F623HX-Dc

Dc $^{0}_{-0.02}$	R ±0.005	Lc mm	L mm	d h5	Ll mm	Dl mm	AlTiCrN F623HX
1	0.5R	1	50	6	3	0.95	•
1.5	0.75R	2	50	6	4	1.4	•
2	1R	3	57	6	6	1.9	•
3	1.5R	4	57	6	9	2.8	•
4	2R	5	57	6	12	3.7	•
5	2.5R	6	57	6	15	4.6	•
6	3R	7	57	6	20	5.5	•
8	4R	9	63	8	26	7.4	•
10	5R	11	72	10	31	9.2	•
12	6R	13	83	12	37	11	•

Steel < 48HRC

P	H	M	K	N	S
•	•	○	•	○	

MG Carbide

AlTiCrN HX

30°

2

N

Type of Operation

Code No. F624HX-Dc

Dc $^{0}_{-0.02}$	R ±0.005	Lc mm	L mm	d h5	Ll mm	Dl mm	AlTiCrN F624HX
3	1.5R	4	70	6	9	2.8	•
4	2R	5	70	6	12	3.7	•
5	2R	6	80	6	15	4.6	•
6	3R	7	80	6	20	5.5	•
8	4R	9	100	8	26	7.4	•
10	5R	11	100	10	31	9.2	•
12	6R	13	110	12	37	11	•

Work Material

P	GR1	碳鋼 Carbon Steel	•
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	•
	GR3	高合金鋼鐵<35HRC Hi-alloyed Steel	•
H	GR4	硬化鋼 30-38HRC Hardened Steel	•
	GR5	硬化鋼 38-48HRC Hardened Steel	•
	GR6	硬化鋼 48-56HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	○
K	GR9	鑄鐵 Cast Iron	•
N	GR10	鋁 Aluminium	
	GR11	銅 Copper	○
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

F623HX / F624HX 切削條件參考表

Recommended Milling Condition

General processing 普通加工

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (-24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (-30HRC)		GR.4 硬化鋼 Hardened Steel (30-38HRC)		GR.5 硬化鋼 Hardened Steel (38-48HRC)		GR.6 硬化鋼 Hardened Steel (48-56HRC)		GR.7 硬化鋼 Hardened Steel (56-68HRC)	
切削速度 Vc m/min		120		120		100		80		70		60		42	
型號 Code No.	刃徑 Dc	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/min)
F623HX-R0.5	1	32,000	680	32,000	680	31,500	620	25,000	400	22,000	280	19,000	200	14,000	130
F623HX-R0.75	1.5	32,000	680	32,000	680	31,500	620	25,000	400	22,000	280	19,000	200	14,000	130
F623HX-R1	2	19,000	765	19,000	765	15,500	620	12,500	400	11,000	280	9,500	200	7,100	135
F623HX/F624HX-R1.5	3	12,500	765	12,500	765	10,500	630	8,450	400	7,400	280	6,350	200	4,700	140
F623HX/F624HX-R2	4	9,500	765	9,500	765	7,950	630	6,350	450	5,550	370	4,750	270	3,500	170
F623HX/F624HX-R2.5	5	7,600	850	7,600	850	6,350	630	5,050	450	4,450	370	3,800	280	2,850	170
F623HX/F624HX-R3	6	6,350	850	6,350	850	5,300	650	4,200	460	3,700	390	3,150	290	2,300	175
F623HX/F624HX-R4	8	4,750	1,050	4,750	1,050	3,950	780	3,150	550	2,750	450	2,350	325	1,700	200
F623HX/F624HX-R5	10	3,800	950	3,800	950	3,150	740	2,500	525	2,200	430	1,900	330	1,400	200
F623HX/F624HX-R6	12	3,150	890	3,150	890	2,650	700	2,100	490	1,850	430	1,550	310	1,100	190
切入深度 (mm)		ap 0.1D		ap 0.1D		ap 0.1D		ap 0.1D		ap 0.1D		ap 0.05D		ap 0.05D	
		ae 0.1D		ae 0.1D		ae 0.1D		ae 0.1D		ae 0.1D		ae 0.075D		ae 0.075D	

High-speed machining 高速加工

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (-24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (-30HRC)		GR.4 硬化鋼 Hardened Steel (30-38HRC)		GR.5 硬化鋼 Hardened Steel (38-48HRC)		GR.6 硬化鋼 Hardened Steel (48-56HRC)		GR.7 硬化鋼 Hardened Steel (56-68HRC)	
切削速度 Vc m/min		300		300		250		220		180		180		126	
型號 Code No.	刃徑 Dc	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/min)
F623HX-R0.5	1	50,000	2,600	50,000	2,800	50,000	2,800	50,000	2,500	47,500	2,200	32,000	1,400	25,000	1,000
F623HX-R0.75	1.5	41,800	2,600	41,800	2,800	33,000	2,800	30,000	2,500	28,500	2,200	24,000	1,400	19,500	1,000
F623HX-R1	2	31,500	3,500	31,500	3,500	25,000	2,800	24,500	2,500	23,500	2,250	17,000	1,500	12,500	1,000
F623HX/F624HX-R1.5	3	21,000	3,500	21,000	3,500	16,500	2,800	16,000	2,500	15,500	2,200	11,000	1,500	8,400	950
F623HX/F624HX-R2	4	18,000	3,700	18,000	3,700	15,500	3,200	15,000	2,700	13,500	2,400	11,000	1,900	7,900	1,000
F623HX/F624HX-R2.5	5	15,500	4,000	15,500	4,000	15,000	4,000	14,000	2,800	11,000	2,300	10,000	2,000	7,800	1,200
F623HX/F624HX-R3	6	15,000	4,800	15,000	4,800	13,500	4,300	11,500	2,700	9,500	2,200	9,500	2,200	6,600	1,050
F623HX/F624HX-R4	8	11,500	3,600	11,500	3,600	10,000	3,200	8,900	2,000	7,100	1,700	7,100	1,700	4,900	880
F623HX/F624HX-R5	10	9,500	3,000	9,500	3,000	8,200	2,500	7,100	1,700	5,700	1,300	5,700	1,300	3,900	700
F623HX/F624HX-R6	12	7,900	2,450	7,900	2,450	6,800	2,100	5,900	1,350	4,700	1,000	4,700	1,000	3,300	580
切入深度 (mm)		ap 0.02D		ap 0.02D		ap 0.02D		ap 0.02D		ap 0.02D		ap 0.02D		ap 0.02D	
		ae 0.02D		ae 0.02D		ae 0.02D		ae 0.02D		ae 0.02D		ae 0.02D		ae 0.02D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速相同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

F625TX / F626TX 極超微粒鎢鋼塗層圓頭立銑刀

Ball Nose End Mills

Code No. F625TX-Dc

Dc -0.02	R ±0.005	Lc mm	L mm	d h5	Ll mm	Dl mm	AlTiSiN F625TX
1	0.5R	1	50	6	3	0.95	•
1.5	0.75R	2	50	6	4	1.4	•
2	1R	3	57	6	6	1.9	•
3	1.5R	4	57	6	9	2.8	•
4	2R	5	57	6	12	3.7	•
5	2.5R	6	57	6	15	4.6	•
6	3R	7	57	6	20	5.5	•
8	4R	9	63	8	26	7.4	•
10	5R	11	72	10	31	9.2	•
12	6R	13	83	12	37	11	•

Code No. F626TX-Dc

Dc -0.02	R ±0.005	Lc mm	L mm	d h5	Ll mm	Dl mm	AlTiSiN F626TX
3	1.5R	4	70	6	9	2.8	•
4	2R	5	70	6	12	3.7	•
5	2.5R	6	80	6	15	4.6	•
6	3R	7	80	6	20	5.5	•
8	4R	9	100	8	26	7.4	•
10	5R	11	100	10	31	9.2	•
12	6R	13	110	12	37	11	•

Hardened Steel 40-70HRC

P	H	M	K	N	S
	•				

SMG Carbide

AlTiSiN TX

Type of Operation

Work Material

P	GR1	軟鋼 Carbon Steel
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel
H	GR4	硬化鋼 30-38HRC Hardened Steel
	GR5	硬化鋼 38-48HRC Hardened Steel •
	GR6	硬化鋼 48-56HRC Hardened Steel •
	GR7	硬化鋼 56-68HRC Hardened Steel •
M	GR8	不銹鋼 Stainless Steel
K	GR9	鑄鐵 Cast Iron
N	GR10	鋁 Aluminium
	GR11	銅 Copper
	GR12	塑膠 Plastics
	GR13	複合材料 FRP CFRP Composite Material
	GR14	石墨 Graphite
S	GR15	鈦合金 Titanium
	GR16	鎳 Nickel
	GR17	耐熱鋼 Heat-resistant Steel

F625TX / F626TX 切削條件參考表

Recommanded Milling Condition

Finishing 精加工

被削材 Work Material		GR.5 硬化鋼 Hardened Steel (38-48HRC)		GR.6 硬化鋼 Hardened Steel (48-56HRC)		GR.7 硬化鋼 Hardened Steel (56-68HRC)	
切削速度 Vc m/min		130		120		90	
型號 Code No.	刃徑 Dc	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/min)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/min)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/min)
F625TX-R0.5	1	20,000	800	15,000	750	15,000	750
F625TX-R0.75	1.5	18,000	1,400	15,000	900	14,000	900
F625TX-R1	2	15,000	1,600	14,000	1,200	14,000	1,260
F625TX/F626TX-R1.5	3	13,000	1,700	12,500	1,500	10,000	1,200
F625TX/F626TX-R2	4	11,000	1,680	10,000	1,560	7,200	1,080
F625TX/F626TX-R2.5	5	10,000	1,600	9,600	1,440	6,800	1,060
F625TX/F626TX-R3	6	6,900	1,450	6,400	1,280	4,800	960
F625TX/F626TX-R4	8	5,200	1,200	4,800	1,060	3,600	780
F625TX/F626TX-R5	10	4,100	1,030	3,600	910	2,900	700
F625TX/F626TX-R6	12	3,500	910	3,200	800	2,400	600
切入深度 (mm) 		ap:0.02D		ap:0.02D		ap:0.02D	
		ae:0.02D		ae:0.02D		ae:0.02D	

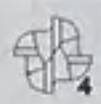
High-speed machining 高速加工

被削材 Work Material		GR.5 硬化鋼 Hardened Steel (38-48HRC)		GR.6 硬化鋼 Hardened Steel (48-56HRC)		GR.7 硬化鋼 Hardened Steel (56-68HRC)	
切削速度 Vc m/min		235		130		115	
型號 Code No.	刃徑 Dc	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/min)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/min)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/min)
F625TX-R0.5	1	30,000	1,700	24,000	2,000	21,000	1,700
F625TX-R0.75	1.5	30,000	2,400	17,000	2,000	15,000	1,700
F625TX-R1	2	28,000	2,800	14,000	2,100	12,200	1,600
F625TX/F626TX-R1.5	3	21,000	3,000	10,500	2,200	9,000	1,750
F625TX/F626TX-R2	4	18,000	3,200	9,000	2,300	7,900	2,000
F625TX/F626TX-R2.5	5	15,500	3,300	7,800	2,500	6,800	2,000
F625TX/F626TX-R3	6	13,000	3,450	6,500	2,500	5,700	2,200
F625TX/F626TX-R4	8	9,500	3,000	5,200	2,100	4,500	1,900
F625TX/F626TX-R5	10	7,500	2,500	4,200	1,800	3,700	1,700
F625TX/F626TX-R6	12	6,200	2,000	3,600	1,700	3,100	1,450
切入深度 (mm) 		ap:0.02D		ap:0.02D		ap:0.01D	
		ae:0.02D		ae:0.02D		ae:0.01D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

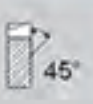
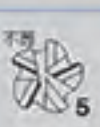
1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工狀況、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

高效率立銑刀
High Performance End Mills

Page	251	253	255	257	259	261
Apperance						
Code No	F513SX	F514SX	HF514SX	F674TX	F608HX F609HX	F638TX F649TX
Carbide	MG Carbide	MG Carbide	MG Carbide	UMG Carbide	UMG Carbide	UMG Carbide
Coating	AlTiN+ZrN SX	AlTiN+ZrN SX	AlTiN+ZrN SX	AlTiSiN TX	AlTiCrN HX	AlTiSiN TX
Helix Angle						
No.of Flutes						

歐規
DIN

7leaders®
The Art of Cutting

263	265	267	269	271
				
F651SX	F652SX	F653SX	F615TX F619TX	F613TX F614TX
MG Carbide	MG Carbide	MG Carbide	UMG Carbide	SMG Carbide
AlTiN+ZrN SX	AlTiN+ZrN SX	AlTiN+ZrN SX	AlTiSiN TX	AlTiSiN TX
				
				

F513SX 超微粒鎢鋼塗層多用途立銑刀

Multipurpose End Mills

Code No. F513SX-Dc

Dc $^{0}_{-0.02}$	Lc mm	L mm	d h5	Cl mm	Dl mm	AlTiN+Zrn F513SX
3	8	57	6	14	2.8	●
4	11	57	6	16	3.8	●
5	13	57	6	18	4.8	●
6	13	57	6	20	5.8	●
8	19	63	8	26	7.7	●
10	22	72	10	31	9.7	●
12	26	83	12	37	11.6	●
14	26	83	14	37	13.5	●
16	32	92	16	43	15.5	●
18	32	92	18	43	17.5	●
20	38	104	20	53	19.5	●

Steel < 48HRC

P	H	M	K	N	S
●	●	●	●	○	○

Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鋼<30HRC Low-alloyed Steel	●
	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-54HRC Hardened Steel	
	GR7	硬化鋼 56-48HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	●
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	○
	GR11	銅 Copper	○
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	○
	GR16	鎳 Nickel	○
	GR17	耐熱鋼 Heat-resistant Steel	○

Side Milling 側面切削

被削材 Work Material		GR.1 碳鋼 Carbon Steels		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.8 不鏽鋼 Stainless Steel		GR.9 鑄鐵 Cast Iron		GR.15 鈦合金 Titanium	
切削速度 Vc m/min		100		100		80		65		60		65		100		30	
型號 Code No.	切徑 Dc	RPM 轉速 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 轉速 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 轉速 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 轉速 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 轉速 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 轉速 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 轉速 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 轉速 [min⁻¹]	Feed 進給速度 [mm/min]
F513SX-3	3	9,000	600	9,000	600	6,600	550	6,000	300	3,800	80	6,000	300	9,000	600	3,100	50
F513SX-4	4	6,600	650	6,600	650	5,000	630	4,500	350	2,800	90	4,500	350	6,600	650	2,300	60
F513SX-5	5	5,300	700	5,300	700	4,000	635	3,500	360	2,200	95	3,500	360	5,300	700	1,900	65
F513SX-6	6	5,300	720	5,300	720	4,000	645	3,500	300	2,200	130	3,500	300	5,300	720	1,900	80
F513SX-8	8	4,000	700	4,000	700	3,000	565	2,600	200	1,600	140	2,600	200	4,000	700	1,400	90
F513SX-10	10	3,200	620	3,200	620	2,400	550	2,100	230	1,300	140	2,100	230	3,200	620	1,100	95
F513SX-12	12	2,600	580	2,600	580	2,000	500	1,700	225	1,100	115	1,700	225	2,600	580	1,000	80
F513SX-14	14	2,300	550	2,300	550	1,800	450	1,400	200	900	100	1,400	200	230	550	900	70
F513SX-16	16	2,000	500	2,000	500	1,500	400	1,300	160	830	90	1,300	160	2,000	500	720	65
F513SX-18	18	1,800	450	1,800	450	1,400	350	1,200	140	700	80	1,200	140	1,800	450	650	65
F513SX-20	20	1,500	420	1,500	420	1,200	315	1,000	150	650	70	1,000	150	1,500	420	600	65
切入深度 (mm) 		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D	
		ae:0.2D		ae:0.2D		ae:0.2D		ae:0.2D		ae:0.1D		ae:0.2D		ae:0.2D		ae:0.1D	

Plunge milling 插銑

被削材 Work Material		GR.1 碳鋼 Carbon Steels		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.8 不鏽鋼 Stainless Steel		GR.9 鑄鐵 Cast Iron		GR.15 鈦合金 Titanium	
切削速度 Vc m/min		100		100		80		65		60		65		100		30	
型號 Code No.	切徑 Dc	RPM 轉速 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 轉速 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 轉速 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 轉速 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 轉速 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 轉速 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 轉速 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 轉速 [min⁻¹]	Feed 進給速度 [mm/min]
F513SX-3	3	8,500	320	8,500	320	6,300	200	5,600	110	5,600	110	5,600	105	8,500	320	4,800	80
F513SX-4	4	6,300	350	6,300	350	4,700	205	4,200	110	4,200	110	4,200	110	6,300	350	3,600	85
F513SX-5	5	5,000	350	5,000	350	3,800	210	3,500	120	3,500	120	3,500	125	5,000	350	2,800	90
F513SX-6	6	4,200	360	4,200	360	3,200	220	2,800	130	2,800	130	2,800	120	4,200	360	2,400	95
F513SX-8	8	3,200	350	3,200	350	2,400	210	2,200	120	2,200	120	2,200	120	3,200	350	1,800	85
F513SX-10	10	2,500	300	2,500	300	1,800	180	1,700	100	1,700	100	1,700	105	2,500	300	1,500	70
F513SX-12	12	2,000	300	2,000	300	1,600	190	1,400	100	1,400	100	1,400	100	2,000	300	1,200	70
F513SX-14	14	1,800	200	1,800	200	1,400	160	1,300	80	1,300	80	1,300	80	1,800	200	1,000	60
F513SX-16	16	1,500	180	1,500	180	1,200	140	1,200	80	1,200	80	1,200	80	1,500	180	800	60
F513SX-18	18	1,400	150	1,400	150	1,000	120	1,000	60	1,000	60	1,000	60	1,400	150	700	50
F513SX-20	20	1,300	100	1,300	100	800	80	800	60	800	60	800	60	1,300	100	600	50
切入深度 (mm) 																	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 需使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速需按一比例降低。
5. 切削加工時如果發生振顫，請降低切削條件。

F514SX 超微粒鎢鋼塗層多用途立銑刀

Multipurpose End Mills

Code No. F514SX-Dc

Dc $^{0}_{-0.02}$	Lc mm	L mm	d h5	Ll mm	Dl mm	AlTiN+ZrN F514SX
3	8	57	6	14	2.8	●
4	11	57	6	16	3.8	●
5	13	57	6	18	4.8	●
6	13	57	6	20	5.8	●
8	19	63	8	26	7.7	●
10	22	72	10	31	9.7	●
12	26	83	12	37	11.6	●
14	26	83	14	37	13.5	●
16	32	92	16	43	15.5	●
18	32	92	18	43	17.5	●
20	38	104	20	53	19.5	●

Steel < 48HRC

P	H	M	K	N	S
●	●	●	●	○	○

MG Carbide

AlTiN+ZrN SX

Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鋼<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-54HRC Hardened Steel	
	GR7	硬化鋼 56-48HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	●
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	○
	GR11	銅 Copper	○
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	○
	GR16	鎳 Nickel	○
	GR17	耐熱鋼 Heat-resistant Steel	○

Side Milling 側面切削

被削材 Work Material		GR.1 碳鋼 Carbon Steels		GR.2 低合金鋼 Low-alloyed Steel (-24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (-30HRC)		GR.4 硬化鋼 Hardened Steel (30-38HRC)		GR.5 硬化鋼 Hardened Steel (38-48HRC)		GR.8 不銹鋼 Stainless Steel		GR.9 鑄鐵 Cast Iron		GR.15 鈦合金 Titanium	
切削速度 Vc m/min		120		120		80		65		60		65		120		30	
型號 Code No.	切徑 Dc	RPM 迴轉速度 [n/min]	Feed 進給速度 [mm/min]	RPM 迴轉速度 [n/min]	Feed 進給速度 [mm/min]	RPM 迴轉速度 [n/min]	Feed 進給速度 [mm/min]	RPM 迴轉速度 [n/min]	Feed 進給速度 [mm/min]	RPM 迴轉速度 [n/min]	Feed 進給速度 [mm/min]	RPM 迴轉速度 [n/min]	Feed 進給速度 [mm/min]	RPM 迴轉速度 [n/min]	Feed 進給速度 [mm/min]	RPM 迴轉速度 [n/min]	Feed 進給速度 [mm/min]
F514SX-3	3	10,600	883	10,600	883	8,280	530	6,550	389	6,400	105	6,550	389	10,600	883	3,200	180
F514SX-4	4	8,350	735	8,350	735	4,950	590	3,950	413	3,800	120	3,950	413	8,350	735	2,400	180
F514SX-5	5	4,550	875	4,550	875	3,550	625	2,800	448	2,730	125	2,800	448	4,550	875	2,000	190
F514SX-6	6	3,540	875	3,540	875	2,760	600	2,200	413	2,100	125	2,200	413	3,540	875	1,600	190
F514SX-8	8	3,185	770	3,185	770	2,480	600	1,975	413	1,900	125	1,975	413	3,185	770	1,200	170
F514SX-10	10	3,650	770	3,650	770	2,070	595	1,845	375	1,595	120	1,845	375	3,650	770	1,000	160
F514SX-12	12	2,275	670	2,275	670	1,770	590	1,410	350	1,365	120	1,410	350	2,275	670	900	160
F514SX-14	14	2,048	655	2,048	655	1,706	546	1,365	328	1,251	110	1,365	328	2,048	656	700	150
F514SX-16	16	1,990	670	1,990	670	1,550	520	1,230	312	1,190	100	1,230	312	1,990	670	600	150
F514SX-18	18	1,593	637	1,593	637	1,327	425	1,062	297	973	97	1,062	297	1,593	637	500	150
F514SX-20	20	1,590	535	1,590	535	1,240	415	985	277	950	90	985	277	1,590	535	480	130
切入深度 (mm)		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D	
		ae:0.2D		ae:0.2D		ae:0.2D		ae:0.2D		ae:0.1D		ae:0.2D		ae:0.2D		ae:0.1D	

Slotting 滿切削

被削材 Work Material		GR.1 碳鋼 Carbon Steels		GR.2 低合金鋼 Low-alloyed Steel (-24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (-30HRC)		GR.4 硬化鋼 Hardened Steel (30-38HRC)		GR.5 硬化鋼 Hardened Steel (38-48HRC)		GR.8 不銹鋼 Stainless Steel		GR.9 鑄鐵 Cast Iron		GR.15 鈦合金 Titanium	
切削速度 Vc m/min		120		120		80		65		60		65		120		30	
型號 Code No.	切徑 Dc	RPM 迴轉速度 [n/min]	Feed 進給速度 [mm/min]	RPM 迴轉速度 [n/min]	Feed 進給速度 [mm/min]	RPM 迴轉速度 [n/min]	Feed 進給速度 [mm/min]	RPM 迴轉速度 [n/min]	Feed 進給速度 [mm/min]	RPM 迴轉速度 [n/min]	Feed 進給速度 [mm/min]	RPM 迴轉速度 [n/min]	Feed 進給速度 [mm/min]	RPM 迴轉速度 [n/min]	Feed 進給速度 [mm/min]	RPM 迴轉速度 [n/min]	Feed 進給速度 [mm/min]
F514SX-3	3	10,600	600	10,600	600	8,280	430	6,550	290	6,400	105	6,550	290	10,600	600	3,200	130
F514SX-4	4	8,350	635	8,350	635	4,950	500	3,950	325	3,800	120	3,950	325	8,350	635	2,400	150
F514SX-5	5	4,550	775	4,550	775	3,550	525	2,800	348	2,730	125	2,800	348	4,550	775	2,000	160
F514SX-6	6	3,540	775	3,540	775	2,760	500	2,200	313	2,100	125	2,200	313	3,540	775	1,600	145
F514SX-8	8	3,185	650	3,185	650	2,480	500	1,975	313	1,900	125	1,975	313	3,185	650	1,200	120
F514SX-10	10	3,650	670	3,650	670	2,070	490	1,845	288	1,595	120	1,845	288	3,650	670	1,000	145
F514SX-12	12	2,275	560	2,275	560	1,770	460	1,410	275	1,365	120	1,410	275	2,275	560	900	150
F514SX-14	14	2,048	655	2,048	655	1,706	546	1,365	328	1,251	110	1,365	328	2,048	656	700	150
F514SX-16	16	1,990	660	1,990	660	1,550	420	1,230	240	1,190	100	1,230	240	1,990	660	600	150
F514SX-18	18	1,593	637	1,593	637	1,327	425	1,062	297	973	97	1,062	297	1,593	637	500	150
F514SX-20	20	1,590	500	1,590	500	1,240	390	985	200	950	90	985	200	1,590	500	480	130
切入深度 (mm)		ap:0.5D		ap:0.5D		ap:0.5D		ap:0.5D		ap:0.05D		ap:0.5D		ap:0.5D		ap:0.05D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 需使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材質的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速需按一比例降低。
5. 切削加工時如果發生振顫，請降低切削條件。

HF514SX 超微粒鎢鋼塗層多用途立銑刀/內冷孔

Multipurpose End Mills With Coolant Hole

Code No. HF514SX-Dc

Dc $^{0}_{-0.02}$	Lc mm	L mm	d h5	Cl mm	Dl mm	AlTiN+ZrN HF514SX
6	13	57	6	20	5.8	—
8	19	63	8	26	7.7	—
10	22	72	10	31	9.7	—
12	26	83	12	37	11.6	—
16	32	92	16	43	15.5	—
20	38	104	20	53	19.5	—

※ Radial coolant hole can be customized. —— In production

※Y型內冷孔可依需求製造生產 ——庫存建立中

DIN 6535 HB

Steel < 48HRC

P	H	M	K	N	S
●	●	●	●	○	○

MG Carbide

AlTiN+ZrN SX

Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-54HRC Hardened Steel	
	GR7	硬化鋼 56-48HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	●
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	○
	GR11	銅 Copper	○
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	○
	GR16	鎳 Nickel	○
	GR17	耐熱鋼 Heat-resistant Steel	○

Side Milling 側面切削

被削材 Work Material		GR.1 碳鋼 Carbon Steels		GR.2 低合金鋼 Low-alloyed Steel (-24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (-30HRC)		GR.4 硬化鋼 Hardened Steel (30-38HRC)		GR.5 硬化鋼 Hardened Steel (38-48HRC)		GR.8 不鏽鋼 Stainless Steel		GR.9 鑄鐵 Cast Iron		GR.15 鈦合金 Titanium	
切削速度 Vc m/min		120		120		80		65		60		65		120		30	
型號 Code No.	切徑 Dc	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/min]
HF514SX-6	6	3,540	875	3,540	875	2,760	600	2,200	413	2,100	125	2,200	413	3,540	875	1,600	190
HF514SX-8	8	3,185	770	3,185	770	2,480	600	1,975	413	1,900	125	1,975	413	3,185	770	1,200	170
HF514SX-10	10	3,650	770	3,650	770	2,070	595	1,645	375	1,595	120	1,645	375	3,650	770	1,000	160
HF514SX-12	12	2,275	670	2,275	670	1,770	560	1,410	350	1,365	120	1,410	350	2,275	670	800	160
HF514SX-16	16	1,990	670	1,990	670	1,550	520	1,230	312	1,190	100	1,230	312	1,990	670	600	150
HF514SX-20	20	1,590	535	1,590	535	1,240	415	985	277	950	90	985	277	1,590	535	480	130
切入深度 (mm)		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D	
		ae:0.2D		ae:0.2D		ae:0.2D		ae:0.2D		ae:0.1D		ae:0.2D		ae:0.2D		ae:0.1D	

Slotting 滿切削

被削材 Work Material		GR.1 碳鋼 Carbon Steels		GR.2 低合金鋼 Low-alloyed Steel (-24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (-30HRC)		GR.4 硬化鋼 Hardened Steel (30-38HRC)		GR.5 硬化鋼 Hardened Steel (38-48HRC)		GR.8 不鏽鋼 Stainless Steel		GR.9 鑄鐵 Cast Iron		GR.15 鈦合金 Titanium	
切削速度 Vc m/min		120		120		80		65		60		65		120		30	
型號 Code No.	切徑 Dc	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/min]	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/min]
HF514SX-6	6	3,540	775	3,540	775	2,760	500	2,200	313	2,100	125	2,200	313	3,540	775	1,600	145
HF514SX-8	8	3,185	650	3,185	650	2,480	500	1,975	313	1,900	125	1,975	313	3,185	650	1,200	120
HF514SX-10	10	3,650	670	3,650	670	2,070	490	1,645	288	1,595	120	1,645	288	3,650	670	1,000	145
HF514SX-12	12	2,275	560	2,275	560	1,770	460	1,410	275	1,365	120	1,410	275	2,275	560	800	150
HF514SX-16	16	1,990	660	1,990	660	1,550	420	1,230	240	1,190	100	1,230	240	1,990	660	600	150
HF514SX-20	20	1,590	500	1,590	500	1,240	360	985	200	950	90	985	200	1,590	500	480	130
切入深度 (mm)		ap:0.5D		ap:0.5D		ap:0.5D		ap:0.5D		ap:0.05D		ap:0.5D		ap:0.5D		ap:0.05D	

1. Please work with good rigidity / high precison facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工形狀、刃數、使用機台等因素，對切削條件值加以調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

F674TX 極超微粒鎢鋼塗層多用途立銑刀

Holtpurpose End Mills

Code No. F674TX-Dc

Dc $^{0}_{-0.02}$	Lc mm	L mm	d h5	Cl mm	Dl mm	AlTiSiN F674TX
6	13	57	6	20	5.8	●
8	19	63	8	26	7.7	●
10	22	72	10	31	9.7	●
12	26	83	12	37	11.6	●
16	32	92	16	43	15.5	●
20	38	104	20	53	19.5	●

Steel < 60HRC

P	H	M	K	N	S
●	●	○	●		○

UMG Carbide

AlTiSiN TX

Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鋼<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-54HRC Hardened Steel	●
	GR7	硬化鋼 56-68HRC Hardened Steel	○
M	GR8	不銹鋼 Stainless Steel	○
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	○
	GR16	鎳 Nickel	○
	GR17	耐熱鋼 Heat-resistant Steel	○

Side Milling 側面切削

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.6 硬化鋼 Hardened Steel (48~56HRC)		GR.9 鑄鐵 Cast Iron	
切削速度 Vc m/min		85		85		75		70		60		30		85	
型號 Code No.	切徑 Dc	RPM 迴轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 迴轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 迴轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 迴轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 迴轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 迴轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 迴轉速度 (min-1)	Feed 進給速度 (mm/min)
F674TX-6	6	4,500	610	4,500	610	3,700	425	3,700	425	2,900	145	1,500	70	4,500	610
F674TX-8	8	3,300	590	3,300	590	2,700	425	2,700	425	2,200	145	1,100	65	3,300	590
F674TX-10	10	2,600	580	2,600	580	2,200	420	2,200	420	1,700	145	850	65	2,600	580
F674TX-12	12	2,200	560	2,200	580	1,800	420	1,800	420	1,400	140	800	60	2,200	580
F674TX-16	16	1,600	530	1,600	530	1,300	400	1,300	400	1,200	130	600	45	1,600	530
F674TX-20	20	1,300	510	1,300	510	1,100	370	1,100	370	890	110	470	35	1,300	510
切入深度 (mm)		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D	
		ae:0.1D		ae:0.1D		ae:0.1D		ae: 0.1D		ae: 0.1D		ae:0.02D		ae:0.1D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速也同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

F608HX / F609HX 極超微粒鎢鋼塗層粗加工立銑刀

Roughing End Mills

Code No. F608HX-Dc-HB

Dc h10	Lc mm	L mm	d h5	Z T	C mm	AlTiCrN F608HX
3	8	57	6	3	0.3	●
4	11	57	6	3	0.3	●
5	13	57	6	3	0.4	●
6	13	57	6	3	0.4	●
8	19	63	8	3	0.4	●
10	22	72	10	4	0.5	●
12	26	83	12	4	0.5	●
14	26	83	14	4	0.5	●
16	32	92	16	4	0.5	●
18	32	92	18	4	0.5	●
20	38	104	20	4	0.5	●

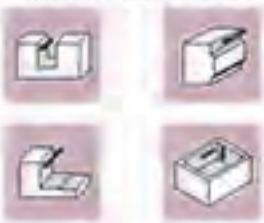
Steel < 48HRC

P	H	M	K	N	S
●	●	○	●		

UMG Carbide

AlTiCrN HX

Type of Operation



Work Material

P	GR1	碳鋼 Carbon Steel	●
P	GR2	低合金鋼硬<24HRC Low-alloyed Steel	●
P	GR3	高合金鋼硬<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
H	GR5	硬化鋼 38-48HRC Hardened Steel	●
H	GR6	硬化鋼 48-54HRC Hardened Steel	
H	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	○
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	
N	GR11	銅 Copper	
N	GR12	塑膠 Plastics	
N	GR13	複合材料 FRP CFRP Composite Material	
N	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
S	GR16	鎳 Nickel	
S	GR17	耐熱鋼 Heat-resistant Steel	

Code No. F609HX-Dc-HB

Dc h10	Lc mm	L mm	d h5	Z T	C mm	AlTiCrN F609HX
6	19	63	6	3	0.4	●
8	28	72	8	3	0.4	●
10	34	84	10	4	0.5	●
12	40	97	12	4	0.5	●
16	48	108	16	4	0.5	●
20	56	122	20	4	0.5	●

F608HX / F609HX 切削條件參考表

Side Milling 側面切削

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.9 鑄鐵 Cast Iron	
切削速度 Vc m/min		120		120		100		80		65		140	
型號 Code No.	切徑 Dc	RPM 回轉速度 (min⁻¹)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min⁻¹)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min⁻¹)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min⁻¹)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min⁻¹)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min⁻¹)	Feed 進給速度 (mm/min)
F608HX-3	3	10,600	1,270	10,600	1,270	9,000	720	6,900	550	5,300	254	12,740	1,020
F608HX-4	4	7,960	955	7,960	955	6,760	540	5,175	420	3,980	238	9,550	955
F608HX-5	5	6,370	764	6,370	764	5,410	432	4,140	330	3,180	216	7,640	764
F608HX/F609HX-6	6	5,300	620	5,300	620	4,500	350	3,400	260	2,600	200	6,300	730
F608HX/F609HX-8	8	4,000	620	4,000	620	3,400	400	2,600	300	2,000	220	4,700	750
F608HX/F609HX-10	10	3,200	630	3,200	620	2,700	420	2,000	320	1,600	250	3,800	750
F608HX/F609HX-12	12	2,600	630	2,600	630	2,200	430	1,700	320	1,350	260	3,200	750
F608HX-14	14	2,250	650	2,250	650	1,950	470	1,500	350	1,150	260	2,750	770
F608HX/F609HX-16	16	2,000	620	2,000	620	1,700	460	1,300	350	1,000	260	2,400	760
F608HX-18	18	1,750	630	1,750	630	1,500	480	1,150	350	900	270	2,100	750
F608HX/F609HX-20	20	1,600	600	1,600	600	1,400	450	1,100	340	790	250	1,900	760
切入深度 (mm)		ap:1.5D ae:0.4D		ap:1.5D ae:0.4D		ap:1.5D ae:0.3D		ap:1.5D ae:0.3D		ap:1.5D ae:0.3D		ap:1.5D ae:0.4D	

Slotting 溝切削

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.9 鑄鐵 Cast Iron	
切削速度 Vc m/min		60		60		50		45		40		60	
型號 Code No.	切徑 Dc	RPM 回轉速度 (min⁻¹)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min⁻¹)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min⁻¹)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min⁻¹)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min⁻¹)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min⁻¹)	Feed 進給速度 (mm/min)
F608HX-3	3	6,300	200	6,300	200	5,300	170	4,700	150	4,200	100	6,300	200
F608HX-4	4	4,700	250	4,700	250	3,980	200	3,500	160	3,150	120	4,700	250
F608HX-5	5	3,800	300	3,800	300	3,180	230	2,800	180	2,550	140	3,800	300
F608HX/F609HX-6	6	3,150	315	3,150	315	2,650	260	2,300	180	2,100	160	3,150	315
F608HX/F609HX-8	8	2,350	300	2,350	300	2,000	250	1,750	170	1,600	150	2,350	300
F608HX/F609HX-10	10	1,900	300	1,900	300	1,600	240	1,400	160	1,300	150	1,900	300
F608HX/F609HX-12	12	1,600	280	1,600	280	1,300	230	1,200	160	1,100	140	1,600	280
F608HX-14	14	1,350	280	1,350	280	1,100	235	1,000	150	900	130	1,350	280
F608HX/F609HX-16	16	1,200	270	1,200	270	1,000	225	900	140	800	120	1,200	270
F608HX-18	18	1,000	260	1,000	260	900	240	800	135	700	120	1,000	260
F608HX/F609HX-20	20	950	260	950	260	900	240	700	130	650	125	950	260
切入深度 (mm)		ap:0.5D		ap:0.5D		ap:0.5D		ap:0.5D		ap:0.5D		ap:0.5D	

- Note that when the end mills diameter less than 6 mm, please adjust proper parameters in accordance with the actual processing conditions.
- Notice: F609HX is Long Length series End Mills. Please adjust the parameter according

- 注意當銑刀直徑小於6毫米時候，請按照實際的加工情況調整合理的參數。
- 注意F609HX為加長柄系列銑刀，請按照實際的加工狀況調整刀具的參數。

Code No. F638TX-Dc-HB

Dc h10	Lc mm	L mm	d h5	Z T	C mm	AlTiSiN F638TX
6	13	57	6	4	0.4	●
8	19	63	8	4	0.4	●
10	22	72	10	4	0.5	●
12	26	83	12	4	0.5	●
14	26	83	14	4	0.5	●
16	32	92	16	4	0.5	●
18	32	92	18	4	0.5	●
20	38	104	20	4	0.5	●

Steel < 60HRC

P	H	M	K	N	S
●	●	●	○		○

UMG Carbide

AlTiSiN TX

Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼硬<34HRC Low-alloyed Steel	●
	GR3	高合金鋼硬<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-54HRC Hardened Steel	○
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	●
K	GR9	鑄鐵 Cast Iron	○
N	GR10	鋁 Aluminum	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	○
	GR16	鎳 Nickel	○
	GR17	耐熱鋼 Heat-resistant Steel	○

Code No. F649TX-Dc-HB

Dc h10	Lc mm	L mm	d h5	Z T	C mm	AlTiSiN F649TX
6	19	63	6	4	0.4	●
8	28	72	8	4	0.4	●
10	34	84	10	4	0.5	●
12	40	97	12	4	0.5	●
16	48	108	16	4	0.5	●
20	56	122	20	4	0.5	●

F638TX / F649TX 切削條件參考表

Slotting 滿切削

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.8 不銹鋼 Stainless Steel	
切削速度 Vc m/min		120		120		100		80		65		80	
型號 Code No.	切徑 Dc	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)
F638TX/F649TX-6	6	5,300	620	5,300	620	4,500	350	3,400	260	2,600	200	3,400	260
F638TX/F649TX-8	8	4,000	620	4,000	620	3,400	400	2,600	300	2,000	220	2,600	300
F638TX/F649TX-10	10	3,200	630	3,200	630	2,700	420	2,000	320	1,600	250	2,000	320
F638TX/F649TX-12	12	2,600	630	2,600	630	2,200	430	1,700	320	1,350	260	1,700	320
F638TX-14	14	2,250	650	2,250	650	1,950	470	1,500	350	1,150	280	1,500	350
F638TX/F649TX-16	16	2,000	620	2,000	620	1,700	480	1,300	350	1,000	280	1,300	350
F638TX-18	18	1,750	630	1,750	630	1,500	480	1,150	350	900	270	1,150	350
F638TX/F649TX-20	20	1,600	600	1,600	600	1,400	450	1,100	340	790	250	1,100	340
切入深度 (mm)		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D		ap:1.5D	
		ae:0.4D		ae:0.4D		ae:0.3D		ae:0.3D		ae:0.3D		ae:0.3D	

※Notice: F649TX is Long Length series End Mills. Please adjust the parameter according.
※注意F649TX為加長柄系列銑刀，請按照實際的伸長度調整刀具的參數。

Side Milling 側面切削

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.8 不銹鋼 Stainless Steel	
切削速度 Vc m/min		80		80		50		45		40		45	
型號 Code No.	切徑 Dc	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)
F638TX/F649TX-6	6	3,150	315	3,150	315	2,650	260	2,300	180	2,100	160	2,300	180
F638TX/F649TX-8	8	2,350	300	2,350	300	2,000	250	1,750	170	1,600	150	1,750	170
F638TX/F649TX-10	10	1,900	300	1,900	300	1,600	240	1,400	160	1,300	150	1,400	160
F638TX/F649TX-12	12	1,600	280	1,600	280	1,300	230	1,200	160	1,100	140	1,200	160
F638TX-14	14	1,350	280	1,350	280	1,100	235	1,000	150	900	130	1,000	150
F638TX/F649TX-16	16	1,200	270	1,200	270	1,000	225	900	140	800	120	900	140
F638TX-18	18	1,000	260	1,000	260	900	240	800	135	700	120	800	135
F638TX/F649TX-20	20	950	260	950	260	800	240	700	130	650	125	700	130
切入深度 (mm)		ap ≤16 1.0D >16 0.5D		ap ≤16 1.0D >16 0.5D		ap ≤16 1.0D >16 0.5D		ap ≤16 1.0D >16 0.5D		ap ≤16 1.0D >16 0.5D		ap ≤16 1.0D >16 0.5D	

※Note that when the end mills diameter less than 6 mm, please adjust proper parameters in accordance with the actual processing conditions.
※Notice: F649TX is Long Length series End Mills. Please adjust the parameter according.

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

※注意當銑刀直徑小於6毫米時候，請按照實際的加工情況調整合理的參數。
※注意F649TX為加長柄系列銑刀，請按照實際的伸出長度調整刀具的參數。

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

F651SX 極超微粒鎢鋼塗層多用途立銑刀

Multipurpose End Mills

Code No. F651SX-Dc

Dc $^{0}_{-0.02}$	Lc mm	L mm	d h5	Ll mm	Dl mm	AlTiN+ZrN F651SX
3	8	57	6	14	2.8	●
4	11	57	6	16	3.8	●
5	13	57	6	18	4.8	●
6	13	57	6	20	5.8	●
8	19	63	8	26	7.7	●
10	22	72	10	31	9.7	●
12	26	83	12	37	11.6	●
16	32	92	16	43	15.5	●
20	38	104	20	53	19.5	●

Stainless, Titanium, Nickle

P	H	M	K	N	S
○	○	●			●

MG Carbide

AlTiN+ZrN SX

Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel	○
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	○
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	○
H	GR4	硬化鋼 30-38HRC Hardened Steel	○
	GR5	硬化鋼 38-48HRC Hardened Steel	○
	GR6	硬化鋼 48-54HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	●
K	GR9	鑄鐵 Cast Iron	
N	GR10	鋁 Aluminium	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	●
	GR16	鎳 Nickel	●
	GR17	耐熱鋼 Heat-resistant Steel	●

Side Milling 側面切削

被削材 Work Material		GR.8 不鏽鋼 Stainless Steel		GR.5鈦合金 Titanium	
切削速度 Vc m/min		75		40	
型號 Code No.	刃徑 Dc	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/min)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/min)
F651SX-3	3	7,650	600	4,240	318
F651SX-4	4	6,050	700	3,180	370
F651SX-5	5	5,000	770	2,550	410
F651SX-6	6	4,200	830	2,120	440
F651SX-8	8	3,100	600	1,590	420
F651SX-10	10	2,600	710	1,270	375
F651SX-12	12	2,100	670	1,060	355
F651SX-16	16	1,600	550	800	290
F651SX-20	20	1,250	510	630	270
切入深度 (mm) 		ap:1.5D		ap:1.5D	
		ae:0.1D		ae:0.1D	

Slotting 溝切削

被削材 Work Material		GR.8 不鏽鋼 Stainless Steel		GR.5鈦合金 Titanium	
切削速度 Vc m/min		70		35	
型號 Code No.	刃徑 Dc	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/min)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/min)
F651SX-3	3	7,450	450	3,715	225
F651SX-4	4	5,500	500	2,780	250
F651SX-5	5	4,500	530	2,230	265
F651SX-6	6	3,700	550	1,860	275
F651SX-8	8	2,800	525	1,400	260
F651SX-10	10	2,330	465	1,115	230
F651SX-12	12	1,850	430	930	215
F651SX-16	16	1,400	370	700	185
F651SX-20	20	1,100	330	560	165
切入深度 (mm) 		ap 0.5D		ap 0.5D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

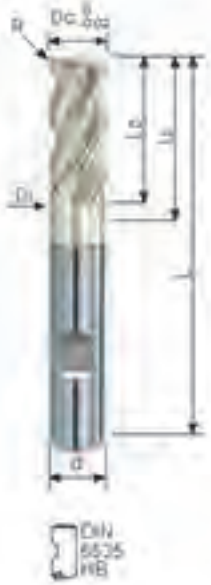
1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

F652SX 超微粒鎢鋼塗層多用途R角立銑刀

Multipurpose End Mills With Corner Radius

Code No. F652SX-Dc×R

Dc $^{0}_{-0.02}$	R ±0.01	Lc mm	L mm	d h5	Ll mm	Dl mm	AlTiN+ZrN F652SX
3	R0.2	8	57	6	14	2.8	●
4	R0.2	11	57	6	16	3.8	●
5	R0.2	13	57	6	18	4.8	●
6	R0.2	13	57	6	20	5.8	●
8	R0.2	19	63	8	26	7.7	●
10	R0.2	22	72	10	31	9.7	●
12	R0.2	26	83	12	37	11.6	●
16	R0.2	32	92	16	43	15.5	●
20	R0.2	38	104	20	53	19.5	●
3	R0.5	8	57	6	14	2.8	●
4	R0.5	11	57	6	16	3.8	●
5	R0.5	13	57	6	18	4.8	●
6	R0.5	13	57	6	20	5.8	●
8	R0.5	19	63	8	26	7.7	●
10	R0.5	22	72	10	31	9.7	●
12	R0.5	26	83	12	37	11.6	●
16	R0.5	32	92	16	43	15.5	●
20	R0.5	38	104	20	53	19.5	●
6	R1	13	57	6	20	5.8	●
8	R1	19	63	8	26	7.7	●
10	R1	22	72	10	31	9.7	●
12	R1	26	83	12	37	11.6	●
16	R1	32	92	16	43	15.5	●
20	R1	38	104	20	53	19.5	●
6	R2	13	57	6	20	5.8	●
8	R2	19	63	8	26	7.7	●
10	R2	22	72	10	31	9.7	●
12	R2	26	83	12	37	11.6	●
16	R2	32	92	16	43	15.5	●
20	R2	38	104	20	53	19.5	●
12	R3	26	83	12	37	11.6	●
16	R3	32	92	16	43	15.5	●
20	R3	38	104	20	53	19.5	●



Stainless, Titanium, Nickle

P	H	M	K	N	S
○	○	●			●

MG Carbide

AlTiN+ZrN SX

R

Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel	○
	GR2	低合金鋼鋼<24HRC Low-alloyed Steel	○
	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	○
H	GR4	硬化鋼 30-38HRC Hardened Steel	○
	GR5	硬化鋼 38-48HRC Hardened Steel	○
	GR6	硬化鋼 48-54HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	●
K	GR9	鑄鐵 Cast Iron	
N	GR10	鋁 Aluminium	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	●
	GR16	鎳 Nickel	●
	GR17	耐熱鋼 Heat-resistant Steel	●

Side Milling 側面切削

被削材 Work Material		GR.8 不鏽鋼 Stainless Steel		GR.5鈦合金 Titanium	
切削速度 Vc m/min		75		40	
型號 Code No.	刃徑 Dc	RPM 迴轉速度 (min-1)	Feed 進給速度 (mm/min)	RPM 迴轉速度 (min-1)	Feed 進給速度 (mm/min)
F652SX-3	3	7,650	600	4,240	318
F652SX-4	4	6,050	700	3,180	370
F652SX-5	5	5,000	770	2,550	410
F652SX-6	6	4,200	830	2,120	440
F652SX-8	8	3,100	600	1,590	420
F652SX-10	10	2,600	710	1,270	375
F652SX-12	12	2,100	670	1,060	355
F652SX-16	16	1,600	550	800	290
F652SX-20	20	1,250	510	630	270
切入深度 (mm) 		ap:1.5D		ap:1.5D	
		ae:0.1D		ae:0.1D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

F653SX 超微粒鎢鋼塗層多用途R角立銑刀

Multipurpose End Mills With Corner Radius

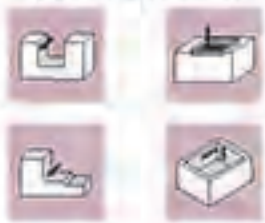
Code No. F653SX-Dc×R

Dc $^{0}_{-0.02}$	R ±0.01	Lc mm	L mm	d h5	Ll mm	Dl mm	AlTiN+ZrN F653SX
3	R0.5	8	57	6	14	2.8	•
4	R0.5	11	57	6	16	3.8	•
5	R0.5	13	57	6	18	4.8	•
6	R0.5	13	57	6	20	5.8	•
8	R0.5	19	63	8	26	7.7	•
10	R0.5	22	72	10	31	9.7	•
12	R0.5	26	83	12	37	11.6	•
16	R0.5	32	92	16	43	15.5	•
20	R0.5	38	104	20	53	19.5	•

Stainless, Titanium, Nickle

P	H	M	K	N	S
○	○	●			●

Type of Operation



Work Material

P	GR1	碳鋼 Carbon Steel	○
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	○
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	○
H	GR4	硬化鋼 30-38HRC Hardened Steel	○
	GR5	硬化鋼 38-48HRC Hardened Steel	○
	GR6	硬化鋼 48-56HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	●
K	GR9	鑄鐵 Cast Iron	
N	GR10	鋁 Aluminium	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	●
	GR16	鎳 Nickel	●
	GR17	耐熱鋼 Heat-resistant Steel	●

Side Milling 側面切削

被削材 Work Material		GR.8 不鏽鋼 Stainless Steel		GR.5鈦合金 Titanium	
切削速度 Vc m/min		75		40	
型號 Code No.	刃徑 Dc	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/min)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/min)
F653SX-3	3	7,650	720	4,240	400
F653SX-4	4	6,050	840	3,180	460
F653SX-5	5	5,000	920	2,550	510
F653SX-6	6	4,200	990	2,120	550
F653SX-8	8	3,100	960	1,590	525
F653SX-10	10	2,600	850	1,270	470
F653SX-12	12	2,100	800	1,060	440
F653SX-16	16	1,600	680	800	380
F653SX-20	20	1,250	615	630	340
切入深度 (mm) 		ap:1.5D		ap:1.5D	
		ae:0.1D		ae:0.1D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，需依加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

F615TX / F619TX 極超微粒鎢鋼塗層環面立銑刀

Toric End Mill

Code No. F615TX-Dc×R

Dc	R	Lc	L	d	Ll	Dl	AlTiSiN F615TX
		mm	mm	h5	mm	mm	
3	R0.3	4	57	6	14	2.8	●
3	R0.5	4	57	6	14	2.8	●
4	R0.3	5	57	6	16	3.7	●
4	R0.5	5	57	6	16	3.7	●
4	R1	5	57	6	16	3.7	●
6	R0.5	7	57	6	20	5.5	●
6	R1	7	57	6	20	5.5	●
6	R1.5	7	57	6	20	5.5	●
8	R0.5	9	63	8	26	7.4	●
8	R1	9	63	8	26	7.4	●
8	R1.5	9	63	8	26	7.4	●
8	R2	9	63	8	26	7.4	●
10	R0.5	11	72	10	31	9.2	●
10	R1	11	72	10	31	9.2	●
10	R1.5	11	72	10	31	9.2	●
10	R2	11	72	10	31	9.2	●
10	R2.5	11	72	10	31	9.2	●
12	R0.5	13	83	12	37	11	●
12	R1	13	83	12	37	11	●
12	R1.5	13	83	12	37	11	●
12	R2	13	83	12	37	11	●
12	R3	13	83	12	37	11	●
16	R2	17	92	16	43	14.5	●
16	R4	17	92	16	43	14.5	●

Steel < 62HRC

P	H	M	K	N	S
●	●		●		

UMG Carbide

AlTiSiN TX

Type of Operation

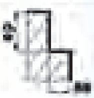
Work Material

P	GR1	炭鋼 Carbon Steel	●
P	GR2	低合金鋼鋼<24HRC Low-alloyed Steel	●
P	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
H	GR5	硬化鋼 38-48HRC Hardened Steel	●
H	GR6	硬化鋼 48-54HRC Hardened Steel	●
H	GR7	硬化鋼 56-68HRC Hardened Steel	○
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	
N	GR11	銅 Copper	
N	GR12	塑膠 Plastics	
N	GR13	複合材料 FRP CFRP Composite Material	
N	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
S	GR16	鎳 Nickel	
S	GR17	耐熱鋼 Heat-resistant Steel	

Code No. F619TX-Dc×R

Dc	R	Lc	L	d	Ll	Dl	AlTiSiN F619TX
		mm	mm	h5	mm	mm	
6	R0.5	7	70	6	33	5.5	●
6	R1	7	70	6	33	5.5	●
6	R1.5	7	70	6	33	5.5	●
8	R0.5	9	80	8	43	7.4	●
8	R1	9	80	8	43	7.4	●
8	R2	9	80	8	43	7.4	●
10	R0.5	11	90	10	49	9.2	●
10	R1	11	90	10	49	9.2	●
10	R2.5	11	90	10	49	9.2	●
12	R0.5	13	100	12	54	11	●
12	R1	13	100	12	54	11	●
12	R2	13	100	12	54	11	●
12	R3	13	100	12	54	11	●
16	R2	17	115	16	66	14.5	●
16	R4	17	115	16	66	14.5	●

Side Milling 側面切削

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~28HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.6 硬化鋼 Hardened Steel (48~56HRC)		GR.9 鑄鐵 Cast Iron	
切削速度 Vc. m/min		135~160		135~160		108~122		69~72		69~72		30~45		135~160	
型號 Code No.	刃徑 Dc	RPM 回轉速度 (min⁻¹)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min⁻¹)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min⁻¹)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min⁻¹)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min⁻¹)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min⁻¹)	Feed 進給速度 (mm/min)	RPM 回轉速度 (min⁻¹)	Feed 進給速度 (mm/min)
F615TX-3	3	15,100	715	15,100	715	11,500	500	7,300	450	7,300	450	4,800	220	15,100	715
F615TX-4	4	10,800	720	10,800	720	8,600	515	5,600	500	5,600	500	3,600	250	10,800	720
F615TX-5	5	9,000	730	9,000	730	6,800	515	4,500	550	4,500	550	2,900	280	9,000	730
F615TX/F619TX-6	6	7,200	735	7,200	735	5,800	520	3,700	600	3,700	600	2,400	300	7,200	735
F615TX/F619TX-8	8	5,400	740	5,400	740	4,300	520	2,800	620	2,800	620	1,800	310	5,400	740
F615TX/F619TX-10	10	4,350	755	4,350	755	3,400	540	2,300	620	2,300	620	1,400	300	4,350	755
F615TX/F619TX-12	12	3,600	840	3,600	840	2,900	545	1,900	620	1,900	620	1,200	300	3,600	840
F615TX/F619TX-16	16	3,200	900	3,200	900	2,400	610	1,400	480	1,400	480	900	230	3,200	900
切入深度 (mm)		ap:1.0D		ap:1.0D		ap:1.0D		ap:1.0D		ap:1.0D		ap:1.0D		ap:1.0D	
		ae:0.05D		ae:0.05D		ae:0.05D		ae:0.05D		ae:0.05D		ae:0.02D		ae:0.05D	

※ Notice: F619TX is Long Length series End Mills. Please adjust the parameter according.

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

※注意F619TX為加長柄系列銑刀，請按照適當的伸長量調整刀具的參數。

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的標準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

F613TX / F614TX 極超微粒鎢鋼塗層環面立銑刀

Toric End Mills

Code No. F613TX-Dc×R

Dc	R	Lc	L	d	Ll	Dl	Z	AlTiSiN F613TX
		mm	mm	h5	mm	mm		
3	R0.5	4	57	6	14	2.8	4	●
4	R0.5	5	57	6	16	3.7	4	●
5	R0.5	6	57	6	18	4.6	4	●
6	R0.5	7	57	6	20	5.5	6	●
8	R0.5	9	63	8	26	7.4	6	●
10	R0.5	11	72	10	31	9.2	6	●
12	R0.5	13	83	12	37	11	6	●
6	R1	7	57	6	20	5.5	6	●
8	R1	9	63	8	26	7.4	6	●
10	R1	11	72	10	31	9.2	6	●
12	R1	13	83	12	37	11	6	●

Code No. F614TX-Dc×R

Dc	R	Lc	L	d	Ll	Dl	Z	AlTiSiN F614TX
		mm	mm	h5	mm	mm		
3	R0.5	4	70	6	27	2.8	4	●
4	R0.5	5	70	6	29	3.7	4	●
5	R0.5	6	70	6	31	4.6	4	●
6	R0.5	7	70	6	33	5.5	6	●
8	R0.5	9	80	8	43	7.4	6	●
10	R0.5	11	90	10	49	9.2	6	●
12	R0.5	13	100	12	54	11	6	●
6	R1	7	70	6	33	5.5	6	●
8	R1	9	80	8	43	7.4	6	●
10	R1	11	90	10	49	9.2	6	●
12	R1	13	100	12	54	11	6	●

Hardened Steel 40-70 HRC

P	H	M	K	N	S
	●		○		

SMG Carbide

AlTiSiN TX

Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel
P	GR2	低合金鋼鐵<24HRC Low-alloyed Steel
P	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel
H	GR4	硬化鋼 30-38HRC Hardened Steel
H	GR5	硬化鋼 38-48HRC Hardened Steel ●
H	GR6	硬化鋼 48-54HRC Hardened Steel ●
H	GR7	硬化鋼 56-68HRC Hardened Steel ●
M	GR8	不銹鋼 Stainless Steel
K	GR9	鑄鐵 Cast Iron ○
N	GR10	鋁 Aluminium
N	GR11	銅 Copper
N	GR12	塑膠 Plastics
N	GR13	複合材料 FRP CFRP Composite Material
N	GR14	石墨 Graphite
S	GR15	鈦合金 Titanium
S	GR16	鎳 Nickel
S	GR17	耐熱鋼 Heat-resistant Steel

Side Milling 側面切削

被削材 Work Material		GR.5 硬化鋼 Hardened Steel (38-48HRC)		GR.6 硬化鋼 Hardened Steel (48-56HRC)		GR.7 硬化鋼 Hardened Steel (56-68HRC)	
切削速度 Vc m/min		150		100		90	
型號 Code No.	切徑 Dc	RPM 主軸速度 (min-1)	Feed 進給速度 (mm/min)	RPM 主軸速度 (min-1)	Feed 進給速度 (mm/min)	RPM 主軸速度 (min-1)	Feed 進給速度 (mm/min)
F613TX/F614TX-3	3	7,300	450	4,800	220	4,000	150
F613TX/F614TX-4	4	5,600	500	3,600	250	3,200	220
F613TX/F614TX-5	5	4,500	550	2,900	280	2,600	220
F613TX/F614TX-6	6	6,600	2,300	5,300	1,800	4,000	1,000
F613TX/F614TX-8	8	4,900	2,350	4,000	1,850	3,000	1,000
F613TX/F614TX-10	10	4,000	2,400	3,200	1,900	2,400	1,000
F613TX/F614TX-12	12	3,300	2,400	2,600	1,900	2,000	1,000
切入深度 (mm) 		ap:1.0D		ap:1.0D		ap:1.0D	
		ae:0.1D		ae:0.05D		ae:0.03D	

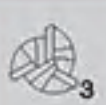
※ Notice: F614TX is Long Length series End Mills. Please adjust the parameter according.

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

※注意F614TX為加長柄系列銑刀，請按照通常的作業設備整刀具的參數。

1. 請使用剛性好、精度高的設備和夾具。
2. 需要根據用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機械等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

鋁用立銑刀
End Mills For Aluminium

Page	275	277	279	281
Apperance				
Code No	F631ZX	F607ZX	F642ZX	F618ZX F620ZX
Carbide	MG Carbide	MG Carbide	MG Carbide	UMG Carbide
Coating	ZrN ZX	ZrN ZX	ZrN ZX	ZrN ZX
Helix Angle				
No.of Flutes				

歐規
DIN

7leaders®
The Art of Cutting

F631ZX 超微粒鎢鋼塗層鋁用立銑刀

End Mills For Aluminium

Code No. F631ZX-Dc

Dc $^{0}_{-0.02}$	Lc mm	L mm	d h5	Ll mm	Dl mm	ZrN F631ZX
3	8	57	6	14	2.8	•
4	11	57	6	16	3.8	•
5	13	57	6	18	4.8	•
6	13	57	6	20	5.8	•
8	19	63	8	26	7.7	•
10	22	72	10	31	9.7	•
12	26	83	12	37	11.6	•
16	32	92	16	43	15.5	•
20	38	104	20	53	19.5	•

Aluminium

P	H	M	K	N	S
				•	

MG Carbide

ZrN ZX

Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel	
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	
H	GR4	硬化鋼 30-38HRC Hardened Steel	
	GR5	硬化鋼 38-48HRC Hardened Steel	
	GR6	硬化鋼 48-56HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	
N	GR10	鋁 Aluminium	•
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Side Milling 側面切削

被削材 Work Material		鋁合金 Aluminum	
切削速度 Vc m/min		400	
型號 Code No	切削 Dc	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)
F631ZX-3	3	42,000	1,900
F631ZX-4	4	31,000	2,200
F631ZX-5	5	25,000	2,200
F631ZX-6	6	21,000	2,400
F631ZX-8	8	16,000	2,600
F631ZX-10	10	12,700	3,000
F631ZX-12	12	10,600	3,200
F631ZX-16	16	8,000	3,200
F631ZX-20	20	6,300	3,100
切入深度 (mm)		ap 1.5D	
		ae 0.1D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速也同比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

F607ZX 超微粒鎢鋼塗層鋁用立銑刀
Toric End Mills For Aluminium

Code No. F607ZX-Dc

Dc $^{0}_{-0.02}$	Lc mm	L mm	d h5	Ll mm	Dl mm	ZrN F607ZX
3	4.5	57	6	9	2.8	•
4	6	57	6	12	3.7	•
5	7.5	57	6	15	4.6	•
6	9	57	6	20	5.5	•
8	12	63	8	26	7.4	•
10	15	72	10	31	9.2	•
12	18	83	12	37	11	•
16	24	92	16	43	14.5	•
20	30	104	20	53	18.2	•

※Corner radius can be customized.
※R角可依需求製造生產

Aluminium

P	H	M	K	N	S
				•	

MG Carbide

ZrN ZX

Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel	
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	
	GR3	高合金鋼鐵<36HRC Hi-alloyed Steel	
H	GR4	硬化鋼 30-38HRC Hardened Steel	
	GR5	硬化鋼 38-48HRC Hardened Steel	
	GR6	硬化鋼 48-56HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	
N	GR10	鋁 Aluminium	•
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Side Milling 側面切削

被削材 Work Material		鋁合金 Aluminum	
切削速度 Vc m/min		400	
型號 Code No	切徑 Dc	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/min)
F607ZX-3	3	42,000	1,900
F607ZX-4	4	31,000	2,200
F607ZX-5	5	25,000	2,200
F607ZX-6	6	21,000	3,400
F607ZX-8	8	16,000	2,600
F607ZX-10	10	12,700	3,000
F607ZX-12	12	10,600	3,200
F607ZX-20	20	6,360	1,900
切入深度 (mm)		ap 0.75D	
		ae 0.3D	

1. Please work with good rigidity / high precison facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

F642ZX 超微粒鎢鋼塗層粗加工銘用立銑刀

Roughing End Mills For Aluminium

Code No. F642ZX-Dc

Dc h10	Lc mm	L mm	d h5	ZrN F642ZX
6	13	57	6	•
8	19	63	8	•
10	22	72	10	•
12	26	83	12	•
16	32	92	16	•
20	38	104	20	•

WR

Aluminium

P	H	M	K	N	S
				•	

MG Carbide

ZrN ZX

Type of Operation

Work Material

P	GR1	碳鋼 Carbon Steel	
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	
H	GR4	硬化鋼 30-38HRC Hardened Steel	
	GR5	硬化鋼 38-48HRC Hardened Steel	
	GR6	硬化鋼 48-54HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	
N	GR10	鋁 Aluminium	•
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Slotting 滿切削

被削材 Work Material		GA30 鋁 Aluminium	
切削速度 Vc m/min		400	
型號 Code No.	外徑 (mm)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/min)
F642ZX-6	6	21,000	1,950
F642ZX-8	8	16,000	2,050
F642ZX-10	10	12,700	2,300
F642ZX-12	12	10,600	2,500
F642ZX-16	16	7,900	2,500
F642ZX-20	20	6,300	2,550
切入深度 (mm)		1.0D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好，精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

F618ZX / F620ZX 極超微粒鎢鋼塗層圓頭鋁用立銑刀

Ball Nose End Mills For Aluminium

Code No. F618ZX-Dc

Dc $^{0}_{-0.02}$	R ±0.01	Lc mm	L mm	Lc mm	Ll mm	Dl h5	ZrN F618ZX
3	1.5R	6	57	6	9	2.8	●
4	2R	8	57	6	12	3.7	●
5	2.5R	10	57	6	15	4.6	●
6	3R	12	57	6	20	5.5	●
8	4R	16	63	8	26	7.4	●
10	5R	20	72	10	31	9.2	●
12	6R	24	83	12	37	11	●

Code No. F620ZX-Dc

Dc $^{0}_{-0.02}$	R ±0.01	Lc mm	L mm	Lc mm	Ll mm	Dl h5	ZrN F620ZX
3	1.5R	6	70	6	9	2.8	●
4	2R	8	70	6	12	3.7	●
5	2.5R	10	80	6	15	4.6	●
6	3R	12	80	6	20	5.5	●
8	4R	16	100	8	26	7.4	●
10	5R	20	100	10	31	9.2	●
12	6R	24	110	12	37	11	●

Aluminium

P	H	M	K	N	S
				●	

UMG Carbide

ZrN ZX

Type of Operation

Work Material

P	GR1	炭鋼 Carbon Steel	
	GR2	低合金鋼硬<24HRC Low-alloyed Steel	
	GR3	高合金鋼硬<30HRC Hi-alloyed Steel	
H	GR4	硬化鋼 30-38HRC Hardened Steel	
	GR5	硬化鋼 38-48HRC Hardened Steel	
	GR6	硬化鋼 48-54HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	
N	GR10	鋁 Aluminium	●
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Finishing 精加工

被削材 Work Material		GR10 鋁 Aluminium	
切削速度 Vc m/min		300	
型號 Code No.	外徑 (mm)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/min)
F618ZX/F620ZX-3	3	21,200	1,590
F618ZX/F620ZX-4	4	15,900	1,590
F618ZX/F620ZX-5	5	12,700	1,580
F618ZX/F620ZX-6	6	10,600	1,600
F618ZX/F620ZX-8	8	8,000	1,960
F618ZX/F620ZX-10	10	6,350	1,750
F618ZX/F620ZX-12	12	5,300	1,650
切入深度 (mm)		ap:0.1D	

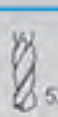
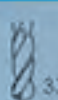
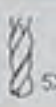
High Speed Finishing 高速精加工

被削材 Work Material		GR10 鋁 Aluminium	
切削速度 Vc m/min		300	
型號 Code No.	外徑 (mm)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/min)
F618ZX/F620ZX-3	3	31,800	1,908
F618ZX/F620ZX-4	4	23,850	1,908
F618ZX/F620ZX-5	5	19,080	2,290
F618ZX/F620ZX-6	6	15,900	2,544
F618ZX/F620ZX-8	8	11,925	2,385
F618ZX/F620ZX-10	10	9,540	2,290
F618ZX/F620ZX-12	12	7,950	2,385
切入深度 (mm)		ap:0.05D	

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振顫，請降低切削條件。

鑽頭
Drills

Page	285	287	289	291	293	295
Apperance						
Code No	D903 D904 D913 D914	D908	D400	D412	D413	D415
Carbide	MG Carbide	MG Carbide	MG Carbide	MG Carbide	MG Carbide	MG Carbide
Coating	Uncoated Blank	Uncoated Blank	Uncoated Blank	Uncoated Blank	Uncoated Blank	Uncoated Blank
Helix Angle						
No.of Flutes						

歐規
DIN

7leaders
The Art of Cutting

297	299	301	303	305	307	309	311	313
D430FN	D433FN	D431FT	D432FT	D435FT	D436FT	D437FT	D441FT D442FT D443FT	D419FT
MG Carbide	MG Carbide	UMG Carbide	UMG Carbide	UMG Carbide	UMG Carbide	UMG Carbide	UMG Carbide	UMG Carbide
AlTiCrN FN	AlTiCrN FN	AlTiCrN FT	AlTiCrN FT	AlTiCrN FT	AlTiCrN FT	AlTiCrN FT	AlTiCrN FT	AlTiCrN FT
3XD	5XD	3XD	5XD	3XD	5XD	8XD	12XD 16XD 20XD	90°
2	2	2	2	2	2	2	2	2

D903 / D904 超微粒鎢鋼NC定點鑽頭90°

NC Spot Drills / 90°

Code No. D903-Dc

Dc h6	Lc mm	L mm	d h6	90° D903
3	10	38	3	•
4	12	50	4	•
5	15	50	5	•
6	20	60	6	•
8	25	60	8	•
10	25	72	10	•
12	30	75	12	•
16	35	100	16	•
20	40	100	20	•

Code No. D904-Dc

Dc h6	Lc mm	L mm	d h6	90° D904
6	20	100	6	•
8	25	125	8	•
10	25	150	10	•
12	30	150	12	•
16	35	150	16	•
20	40	150	20	•

D913 / D914 超微粒鎢鋼NC定點鑽頭120°

NC Spot Drills / 120°

Code No. D913-Dc

Dc h6	Lc mm	L mm	d h6	120° D913
3	10	38	3	•
4	12	50	4	•
5	15	50	5	•
6	20	60	6	•
8	25	60	8	•
10	25	72	10	•
12	30	75	12	•
16	35	100	16	•
20	40	100	20	•

Code No. D914-Dc

Dc h6	Lc mm	L mm	d h6	120° D914
6	20	100	6	•
8	25	125	8	•
10	25	150	10	•
12	30	150	12	•
16	35	150	16	•
20	40	150	20	•

Steel < 48HRC

P	H	M	K	N	S
•	•	○	•	•	○

MG Carbide

Uncoated Blank

Work Material

P	GR1	鋼 Carbon Steel	•
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	•
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	•
H	GR4	硬化鋼 30-38HRC Hardened Steel	•
	GR5	硬化鋼 38-48HRC Hardened Steel	•
	GR6	硬化鋼 48-54HRC Hardened Steel	
	GR7	硬化鋼 54-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	○
K	GR9	鑄鐵 Cast Iron	•
N	GR10	鋁 Aluminium	•
	GR11	銅 Copper	•
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	○
	GR16	鎳 Nickel	○
	GR17	耐熱鋼 Heat-resistant Steel	○

Generic point drilling parameters 適用定點鑽參數

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (-24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (-30HRC)		GR.4 硬化鋼 Hardened Steel (30-38HRC)		GR.5 硬化鋼 Hardened Steel (38-48HRC)		GR.8 不鏽鋼 Stainless Steel		GR.9 鑄鐵 Cast Iron		GR.11 銅 Copper	
切削速度 Vc m/min		50~60		50~60		40~50		40~50		30~40		20~30		50~60		80~100	
型號 Code No.	切徑 Dc	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/rev]	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/rev]	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/rev]	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/rev]	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/rev]	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/rev]	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/rev]	RPM 旋轉速度 [min⁻¹]	Feed 進給速度 [mm/rev]
D903/D904/ D913/D914	3	5,839	0.05	5,839	0.05	4,777	0.03	4,777	0.03	3,715	0.015	2,654	0.035	5,839	0.05	9,555	0.06
D903/D904/ D913/D914	4	4,379	0.065	4,379	0.065	3,583	0.045	3,583	0.05	2,786	0.026	1,990	0.05	4,379	0.065	7,166	0.08
D903/D904/ D913/D914	5	3,503	0.08	3,503	0.08	2,866	0.05	2,866	0.065	2,229	0.025	1,592	0.06	3,503	0.08	5,733	0.1
D903/D904/ D913/D914	6	2,919	0.1	2,919	0.1	2,388	0.06	2,388	0.06	1,857	0.031	1,327	0.07	2,919	0.1	4,777	0.14
D903/D904/ D913/D914	8	2,189	0.125	2,189	0.125	1,791	0.08	1,791	0.08	1,393	0.04	995	0.09	2,189	0.125	3,583	0.17
D903/D904/ D913/D914	10	1,751	0.155	1,751	0.155	1,433	0.1	1,433	0.1	1,114	0.05	796	0.12	1,751	0.155	2,866	0.2
D903/D904/ D913/D914	12	1,459	0.155	1,459	0.155	1,194	0.12	1,194	0.12	928	0.055	663	0.13	1,459	0.155	2,388	0.25
D903/D904/ D913/D914	16	1,094	0.24	1,094	0.24	895	0.15	895	0.15	696	0.075	497	0.175	1,094	0.24	1,791	0.3
D903/D904/ D913/D914	20	875	0.25	875	0.25	716	0.16	716	0.2	557	0.09	398	0.2	875	0.25	1,433	0.32

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工狀況、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

D908 超微粒鎢鋼中心鑽頭/60°

Combined Drill and Countersink / 60° mm

MG Carbide | Uncoated Blank | 60° | 2 | DIN 333 | 120°

Code No. D908-Dc

Dc h7	Lc mm	L mm	d h6	Blank D908
0.5	0.8	38	3	•
0.8	1.1	38	3	•
1	1.3	38	3	•
1.25	1.6	38	3	•
1.6	2	38	4	•
2	2.5	50	5	•
2.5	3.1	50	6	•
3.15	3.9	63	8	•
4	5	66	10	•
5	6.3	73	12	•

Steel < 48HRC

P	H	M	K	N	S
●	●	○	●	●	

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-58HRC Hardened Steel	
	GR7	硬化鋼 58-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	○
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	●
	GR11	銅 Copper	●
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

D908 超微粒鎢鋼中心鑽頭/60°

Combined Drill and Countersink / 60° INCH

MG Carbide | Uncoated Blank | 60° | 2 | ANSI | 120°

Code No. D908-Dc

Size No.	Dc h7	L inch	d h6	Blank D908
#0	1/32	1-1/4	1/8	•
#1	3/64	1-1/4	1/8	•
#2	5/64	1-7/8	3/16	•
#3	7/64	2	1/4	•
#4	1/8	2-1/2	5/16	•
#5	3/16	3	7/16	•
#6	7/32	3	1/2	•
#7	1/4	3-1/4	5/8	•
#8	5/16	3-1/2	3/4	•

General center drill parameters 通用中心鑽參數 mm/公製規格

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30-38HRC)		GR.5 硬化鋼 Hardened Steel (38~43HRC)		GR.8 不鏽鋼 Stainless Steel		GR.9 鑄鐵 Cast Iron		GR.11 銅 Copper	
切削速度 Vc m/min		30		30		20		10		10		15		30		60	
型號 Code No.	刃徑 Dc	RPM 迴轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 迴轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 迴轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 迴轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 迴轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 迴轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 迴轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 迴轉速度 [min-1]	Feed 進給速度 [mm/rev]
D908-D1.0	1	11,147	0.01	11,147	0.01	7,962	0.010	4,777	0.01	4,777	0.005	6,370	0.01	11,147	0.01	22,295	0.02
D908-D1.25	1.25	8,918	0.02	8,918	0.02	6,370	0.02	3,822	0.016	3,822	0.005	5,096	0.015	8,918	0.02	17,836	0.03
D908-D1.6	1.6	6,967	0.03	6,967	0.03	4,976	0.02	2,985	0.02	2,985	0.01	3,981	0.023	6,967	0.03	13,934	0.04
D908-D2.0	2	5,573	0.04	5,573	0.04	3,981	0.03	2,388	0.03	2,388	0.01	3,185	0.03	5,573	0.04	11,147	0
D908-D2.5	2.5	4,459	0.05	4,459	0.05	3,185	0.03	1,911	0.03	1,911	0.015	2,548	0.035	4,459	0.05	8,918	0.06
D908-D3.15	3.15	3,538	0.07	3,538	0.07	2,527	0.045	1,516	0.045	1,516	0.022	2,022	0.05	3,538	0.07	7,077	0.08
D908-D4.0	4	2,786	0.1	2,786	0.1	1,990	0.05	1,194	0.05	1,194	0.025	1,592	0.06	2,786	0.1	5,573	0.06
D908-D5.0	5	2,229	0.11	2,229	0.11	1,592	0.06	955	0.06	955	0.031	1,274	0.07	2,229	0.11	4,459	0.14

General center drill parameters 通用中心鑽參數 INCH/英吋規格

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30-38HRC)		GR.5 硬化鋼 Hardened Steel (38~43HRC)		GR.8 不鏽鋼 Stainless Steel		GR.9 鑄鐵 Cast Iron		GR.11 銅 Copper	
切削速度 Vc m/min		30		30		20		10		10		15		30		60	
型號 Code No.	刃徑 Dc	RPM 迴轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 迴轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 迴轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 迴轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 迴轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 迴轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 迴轉速度 [min-1]	Feed 進給速度 [mm/rev]	RPM 迴轉速度 [min-1]	Feed 進給速度 [mm/rev]
D908-#0	1/32	12,095	0.02	7,844	0.02	8,063	0.02	4,032	0.010	2,548	0.005	6,047	0.015	7,844	0.02	24,190	0.03
D908-#1	3/64	8,029	0.03	5,972	0.03	5,353	0.02	2,676	0.02	1,991	0.01	4,015	0.023	5,972	0.03	16,059	0.04
D908-#2	5/64	4,828	0.04	4,778	0.04	3,217	0.03	1,609	0.03	1,593	0.01	2,413	0.03	4,778	0.04	9,652	0.05
D908-#3	7/64	3,437	0.05	3,822	0.05	2,291	0.03	1,146	0.03	1,274	0.015	1,719	0.035	3,822	0.05	6,874	0.06
D908-#4	1/8	3,005	0.07	3,033	0.07	2,003	0.045	1,002	0.045	1,011	0.022	1,502	0.05	3,033	0.07	6,009	0.08
D908-#5	3/16	2,007	0.1	2,389	0.1	1,338	0.05	669	0.05	796	0.025	1,004	0.06	2,389	0.1	4,015	0.06
D908-#6	7/32	1,719	0.11	1,911	0.11	1,146	0.06	573	0.06	637	0.031	859	0.07	1,911	0.11	3,437	0.14
D908-#7	1/4	1,505	0.12	1,911	0.12	1,003	0.065	502	0.065	637	0.035	752	0.075	1,911	0.12	3,009	0.15
D908-#8	5/16	1,203	0.13	1,911	0.13	802	0.07	401	0.07	637	0.040	602	0.080	1,911	0.13	2,407	0.16

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

D400 超微粒鎢鋼微小徑鑽頭

Micro Precision Drills

Code No. D400-Dc

Dc h7	Lc mm	L mm	d h6	Blank D400
0.2	1.2	25	1	●
0.25	1.5	25	1	●
0.3	1.9	25	1	●
0.35	2.4	25	1	●
0.4	3	25	1	●
0.45	3	25	1	●
0.5	3.4	25	1	●
0.55	3.9	25	1	●
0.6	3.9	25	1	●
0.65	4.2	25	1	●
0.7	4.8	25	1	●
0.75	4.8	25	1	●
0.8	5.3	25	1.5	●
0.85	5.3	25	1.5	●
0.9	6	25	1.5	●
0.95	6	25	1.5	●
1	6.8	25	1.5	●
1.05	6.8	25	1.5	●
1.1	7.6	25	1.5	●
1.15	7.6	25	1.5	●
1.2	8.5	25	1.5	●
1.25	8.5	25	1.5	●
1.3	8.5	25	1.5	●
1.35	9.5	25	1.5	●
1.4	9.5	25	1.5	●

AL,Cu,PVC,CFRP

P	H	M	K	N	S
○			●	●	

MG Carbide

Uncoated Blank

DIN 1899

Work Material

P	GR1	碳鋼 Carbon Steel	○
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	○
	GR3	低合金鋼鐵<30HRC Hi-alloyed Steel	○
H	GR4	硬化鋼 30-38HRC Hardened Steel	
	GR5	硬化鋼 38-48HRC Hardened Steel	
	GR6	硬化鋼 48-56HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	●
	GR11	銅 Copper	●
	GR12	塑膠 Plastics	●
	GR13	複合材料 FRP CFRP Composite Material	●
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Borehole parameters 鑽孔參數

被削材 Work Material		GR.I 鋁 Aluminium		GR.II 銅 Copper		GR.I2 塑料 Plastics	
切削速度 Vc m/min		32~80		20~45		20~45	
型號 Code No.	刃徑 Dc	RPM 轉速速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 轉速速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 轉速速度 (min-1)	Feed 進給速度 (mm/rev)
D400-0.2	0.2	25,000	0.004	25,000	0.002	25,000	0.002
D400-0.25	0.25	22,500	0.005	22,500	0.0025	22,500	0.0025
D400-0.3	0.3	20,000	0.007	20,000	0.003	20,000	0.003
D400-0.35	0.35	18,750	0.0085	18,250	0.004	18,250	0.004
D400-0.4	0.4	17,500	0.01	16,500	0.005	16,500	0.005
D400-0.45	0.45	16,250	0.012	14,750	0.006	14,750	0.006
D400-0.5	0.5	15,000	0.015	13,000	0.007	13,000	0.007
D400-0.55	0.55	14,700	0.016	12,340	0.007	12,340	0.007
D400-0.6	0.6	14,400	0.018	11,680	0.007	11,680	0.007
D400-0.65	0.65	14,100	0.020	11,020	0.008	11,020	0.008
D400-0.7	0.7	13,800	0.023	10,360	0.008	10,360	0.008
D400-0.75	0.75	13,500	0.024	9,700	0.0085	9,700	0.0085
D400-0.8	0.8	13,200	0.025	9,040	0.0085	9,040	0.0085
D400-0.85	0.85	12,900	0.026	8,380	0.009	8,380	0.009
D400-0.9	0.9	12,600	0.027	7,720	0.009	7,720	0.009
D400-0.95	0.95	12,300	0.028	7,060	0.0095	7,060	0.0095
D400-1	1	12,000	0.03	6,400	0.01	6,400	0.01

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

Code No. D412-Dc

Dc h7	Lc mm	L mm	Blank D412	Dc h7	Lc mm	L mm	Blank D412
1	6	26	•	5	26	62	•
1.05	6	26	•	5.1	26	62	•
1.1	7	28	•	5.2	26	62	•
1.15	7	28	•	5.3	26	62	•
1.2	8	30	•	5.4	28	66	•
1.25	8	30	•	5.5	28	66	•
1.3	8	30	•	5.6	28	66	•
1.35	9	32	•	5.7	28	66	•
1.4	9	32	•	5.8	28	66	•
1.45	9	32	•	5.9	28	66	•
1.5	9	32	•	6	28	66	•
1.55	10	34	•	6.1	31	70	•
1.6	10	34	•	6.2	31	70	•
1.65	10	34	•	6.3	31	70	•
1.7	10	34	•	6.4	31	70	•
1.75	11	36	•	6.5	31	70	•
1.8	11	36	•	6.6	31	70	•
1.85	11	36	•	6.7	31	70	•
1.9	11	36	•	6.8	34	74	•
1.95	12	38	•	6.9	34	74	•
2	12	38	•	7	34	74	•
2.05	12	38	•	7.1	34	74	•
2.1	12	38	•	7.2	34	74	•
2.15	13	40	•	7.3	34	74	•
2.2	13	40	•	7.4	34	74	•
2.25	13	40	•	7.5	34	74	•
2.3	13	40	•	7.6	37	79	•
2.35	13	40	•	7.7	37	79	•
2.4	14	43	•	7.8	37	79	•
2.45	14	43	•	7.9	37	79	•
2.5	14	43	•	8	37	79	•
2.55	14	43	•	8.1	37	79	•
2.6	14	43	•	8.2	37	79	•
2.65	14	43	•	8.3	37	79	•
2.7	16	46	•	8.4	37	79	•
2.75	16	46	•	8.5	37	79	•
2.8	16	46	•	8.6	40	84	•
2.85	16	46	•	8.7	40	84	•
2.9	16	46	•	8.8	40	84	•
2.95	16	46	•	8.9	40	84	•
3	16	46	•	9	40	84	•
3.1	18	49	•	9.1	40	84	•
3.2	18	49	•	9.2	40	84	•
3.3	18	49	•	9.3	40	84	•
3.4	20	52	•	9.4	40	84	•
3.5	20	52	•	9.5	40	84	•
3.6	20	52	•	9.6	43	89	•
3.7	20	52	•	9.7	43	89	•
3.8	22	55	•	9.8	43	89	•
3.9	22	55	•	9.9	43	89	•
4	22	55	•	10	43	89	•
4.1	22	55	•	10.2	43	89	•
4.2	22	55	•	10.5	43	89	•
4.3	24	58	•	10.8	47	95	•
4.4	24	58	•	11	47	95	•
4.5	24	58	•	11.5	47	95	•
4.6	24	58	•	12	51	102	•
4.7	24	58	•	12.5	51	102	•
4.8	26	62	•	13	51	102	•
4.9	26	62	•				

AL,Cu,PVC,CFRP

P	H	M	K	N	S
○			•	•	

MG Carbide

Uncoated Blank

3XD

2

DIN 6539

118°

Work Material

P	GR1	碳鋼 Carbon Steel	○
	GR2	低合金鋼鐵<34HRC Low-alloyed Steel	○
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	○
H	GR4	硬化鋼 30-38HRC Hardened Steel	
	GR5	硬化鋼 38-48HRC Hardened Steel	
	GR6	硬化鋼 48-54HRC Hardened Steel	
	GR7	硬化鋼 54-68HRC Hardened Steel	
M	GR8	不鏽鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	•
N	GR10	鋁 Aluminium	•
	GR11	銅 Copper	•
	GR12	塑膠 Plastics	•
	GR13	複合材料 FRP CFRP Composite Material	•
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Borehole parameters 鑽孔參數

被削材 Work Material		GR.10 鋁 Aluminium		GR.II 銅 Copper		GR.12 塑料 Plastics	
切削速度 Vc m/min		60~200		40~100		40~100	
型號 Code No.	刃徑 Dc	RPM 主軸速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸速度 (min-1)	Feed 進給速度 (mm/rev)
D412-1	1	10,000	0.03	8,800	0.015	8,800	0.015
D412-1.5	1.5	10,000	0.045	8,450	0.02	8,450	0.02
D412-2	2	9,880	0.06	8,100	0.02	8,100	0.02
D412-2.5	2.5	9,740	0.075	7,750	0.02	7,750	0.02
D412-3	3	9,600	0.09	7,400	0.02	7,400	0.02
D412-3.5	3.5	8,800	0.105	6,500	0.02	6,500	0.02
D412-4	4	7,600	0.12	5,600	0.02	5,600	0.02
D412-4.5	4.5	7,000	0.135	5,050	0.025	5,050	0.025
D412-5	5	6,400	0.15	4,500	0.03	4,500	0.03
D412-5.5	5.5	6,000	0.165	4,100	0.03	4,100	0.03
D412-6	6	5,600	0.18	3,700	0.03	3,700	0.03
D412-6.5	6.5	5,300	0.195	3,475	0.03	3,475	0.03
D412-7	7	5,000	0.21	3,250	0.035	3,250	0.035
D412-7.5	7.5	4,700	0.225	3,025	0.035	3,025	0.035
D412-8	8	4,400	0.24	2,800	0.04	2,800	0.04
D412-8.5	8.5	4,250	0.255	2,650	0.04	2,650	0.04
D412-9	9	4,100	0.27	2,500	0.045	2,500	0.045
D412-9.5	9.5	3,950	0.285	2,350	0.045	2,350	0.045
D412-10	10	3,800	0.3	2,200	0.05	2,200	0.05
D412-10.5	10.5	3,725	0.315	2,125	0.05	2,125	0.05
D412-11	11	3,650	0.33	2,050	0.055	2,050	0.055
D412-11.5	11.5	3,575	0.345	1,975	0.055	1,975	0.055
D412-12	12	3,500	0.36	1,900	0.06	1,900	0.06
D412-12.5	12.5	3,400	0.375	1,800	0.065	1,800	0.065
D412-13	13	3,300	0.39	1,700	0.07	1,700	0.07

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

Code No. D413-Dc

Dc h7	Lc mm	L mm	Blank D413	Dc h7	Lc mm	L mm	Blank D413
1	12	34	•	6.6	63	101	•
1.1	14	36	•	6.7	63	101	•
1.2	16	38	•	6.8	69	109	•
1.3	16	38	•	6.9	69	109	•
1.4	18	40	•	7	69	109	•
1.5	18	40	•	7.1	69	109	•
1.6	20	43	•	7.2	69	109	•
1.7	20	43	•	7.3	69	109	•
1.8	22	46	•	7.4	69	109	•
1.9	22	46	•	7.5	69	109	•
2	24	49	•	7.6	75	117	•
2.1	24	49	•	7.7	75	117	•
2.2	27	53	•	7.8	75	117	•
2.3	27	53	•	7.9	75	117	•
2.4	30	57	•	8	75	117	•
2.5	30	57	•	8.1	75	117	•
2.6	30	57	•	8.2	75	117	•
2.7	33	61	•	8.3	75	117	•
2.8	33	61	•	8.4	75	117	•
2.9	33	61	•	8.5	75	117	•
3	33	61	•	8.6	81	125	•
3.1	36	65	•	8.7	81	125	•
3.2	36	65	•	8.8	81	125	•
3.3	36	65	•	8.9	81	125	•
3.4	39	70	•	9	81	125	•
3.5	39	70	•	9.1	81	125	•
3.6	39	70	•	9.2	81	125	•
3.7	39	70	•	9.3	81	125	•
3.8	43	75	•	9.4	81	125	•
3.9	43	75	•	9.5	81	125	•
4	43	75	•	9.6	87	133	•
4.1	43	75	•	9.7	87	133	•
4.2	43	75	•	9.8	87	133	•
4.3	47	80	•	9.9	87	133	•
4.4	47	80	•	10	87	133	•
4.5	47	80	•	10.2	87	133	•
4.6	47	80	•	10.5	87	133	•
4.7	47	80	•	10.8	94	142	•
4.8	52	86	•	11	94	142	•
4.9	52	86	•	11.5	94	142	•
5	52	86	•	12	101	151	•
5.1	52	86	•	12.5	101	151	•
5.2	52	86	•	13	101	151	•
5.3	52	86	•				
5.4	57	93	•				
5.5	57	93	•				
5.6	57	93	•				
5.7	57	93	•				
5.8	57	93	•				
5.9	57	93	•				
6	57	93	•				
6.1	63	101	•				
6.2	63	101	•				
6.3	63	101	•				
6.4	63	101	•				
6.5	63	101	•				

AL,Cu,PVC,CFRP

P	H	M	K	N	S
○			•	•	

MG Carbide

Uncoated Blank

5XD

2

DIN 338

118°

Work Material

P	GR1	碳鋼 Carbon Steel	○
P	GR2	低合金鋼硬<34HRC Low-alloyed Steel	○
P	GR3	高合金鋼硬<30HRC Hi-alloyed Steel	○
H	GR4	硬化鋼 30-38HRC Hardened Steel	
H	GR5	硬化鋼 38-48HRC Hardened Steel	
H	GR6	硬化鋼 48-54HRC Hardened Steel	
H	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	•
N	GR10	鋁 Aluminium	•
N	GR11	銅 Copper	•
N	GR12	塑膠 Plastics	•
N	GR13	複合材料 FRP CFRP Composite Material	•
N	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
S	GR16	鎳 Nickel	
S	GR17	耐熱鋼 Heat-resistant Steel	

Borehole parameters 鑽孔參數

被削材 Work Material		GR.10 鋁 Aluminium		GR.II 銅 Copper		GR.12 塑料 Plastics	
切削速度 Vc m/min		60~200		40~100		40~100	
型號 Code No.	刃徑 Dc	RPM 主軸速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸速度 (min-1)	Feed 進給速度 (mm/rev)
D413-1	1	10,000	0.03	8,800	0.015	8,800	0.015
D413-1.5	1.5	10,000	0.045	8,450	0.02	8,450	0.02
D413-2	2	9,880	0.06	8,100	0.02	8,100	0.02
D413-2.5	2.5	9,740	0.075	7,750	0.02	7,750	0.02
D413-3	3	9,600	0.09	7,400	0.02	7,400	0.02
D413-3.5	3.5	8,800	0.105	6,500	0.02	6,500	0.02
D413-4	4	7,600	0.12	5,600	0.02	5,600	0.02
D413-4.5	4.5	7,000	0.135	5,050	0.025	5,050	0.025
D413-5	5	6,400	0.15	4,500	0.03	4,500	0.03
D413-5.5	5.5	6,000	0.165	4,100	0.03	4,100	0.03
D413-6	6	5,600	0.18	3,700	0.03	3,700	0.03
D413-6.5	6.5	5,300	0.195	3,475	0.03	3,475	0.03
D413-7	7	5,000	0.21	3,250	0.035	3,250	0.035
D413-7.5	7.5	4,700	0.225	3,025	0.035	3,025	0.035
D413-8	8	4,400	0.24	2,800	0.04	2,800	0.04
D413-8.5	8.5	4,250	0.255	2,650	0.04	2,650	0.04
D413-9	9	4,100	0.27	2,500	0.045	2,500	0.045
D413-9.5	9.5	3,950	0.285	2,350	0.045	2,350	0.045
D413-10	10	3,800	0.3	2,200	0.05	2,200	0.05
D413-10.5	10.5	3,725	0.315	2,125	0.05	2,125	0.05
D413-11	11	3,650	0.33	2,050	0.055	2,050	0.055
D413-11.5	11.5	3,575	0.345	1,975	0.055	1,975	0.055
D413-12	12	3,500	0.36	1,900	0.06	1,900	0.06
D413-12.5	12.5	3,400	0.375	1,800	0.065	1,800	0.065
D413-13	13	3,300	0.39	1,700	0.07	1,700	0.07

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

D415 超微粒鎢鋼3刃鑽頭
High performence 3-Flute Drills

Code No. D415-Dc

Dc h7	Lc mm	L mm	Blank D415	Dc h7	Lc mm	L mm	Blank D415
3	22	46	•	8.6	52	84	—
3.1	24	49	•	8.7	52	84	—
3.2	24	49	•	8.8	52	84	—
3.3	24	49	•	8.9	52	84	—
3.4	27	52	•	9	52	84	•
3.5	27	52	•	9.1	52	84	—
3.6	27	52	•	9.2	52	84	—
3.7	27	52	•	9.3	52	84	—
3.8	30	55	•	9.4	52	84	—
3.9	30	55	•	9.5	52	84	•
4	30	55	•	9.6	55	89	—
4.1	30	55	•	9.7	55	89	—
4.2	30	55	•	9.8	55	89	•
4.3	32	58	•	9.9	55	89	—
4.4	32	58	•	10	55	89	•
4.5	32	58	•	10.2	55	89	•
4.6	32	58	•	10.5	55	89	•
4.7	32	58	•	11	60	95	•
4.8	35	62	•	11.5	60	95	•
4.9	35	62	•	11.8	65	102	•
5	35	62	•	12	65	102	•
5.1	35	62	—	12.5	65	102	•
5.2	35	62	•	13	65	102	•
5.3	35	62	—				
5.4	39	66	—				
5.5	39	66	•				
5.6	39	66	—				
5.7	39	66	—				
5.8	39	66	•				
5.9	39	66	—				
6	39	66	•				
6.1	42	70	—				
6.2	42	70	•				
6.3	42	70	—				
6.4	42	70	—				
6.5	42	70	•				
6.6	42	70	—				
6.7	42	70	—				
6.8	45	74	•				
6.9	45	74	—				
7	45	74	•				
7.1	45	74	—				
7.2	45	74	—				
7.3	45	74	—				
7.4	45	74	—				
7.5	45	74	•				
7.6	48	79	—				
7.7	48	79	—				
7.8	48	79	•				
7.9	48	79	—				
8	48	79	•				
8.1	48	79	—				
8.2	48	79	•				
8.3	48	79	—				
8.4	48	79	—				
8.5	48	79	•				

※ Mark: —, On request, no stock
※ 記號 —，可訂購規格，無現貨

AL.Cu

P	H	M	K	N	S
				•	

MG Carbide

Uncoated Blank

DIN 6539

Work Material

P	GR1	碳鋼 Carbon Steel	
	GR2	低合金鋼硬<34HRC Low-alloyed Steel	
	GR3	高合金鋼硬<30HRC Hi-alloyed Steel	
H	GR4	硬化鋼 30-38HRC Hardened Steel	
	GR5	硬化鋼 38-48HRC Hardened Steel	
	GR6	硬化鋼 48-54HRC Hardened Steel	
	GR7	硬化鋼 54-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	
N	GR10	鋁 Aluminium	•
	GR11	銅 Copper	•
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Borehole parameters 鑽孔參數

材料 Work Material		GR.6061 鋁 Aluminium		GR.11 銅 Copper	
切削速度 Vc m/min		120		80	
型號 Code No.	刃徑 Dc	RPM 轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 轉速 (min-1)	Feed 進給速度 (mm/rev)
D415-3	3	12,700	0.2	8,400	0.1
D415-3.5	3.5	11,125	0.225	6,900	0.125
D415-4	4	9,550	0.25	6,400	0.15
D415-4.5	4.5	8,400	0.275	5,700	0.200
D415-5	5	7,400	0.3	5,000	0.25
D415-5.5	5.5	6,850	0.33	4,600	0.275
D415-6	6	6,300	0.36	4,200	0.3
D415-6.5	6.5	5,950	0.375	3,950	0.325
D415-7	7	5,550	0.39	3,700	0.35
D415-7.5	7.5	5,170	0.405	3,450	0.375
D415-8	8	4,800	0.42	3,200	0.4
D415-8.5	8.5	4,550	0.465	3,020	0.425
D415-9	9	4,300	0.51	2,850	0.45
D415-9.5	9.5	4,050	0.555	2,670	0.475
D415-10	10	3,800	0.6	2,500	0.5
D415-10.5	10.5	3,650	0.645	2,400	0.525
D415-11	11	3,500	0.69	2,300	0.55
D415-11.5	11.5	3,350	0.735	2,200	0.575
D415-12	12	3,200	0.78	2,100	0.6
D415-12.5	12.5	3,050	0.78	2,050	0.625
D415-13	13	2,900	0.78	2,000	0.65

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工狀況、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

D430FN 超微粒鎢鋼塗層高速鑽頭
High Performance Drills

Code No. D430FN-Dc

Dc h7	Lc mm	L mm	AlTiCrN D430FN	Dc h7	Lc mm	L mm	AlTiCrN D430FN
1	6	26	●	5	26	62	●
1.05	6	26	●	5.1	26	62	●
1.1	7	28	●	5.2	26	62	●
1.15	7	28	●	5.3	26	62	●
1.2	8	30	●	5.4	28	66	●
1.25	8	30	●	5.5	28	66	●
1.3	8	30	●	5.6	28	66	●
1.35	9	32	●	5.7	28	66	●
1.4	9	32	●	5.8	28	66	●
1.45	9	32	●	5.9	28	66	●
1.5	9	32	●	6	28	66	●
1.55	10	34	●	6.1	31	70	●
1.6	10	34	●	6.2	31	70	●
1.65	10	34	●	6.3	31	70	●
1.7	10	34	●	6.4	31	70	●
1.75	11	36	●	6.5	31	70	●
1.8	11	36	●	6.6	31	70	●
1.85	11	36	●	6.7	31	70	●
1.9	11	36	●	6.8	34	74	●
1.95	12	38	●	6.9	34	74	●
2	12	38	●	7	34	74	●
2.05	12	38	●	7.1	34	74	●
2.1	12	38	●	7.2	34	74	●
2.15	13	40	●	7.3	34	74	●
2.2	13	40	●	7.4	34	74	●
2.25	13	40	●	7.5	34	74	●
2.3	13	40	●	7.6	37	79	●
2.35	13	40	●	7.7	37	79	●
2.4	14	43	●	7.8	37	79	●
2.45	14	43	●	7.9	37	79	●
2.5	14	43	●	8	37	79	●
2.55	14	43	●	8.1	37	79	●
2.6	14	43	●	8.2	37	79	●
2.65	14	43	●	8.3	37	79	●
2.7	16	46	●	8.4	37	79	●
2.75	16	46	●	8.5	37	79	●
2.8	16	46	●	8.6	40	84	●
2.85	16	46	●	8.7	40	84	●
2.9	16	46	●	8.8	40	84	●
2.95	16	46	●	8.9	40	84	●
3	16	46	●	9	40	84	●
3.1	18	49	●	9.1	40	84	●
3.2	18	49	●	9.2	40	84	●
3.3	18	49	●	9.3	40	84	●
3.4	20	52	●	9.4	40	84	●
3.5	20	52	●	9.5	40	84	●
3.6	20	52	●	9.6	43	89	●
3.7	20	52	●	9.7	43	89	●
3.8	22	55	●	9.8	43	89	●
3.9	22	55	●	9.9	43	89	●
4	22	55	●	10	43	89	●
4.1	22	55	●	10.2	43	89	●
4.2	22	55	●	10.5	43	89	●
4.3	24	58	●	10.8	47	95	●
4.4	24	58	●	11	47	95	●
4.5	24	58	●	11.5	47	95	●
4.6	24	58	●	12	51	102	●
4.7	24	58	●	12.5	51	102	●
4.8	26	62	●	13	51	102	●
4.9	26	62	●				

Steel < 48HRC

P	H	M	K	N	S
●	●	○	●	○	

MG Carbide

AlTiCrN FN

3XD

2

DIN 6539

140°

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鐵<34HRC Low-alloyed Steel	●
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-54HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	○
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	
	GR11	銅 Copper	○
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

D430FN 切削條件參考表

Recommended Milling Conditions

Borehole parameters 鑽孔參數

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.9 鑄鐵 Cast Iron	
切削速度 Vc m/min		60~100		60~100		60~100		40~65		30~45		60~100	
型號 Code No.	切深 Dc	RPM 轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 轉速 (min-1)	Feed 進給速度 (mm/rev)
D430FN-1	1	19,000	0.03	19,000	0.03	19,000	0.03	12,000	0.02	10,000	0.02	19,000	0.03
D430FN-1.5	1.5	15,000	0.045	15,000	0.045	15,000	0.045	8,800	0.04	8,000	0.04	15,000	0.045
D430FN-2	2	11,000	0.06	11,000	0.06	11,000	0.06	7,600	0.06	6,000	0.06	11,000	0.06
D430FN-2.5	2.5	9,500	0.085	9,500	0.085	9,500	0.085	6,300	0.085	5,000	0.085	9,500	0.085
D430FN-3	3	8,000	0.09	8,000	0.09	8,000	0.09	5,000	0.09	4,000	0.09	8,000	0.09
D430FN-3.5	3.5	7,100	0.09	7,100	0.09	7,100	0.09	4,400	0.09	3,900	0.09	7,100	0.09
D430FN-4	4	6,300	0.10	6,300	0.10	6,300	0.10	3,800	0.10	3,800	0.10	6,300	0.10
D430FN-4.5	4.5	5,600	0.11	5,600	0.11	5,600	0.11	3,400	0.11	3,400	0.11	5,600	0.11
D430FN-5	5	5,000	0.12	5,000	0.12	5,000	0.12	3,000	0.12	3,000	0.12	5,000	0.12
D430FN-5.5	5.5	4,600	0.13	4,600	0.13	4,600	0.13	2,800	0.13	2,800	0.13	4,600	0.13
D430FN-6	6	4,200	0.14	4,200	0.14	4,200	0.14	2,600	0.14	2,600	0.14	4,200	0.14
D430FN-6.5	6.5	3,950	0.14	3,950	0.14	3,950	0.14	3,425	0.14	3,425	0.14	3,950	0.14
D430FN-7	7	3,700	0.15	3,700	0.15	3,700	0.15	2,250	0.15	2,250	0.15	3,700	0.15
D430FN-7.5	7.5	3,450	0.15	3,450	0.15	3,450	0.15	2,075	0.15	2,075	0.15	3,450	0.15
D430FN-8	8	3,200	0.16	3,200	0.16	3,200	0.16	1,900	0.16	1,900	0.16	3,200	0.16
D430FN-8.5	8.5	3,050	0.16	3,050	0.16	3,050	0.16	1,825	0.16	1,825	0.16	3,050	0.16
D430FN-9	9	2,870	0.17	2,870	0.17	2,870	0.17	1,750	0.17	1,750	0.17	2,870	0.17
D430FN-9.5	9.5	2,700	0.17	2,700	0.17	2,700	0.17	1,675	0.17	1,675	0.17	2,700	0.17
D430FN-10	10	2,550	0.18	2,550	0.18	2,550	0.18	1,600	0.18	1,600	0.18	2,550	0.18
D430FN-10.5	10.5	2,450	0.18	2,450	0.18	2,450	0.18	1,525	0.18	1,525	0.18	2,450	0.18
D430FN-11	11	2,350	0.19	2,350	0.19	2,350	0.19	1,450	0.19	1,450	0.19	2,350	0.19
D430FN-11.5	11.5	2,225	0.19	2,225	0.19	2,225	0.19	1,375	0.19	1,375	0.19	2,225	0.19
D430FN-12	12	2,100	0.20	2,100	0.20	2,100	0.20	1,300	0.20	1,300	0.20	2,100	0.20
D430FN-12.5	12.5	1,975	0.02	1,975	0.02	1,975	0.02	1,225	0.02	1,225	0.02	1,975	0.02
D430FN-13	13	1,850	0.21	1,850	0.21	1,850	0.21	1,150	0.21	1,150	0.21	1,850	0.21

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用的工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，刀進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

D433FN 超微粒鎢鋼塗層高速鑽頭
High Performance Drills

Code No. D433FN-Dc

Dc h7	Lc mm	L mm	AlTiCrN D433FN
1	12	34	●
1.1	14	36	●
1.2	16	38	●
1.3	16	38	●
1.4	18	40	●
1.5	18	40	●
1.6	20	43	●
1.7	20	43	●
1.8	22	46	●
1.9	22	46	●
2	24	49	●
2.1	24	49	●
2.2	27	53	●
2.3	27	53	●
2.4	30	57	●
2.5	30	57	●
2.6	30	57	●
2.7	33	61	●
2.8	33	61	●
2.9	33	61	●
3	33	61	●
3.1	36	65	●
3.2	36	65	●
3.3	36	65	●
3.4	39	70	●
3.5	39	70	●
3.6	39	70	●
3.7	39	70	●
3.8	43	75	●
3.9	43	75	●
4	43	75	●
4.1	43	75	●
4.2	43	75	●
4.3	47	80	●
4.4	47	80	●
4.5	47	80	●
4.6	47	80	●
4.7	47	80	●
4.8	52	86	●
4.9	52	86	●
5	52	86	●
5.1	52	86	●
5.2	52	86	●
5.3	52	86	●
5.4	57	93	●
5.5	57	93	●
5.6	57	93	●
5.7	57	93	●
5.8	57	93	●
5.9	57	93	●
6	57	93	●
6.1	63	101	●
6.2	63	101	●
6.3	63	101	●
6.4	63	101	●
6.5	63	101	●
6.6	63	101	●
6.7	63	101	●
6.8	69	109	●
6.9	69	109	●
7	69	109	●
7.1	69	109	●
7.2	69	109	●
7.3	69	109	●
7.4	69	109	●
7.5	69	109	●
7.6	75	117	●
7.7	75	117	●
7.8	75	117	●
7.9	75	117	●
8	75	117	●
8.1	75	117	●
8.2	75	117	●
8.3	75	117	●
8.4	75	117	●
8.5	75	117	●
8.6	81	125	●
8.7	81	125	●
8.8	81	125	●
8.9	81	125	●
9	81	125	●
9.1	81	125	●
9.2	81	125	●
9.3	81	125	●
9.4	81	125	●
9.5	81	125	●
9.6	87	133	●
9.7	87	133	●
9.8	87	133	●
9.9	87	133	●
10	87	133	●
10.2	87	133	●
10.5	87	133	●
10.8	94	142	●
11	94	142	●
11.5	94	142	●
12	101	151	●
12.5	101	151	●
13	101	151	●

Steel < 48HRC

P	H	M	K	N	S
●	●	○	●	○	

MG Carbide

AlTiCrN FN

5xD

2

DIN 338

140°

Work Material

P	GR1	碳鋼 Carbon Steel	●
P	GR2	低合金鋼鋼<34HRC Low-alloyed Steel	●
P	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
H	GR5	硬化鋼 38-48HRC Hardened Steel	●
H	GR6	硬化鋼 48-54HRC Hardened Steel	
H	GR7	硬化鋼 54-58HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	○
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	
N	GR11	銅 Copper	○
N	GR12	塑膠 Plastics	
N	GR13	複合材料 FRP CFRP Composite Material	
N	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
S	GR16	鎳 Nickel	
S	GR17	耐熱鋼 Heat-resistant Steel	

Borehole parameters 鑽孔參數

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.9 鑄鐵 Cast Iron	
切削速度 Vc m/min		60~100		60~100		60~100		40~65		30~45		60~100	
型號 Code No.	切深 Dc	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)
D433FN-1	1	19,000	0.03	19,000	0.03	19,000	0.03	12,000	0.02	10,000	0.02	19,000	0.03
D433FN-1.5	1.5	15,000	0.045	15,000	0.045	15,000	0.045	8,800	0.04	8,000	0.04	15,000	0.045
D433FN-2	2	11,000	0.06	11,000	0.06	11,000	0.06	7,600	0.06	6,000	0.06	11,000	0.06
D433FN-2.5	2.5	9,500	0.085	9,500	0.085	9,500	0.085	6,300	0.085	5,000	0.085	9,500	0.085
D433FN-3	3	8,000	0.09	8,000	0.09	8,000	0.09	5,000	0.09	4,000	0.09	8,000	0.09
D433FN-3.5	3.5	7,100	0.09	7,100	0.09	7,100	0.09	4,400	0.09	3,900	0.09	7,100	0.09
D433FN-4	4	6,300	0.10	6,300	0.10	6,300	0.10	3,800	0.10	3,800	0.10	6,300	0.10
D433FN-4.5	4.5	5,600	0.11	5,600	0.11	5,600	0.11	3,400	0.11	3,400	0.11	5,600	0.11
D433FN-5	5	5,000	0.12	5,000	0.12	5,000	0.12	3,000	0.12	3,000	0.12	5,000	0.12
D433FN-5.5	5.5	4,600	0.13	4,600	0.13	4,600	0.13	2,800	0.13	2,800	0.13	4,600	0.13
D433FN-6	6	4,200	0.14	4,200	0.14	4,200	0.14	2,600	0.14	2,600	0.14	4,200	0.14
D433FN-6.5	6.5	3,950	0.14	3,950	0.14	3,950	0.14	3,425	0.14	3,425	0.14	3,950	0.14
D433FN-7	7	3,700	0.15	3,700	0.15	3,700	0.15	2,250	0.15	2,250	0.15	3,700	0.15
D433FN-7.5	7.5	3,450	0.15	3,450	0.15	3,450	0.15	2,075	0.15	2,075	0.15	3,450	0.15
D433FN-8	8	3,200	0.16	3,200	0.16	3,200	0.16	1,900	0.16	1,900	0.16	3,200	0.16
D433FN-8.5	8.5	3,050	0.16	3,050	0.16	3,050	0.16	1,825	0.16	1,825	0.16	3,050	0.16
D433FN-9	9	2,870	0.17	2,870	0.17	2,870	0.17	1,750	0.17	1,750	0.17	2,870	0.17
D433FN-9.5	9.5	2,700	0.17	2,700	0.17	2,700	0.17	1,675	0.17	1,675	0.17	2,700	0.17
D433FN-10	10	2,550	0.18	2,550	0.18	2,550	0.18	1,600	0.18	1,600	0.18	2,550	0.18
D433FN-10.5	10.5	2,450	0.18	2,450	0.18	2,450	0.18	1,525	0.18	1,525	0.18	2,450	0.18
D433FN-11	11	2,350	0.19	2,350	0.19	2,350	0.19	1,450	0.19	1,450	0.19	2,350	0.19
D433FN-11.5	11.5	2,225	0.19	2,225	0.19	2,225	0.19	1,375	0.19	1,375	0.19	2,225	0.19
D433FN-12	12	2,100	0.20	2,100	0.20	2,100	0.20	1,300	0.20	1,300	0.20	2,100	0.20
D433FN-12.5	12.5	1,975	0.02	1,975	0.02	1,975	0.02	1,225	0.02	1,225	0.02	1,975	0.02
D433FN-13	13	1,850	0.21	1,850	0.21	1,850	0.21	1,150	0.21	1,150	0.21	1,850	0.21

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用的工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

Code No. D43IFT-Dc

Dc m7	Lc mm	L mm	d h6	AlTiCrN D43IFT
3	20	62	6	•
3.1	20	62	6	•
3.2	20	62	6	•
3.3	20	62	6	•
3.4	20	62	6	•
3.5	20	62	6	•
3.6	20	62	6	•
3.7	20	62	6	•
3.8	24	66	6	•
3.9	24	66	6	•
4	24	66	6	•
4.1	24	66	6	•
4.2	24	66	6	•
4.3	24	66	6	•
4.4	24	66	6	•
4.5	24	66	6	•
4.6	24	66	6	•
4.7	24	66	6	•
4.8	28	66	6	•
4.9	28	66	6	•
5	28	66	6	•
5.1	28	66	6	•
5.2	28	66	6	•
5.3	28	66	6	•
5.4	28	66	6	•
5.5	28	66	6	•
5.6	28	66	6	•
5.7	28	66	6	•
5.8	28	66	6	•
5.9	28	66	6	•
6	28	66	6	•
6.1	34	79	8	•
6.2	34	79	8	•
6.3	34	79	8	•
6.4	34	79	8	•
6.5	34	79	8	•
6.6	34	79	8	•
6.7	34	79	8	•
6.8	34	79	8	•
6.9	34	79	8	•
7	34	79	8	•
7.1	41	79	8	•
7.2	41	79	8	•
7.3	41	79	8	•
7.4	41	79	8	•
7.5	41	79	8	•
7.6	41	79	8	•
7.7	41	79	8	•
7.8	41	79	8	•
7.9	41	79	8	•
8	41	79	8	•
8.1	47	89	10	•
8.2	47	89	10	•
8.3	47	89	10	•
8.4	47	89	10	•
8.5	47	89	10	•
8.6	47	89	10	•
8.7	47	89	10	•
8.8	47	89	10	•
8.9	47	89	10	•
9	47	89	10	•
9.1	47	89	10	•
9.2	47	89	10	•
9.3	47	89	10	•
9.4	47	89	10	•
9.5	47	89	10	•
9.6	47	89	10	•
9.7	47	89	10	•
9.8	47	89	10	•
9.9	47	89	10	•
10	47	89	10	•
10.2	55	102	12	•
10.5	55	102	12	•
10.8	55	102	12	•
11	55	102	12	•
11.5	55	102	12	•
12	55	102	12	•
12.5	60	107	14	•
13	60	107	14	•
13.5	60	107	14	•
14	60	107	14	•
14.5	65	115	16	•
15	65	115	16	•
15.5	65	115	16	•
16	65	115	16	•
16.5	73	123	18	•
17	73	123	18	•
17.5	73	123	18	•
18	73	123	18	•
18.5	79	131	20	•
19	79	131	20	•
19.5	79	131	20	•
20	79	131	20	•

Steel < 48HRC

P	H	M	K	N	S
•	•	○	•		○

UMG Carbide

AlTiCrN FT

8XD

2

DIN 6537K

140°

Work Material

P	GR1	碳鋼 Carbon Steel	•
P	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	•
P	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	•
H	GR4	硬化鋼 30-38HRC Hardened Steel	•
H	GR5	硬化鋼 38-48HRC Hardened Steel	•
H	GR6	硬化鋼 48-54HRC Hardened Steel	
H	GR7	硬化鋼 54-58HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	○
K	GR9	鑄鐵 Cast Iron	•
N	GR10	鋁 Aluminum	
N	GR11	銅 Copper	
N	GR12	塑膠 Plastics	
N	GR13	複合材料 FRP CFRP Composite Material	
N	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	○
S	GR16	鎳 Nickel	○
S	GR17	耐熱鋼 Heat-resistant Steel	○

D431FT 切削條件參考表

Recommended Milling Conditions

Borehole parameters 鑽孔參數

被削材 Work Material		GR1 碳鋼 Carbon Steel		GR2 低合金鋼 Low-alloyed Steel (~24HRC)		GR3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR4 硬化鋼 Hardened Steel (30-38HRC)		GR5 硬化鋼 Hardened Steel (38-48HRC)		GR9 鑄鐵 Cast Iron	
切削速度 Vc m/min		60~100		60~100		60~100		40~65		30~45		60~100	
型號 Code No.	刃徑 Dc	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 回轉速度 (min-1)	Feed 進給速度 (mm/rev)
D431FT-3	3	8,000	0.09	8,000	0.09	8,000	0.09	5,000	0.09	4,000	0.09	8,000	0.09
D431FT-3.5	3.5	7,100	0.090	7,100	0.090	7,100	0.090	4,400	0.09	3,900	0.09	7,100	0.090
D431FT-4	4	6,300	0.10	6,300	0.10	6,300	0.10	3,800	0.10	3,800	0.10	6,300	0.10
D431FT-4.5	4.5	5,600	0.110	5,600	0.110	5,600	0.110	3,400	0.11	3,400	0.11	5,600	0.110
D431FT-5	5	5,000	0.12	5,000	0.12	5,000	0.12	3,000	0.12	3,000	0.12	5,000	0.12
D431FT-5.5	5.5	4,600	0.130	4,600	0.130	4,600	0.130	2,800	0.13	2,800	0.13	4,600	0.130
D431FT-6	6	4,200	0.14	4,200	0.14	4,200	0.14	2,600	0.14	2,600	0.14	4,200	0.14
D431FT-6.5	6.5	3,950	0.140	3,950	0.140	3,950	0.140	3,425	0.14	3,425	0.14	3,950	0.140
D431FT-7	7	3,700	0.15	3,700	0.15	3,700	0.15	2,250	0.15	2,250	0.15	3,700	0.15
D431FT-7.5	7.5	3,450	0.150	3,450	0.150	3,450	0.150	2,075	0.15	2,075	0.15	3,450	0.150
D431FT-8	8	3,200	0.16	3,200	0.16	3,200	0.16	1,900	0.16	1,900	0.16	3,200	0.16
D431FT-8.5	8.5	3,050	0.160	3,050	0.160	3,050	0.160	1,825	0.16	1,825	0.16	3,050	0.160
D431FT-9	9	2,870	0.17	2,670	0.17	2,870	0.17	1,750	0.17	1,750	0.17	2,870	0.17
D431FT-9.5	9.5	2,700	0.170	2,700	0.170	2,700	0.170	1,675	0.17	1,675	0.17	2,700	0.170
D431FT-10	10	2,550	0.18	2,550	0.18	2,550	0.18	1,600	0.18	1,600	0.18	2,550	0.18
D431FT-10.5	10.5	2,450	0.180	2,450	0.180	2,450	0.180	1,525	0.18	1,525	0.18	2,450	0.180
D431FT-11	11	2,350	0.19	2,350	0.19	2,350	0.19	1,450	0.19	1,450	0.19	2,350	0.19
D431FT-11.5	11.5	2,225	0.190	2,225	0.190	2,225	0.190	1,375	0.19	1,375	0.19	2,225	0.190
D431FT-12	12	2,100	0.20	2,100	0.20	2,100	0.20	1,300	0.20	1,300	0.20	2,100	0.20
D431FT-12.5	12.5	1,875	0.020	1,875	0.020	1,975	0.020	1,225	0.02	1,225	0.02	1,975	0.020
D431FT-13	13	1,850	0.21	1,850	0.21	1,850	0.21	1,150	0.21	1,150	0.21	1,850	0.21
D431FT-13.5	13.5	1,850	0.21	1,850	0.21	1,850	0.21	1,150	0.21	1,150	0.21	1,850	0.21
D431FT-14	14	1,800	0.22	1,800	0.22	1,800	0.22	1,100	0.22	1,100	0.22	1,600	0.22
D431FT-14.5	14.5	1,750	0.22	1,750	0.22	1,750	0.22	1,075	0.22	1,075	0.22	1,750	0.22
D431FT-15	15	1,700	0.23	1,700	0.23	1,700	0.23	1,025	0.23	1,025	0.23	1,700	0.23
D431FT-15.5	15.5	1,650	0.24	1,650	0.24	1,650	0.24	980	0.24	960	0.24	1,650	0.24
D431FT-16	16	1,600	0.25	1,600	0.25	1,600	0.25	950	0.25	950	0.25	1,600	0.25
D431FT-16.5	16.5	1,550	0.25	1,550	0.25	1,550	0.25	925	0.25	925	0.25	1,550	0.25
D431FT-17	17	1,500	0.26	1,500	0.26	1,500	0.26	900	0.26	900	0.26	1,500	0.26
D431FT-17.5	17.5	1,450	0.26	1,450	0.26	1,450	0.26	875	0.26	875	0.26	1,450	0.26
D431FT-18	18	1,400	0.28	1,400	0.28	1,400	0.28	850	0.28	850	0.28	1,400	0.28
D431FT-18.5	18.5	1,400	0.28	1,400	0.28	1,400	0.28	825	0.28	825	0.28	1,400	0.28
D431FT-19	19	1,350	0.29	1,350	0.29	1,350	0.29	800	0.29	800	0.29	1,350	0.29
D431FT-19.5	19.5	1,350	0.29	1,350	0.29	1,350	0.29	780	0.20	780	0.29	1,350	0.29
D431FT-20	20	1,300	0.30	1,300	0.30	1,300	0.30	760	0.30	760	0.30	1,300	0.30

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好，精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

D432FT 極超微粒鎢鋼塗層高速鑽頭
High Performance Drills

Code No. D432FT-Dc

Dc m7	Lc mm	L mm	d h6	AlTiCrN D432FT
3	28	66	6	•
3.1	28	66	6	•
3.2	28	66	6	•
3.3	28	66	6	•
3.4	28	66	6	•
3.5	28	66	6	•
3.6	28	66	6	•
3.7	28	66	6	•
3.8	36	74	6	•
3.9	36	74	6	•
4	36	74	6	•
4.1	36	74	6	•
4.2	36	74	6	•
4.3	36	74	6	•
4.4	36	74	6	•
4.5	36	74	6	•
4.6	36	74	6	•
4.7	36	74	6	•
4.8	44	82	6	•
4.9	44	82	6	•
5	44	82	6	•
5.1	44	82	6	•
5.2	44	82	6	•
5.3	44	82	6	•
5.4	44	82	6	•
5.5	44	82	6	•
5.6	44	82	6	•
5.7	44	82	6	•
5.8	44	82	6	•
5.9	44	82	6	•
6	44	82	6	•
6.1	53	91	8	•
6.2	53	91	8	•
6.3	53	91	8	•
6.4	53	91	8	•
6.5	53	91	8	•
6.6	53	91	8	•
6.7	53	91	8	•
6.8	53	91	8	•
6.9	53	91	8	•
7	53	91	8	•
7.1	53	91	8	•
7.2	53	91	8	•
7.3	53	91	8	•
7.4	53	91	8	•
7.5	53	91	8	•
7.6	53	91	8	•
7.7	53	91	8	•
7.8	53	91	8	•
7.9	53	91	8	•
8	53	91	8	•
8.1	61	103	10	•
8.2	61	103	10	•
8.3	61	103	10	•
8.4	61	103	10	•
8.5	61	103	10	•
8.6	61	103	10	•
8.7	61	103	10	•
8.8	61	103	10	•
8.9	61	103	10	•
9	61	103	10	•
9.1	61	103	10	•
9.2	61	103	10	•
9.3	61	103	10	•
9.4	61	103	10	•
9.5	61	103	10	•
9.6	61	103	10	•
9.7	61	103	10	•
9.8	61	103	10	•
9.9	61	103	10	•
10	61	103	10	•
10.2	71	118	12	•
10.5	71	118	12	•
10.8	71	118	12	•
11	71	118	12	•
11.5	71	118	12	•
12	71	118	12	•
12.5	77	124	14	•
13	77	124	14	•
13.5	77	124	14	•
14	77	124	14	•
14.5	83	133	16	•
15	83	133	16	•
15.5	83	133	16	•
16	83	133	16	•
16.5	93	143	18	•
17	93	143	18	•
17.5	93	143	18	•
18	93	143	18	•
18.5	101	153	20	•
19	101	153	20	•
19.5	101	153	20	•
20	101	153	20	•

Steel < 48HRC

P	H	M	K	N	S
●	●	○	●		○

UMG Carbide

AlTiCrN FT

DIN 6537L

140°

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼硬<34HRC Low-alloyed Steel	●
	GR3	高合金鋼硬>34HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 39-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-56HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	○
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminum	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	○
	GR16	鎳 Nickel	○
	GR17	耐熱鋼 Heat-resistant Steel	○

D432FT 切削條件參考表

Recommended Milling Conditions

Borehole parameters 鑽孔參數

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.9 鑄鐵 Cast Iron	
切削速度 Vc m/min		60~100		60~100		60~100		40~65		30~45		60~100	
型號 Code No.	刃徑 Dc	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)
D432FT-3	3	8,000	0.09	8,000	0.09	8,000	0.09	5,000	0.09	4,000	0.09	8,000	0.09
D432FT-3.5	3.5	7,100	0.090	7,100	0.090	7,100	0.090	4,400	0.09	3,800	0.09	7,100	0.090
D432FT-4	4	6,300	0.10	6,300	0.10	6,300	0.10	3,800	0.10	3,800	0.10	6,300	0.10
D432FT-4.5	4.5	5,600	0.110	5,600	0.110	5,600	0.110	3,400	0.11	3,400	0.11	5,600	0.110
D432FT-5	5	5,000	0.12	5,000	0.12	5,000	0.12	3,000	0.12	3,000	0.12	5,000	0.12
D432FT-5.5	5.5	4,600	0.130	4,600	0.130	4,600	0.130	2,800	0.13	2,800	0.13	4,600	0.130
D432FT-6	6	4,200	0.14	4,200	0.14	4,200	0.14	2,600	0.14	2,600	0.14	4,200	0.14
D432FT-6.5	6.5	3,950	0.140	3,950	0.140	3,950	0.140	3,425	0.14	3,425	0.14	3,950	0.140
D432FT-7	7	3,700	0.15	3,700	0.15	3,700	0.15	2,250	0.15	2,250	0.15	3,700	0.15
D432FT-7.5	7.5	3,450	0.150	3,450	0.150	3,450	0.150	2,075	0.15	2,075	0.15	3,450	0.150
D432FT-8	8	3,200	0.16	3,200	0.16	3,200	0.16	1,900	0.16	1,900	0.16	3,200	0.16
D432FT-8.5	8.5	3,050	0.160	3,050	0.160	3,050	0.160	1,825	0.16	1,825	0.16	3,050	0.160
D432FT-9	9	2,870	0.17	2,870	0.17	2,870	0.17	1,750	0.17	1,750	0.17	2,870	0.17
D432FT-9.5	9.5	2,700	0.170	2,700	0.170	2,700	0.170	1,675	0.17	1,675	0.17	2,700	0.170
D432FT-10	10	2,550	0.18	2,550	0.18	2,550	0.18	1,600	0.18	1,600	0.18	2,550	0.18
D432FT-10.5	10.5	2,450	0.180	2,450	0.180	2,450	0.180	1,525	0.18	1,525	0.18	2,450	0.180
D432FT-11	11	2,350	0.19	2,350	0.19	2,350	0.19	1,450	0.19	1,450	0.19	2,350	0.19
D432FT-11.5	11.5	2,225	0.190	2,225	0.190	2,225	0.190	1,375	0.19	1,375	0.19	2,225	0.190
D432FT-12	12	2,100	0.20	2,100	0.20	2,100	0.20	1,300	0.20	1,300	0.20	2,100	0.20
D432FT-12.5	12.5	1,975	0.020	1,975	0.020	1,975	0.020	1,225	0.02	1,225	0.02	1,975	0.020
D432FT-13	13	1,850	0.21	1,850	0.21	1,850	0.21	1,150	0.21	1,150	0.21	1,850	0.21
D432FT-13.5	13.5	1,850	0.21	1,850	0.21	1,850	0.21	1,150	0.21	1,150	0.21	1,850	0.21
D432FT-14	14	1,800	0.22	1,800	0.22	1,800	0.22	1,100	0.22	1,100	0.22	1,800	0.22
D432FT-14.5	14.5	1,750	0.22	1,750	0.22	1,750	0.22	1,075	0.22	1,075	0.22	1,750	0.22
D432FT-15	15	1,700	0.23	1,700	0.23	1,700	0.23	1,025	0.23	1,025	0.23	1,700	0.23
D432FT-15.5	15.5	1,650	0.24	1,650	0.24	1,650	0.24	980	0.24	980	0.24	1,650	0.24
D432FT-16	16	1,600	0.25	1,600	0.25	1,600	0.25	950	0.25	950	0.25	1,600	0.25
D432FT-16.5	16.5	1,550	0.25	1,550	0.25	1,550	0.25	925	0.25	925	0.25	1,550	0.25
D432FT-17	17	1,500	0.26	1,500	0.26	1,500	0.26	900	0.26	900	0.26	1,500	0.26
D432FT-17.5	17.5	1,450	0.26	1,450	0.26	1,450	0.26	875	0.26	875	0.26	1,450	0.26
D432FT-18	18	1,400	0.28	1,400	0.28	1,400	0.28	850	0.28	850	0.28	1,400	0.28
D432FT-18.5	18.5	1,400	0.28	1,400	0.28	1,400	0.28	825	0.28	825	0.28	1,400	0.28
D432FT-19	19	1,350	0.29	1,350	0.29	1,350	0.29	800	0.29	800	0.29	1,350	0.29
D432FT-19.5	19.5	1,350	0.29	1,350	0.29	1,350	0.29	780	0.29	780	0.29	1,350	0.29
D432FT-20	20	1,300	0.30	1,300	0.30	1,300	0.30	760	0.30	760	0.30	1,300	0.30

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好，精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工狀況，刀具，使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速需按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

D435FT 極超微粒鎢鋼塗層内冷高速鑽頭
Oil-Feed High Performance Drills

Code No. D435FT-Dc

Dc m7	Lc mm	L mm	d h6	AlTiCrN D435FT
3	20	62	6	•
3.1	20	62	6	•
3.2	20	62	6	•
3.3	20	62	6	•
3.4	20	62	6	•
3.5	20	62	6	•
3.6	20	62	6	•
3.7	20	62	6	•
3.8	24	66	6	•
3.9	24	66	6	•
4	24	66	6	•
4.1	24	66	6	•
4.2	24	66	6	•
4.3	24	66	6	•
4.4	24	66	6	•
4.5	24	66	6	•
4.6	24	66	6	•
4.7	24	66	6	•
4.8	28	66	6	•
4.9	28	66	6	•
5	28	66	6	•
5.1	28	66	6	•
5.2	28	66	6	•
5.3	28	66	6	•
5.4	28	66	6	•
5.5	28	66	6	•
5.6	28	66	6	•
5.7	28	66	6	•
5.8	28	66	6	•
5.9	28	66	6	•
6	28	66	6	•
6.1	34	79	8	•
6.2	34	79	8	•
6.3	34	79	8	•
6.4	34	79	8	•
6.5	34	79	8	•
6.6	34	79	8	•
6.7	34	79	8	•
6.8	34	79	8	•
6.9	34	79	8	•
7	34	79	8	•
7.1	41	79	8	•
7.2	41	79	8	•
7.3	41	79	8	•
7.4	41	79	8	•
7.5	41	79	8	•
7.6	41	79	8	•
7.7	41	79	8	•
7.8	41	79	8	•
7.9	41	79	8	•
8	41	79	8	•
8.1	47	89	10	•
8.2	47	89	10	•
8.3	47	89	10	•
8.4	47	89	10	•
8.5	47	89	10	•
8.6	47	89	10	•
8.7	47	89	10	•
8.8	47	89	10	•
8.9	47	89	10	•
9	47	89	10	•
9.1	47	89	10	•
9.2	47	89	10	•
9.3	47	89	10	•
9.4	47	89	10	•
9.5	47	89	10	•
9.6	47	89	10	•
9.7	47	89	10	•
9.8	47	89	10	•
9.9	47	89	10	•
10	47	89	10	•
10.2	55	102	12	•
10.5	55	102	12	•
10.8	55	102	12	•
11	55	102	12	•
11.5	55	102	12	•
12	55	102	12	•
12.5	60	107	14	•
13	60	107	14	•
13.5	60	107	14	•
14	60	107	14	•
14.5	65	115	16	•
15	65	115	16	•
15.5	65	115	16	•
16	65	115	16	•
16.5	73	123	18	•
17	73	123	18	•
17.5	73	123	18	•
18	73	123	18	•
18.5	79	131	20	•
19	79	131	20	•
19.5	79	131	20	•
20	79	131	20	•

Steel < 48HRC

P	H	M	K	N	S
●	●	●	●		○

UMG Carbide

AlTiCrN FT

3 XD

2

DIN 6537K

140°

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼硬<34HRC Low-alloyed Steel	●
	GR3	高合金鋼硬<50HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 50-55HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 42-56HRC Hardened Steel	○
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	●
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminum	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	○
	GR16	鎳 Nickel	○
	GR17	耐熱鋼 Heat-resistant Steel	○

D435FT 切削條件參考表

Recommanded Milling Conditions

Borehole parameters 鑽孔參數

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel 38~48HRC)		GR.8 不銹鋼 Stainless Steel		GR.9 鑄鐵 Cast Iron	
切削速度 Vc m/min		80~150		80~150		80~150		40~70		32~50		50~80		80~150	
型號 Code No.	刃徑 Dc	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)
D435FT-3	3	13,000	0.09	13,000	0.09	13,000	0.09	6,400	0.09	5,300	0.07	6,300	0.09	13,000	0.09
D435FT-3.5	3.5	11,250	0.09	11,250	0.09	11,250	0.09	5,600	0.09	4,600	0.07	5,500	0.09	11,250	0.09
D435FT-4	4	9,500	0.10	9,500	0.10	9,500	0.10	4,800	0.10	4,000	0.08	4,700	0.10	9,500	0.10
D435FT-4.5	4.5	8,500	0.11	8,500	0.11	8,500	0.11	4,200	0.11	3,600	0.09	4,250	0.11	8,500	0.11
D435FT-5	5	7,600	0.12	7,600	0.12	7,600	0.12	3,800	0.12	3,200	0.10	3,800	0.12	7,600	0.12
D435FT-5.5	5.5	7,000	0.13	7,000	0.13	7,000	0.13	3,500	0.13	2,920	0.11	3,500	0.13	7,000	0.13
D435FT-6	6	6,400	0.14	6,400	0.14	6,400	0.14	3,200	0.14	2,650	0.12	3,200	0.14	6,400	0.14
D435FT-6.5	6.5	6,000	0.14	6,000	0.14	6,000	0.14	3,000	0.15	2,480	0.12	3,000	0.15	6,000	0.14
D435FT-7	7	5,600	0.15	5,600	0.15	5,600	0.15	2,800	0.15	2,320	0.13	2,800	0.15	5,600	0.15
D435FT-7.5	7.5	5,200	0.15	5,200	0.15	5,200	0.15	2,600	0.15	2,160	0.13	2,600	0.15	5,200	0.15
D435FT-8	8	4,800	0.16	4,800	0.16	4,800	0.16	2,400	0.16	2,000	0.14	2,400	0.16	4,800	0.16
D435FT-8.5	8.5	4,550	0.16	4,550	0.16	4,550	0.16	2,275	0.16	1,900	0.14	2,275	0.16	4,550	0.16
D435FT-9	9	4,300	0.17	4,300	0.17	4,300	0.17	2,150	0.17	1,800	0.14	2,150	0.17	4,300	0.17
D435FT-9.5	9.5	4,050	0.17	4,050	0.17	4,050	0.17	2,025	0.17	1,700	0.14	2,025	0.17	4,050	0.17
D435FT-10	10	3,800	0.18	3,800	0.18	3,800	0.18	1,900	0.18	1,600	0.15	1,900	0.18	3,800	0.18
D435FT-10.5	10.5	3,650	0.18	3,650	0.18	3,650	0.18	1,825	0.18	1,525	0.15	1,825	0.18	3,650	0.18
D435FT-11	11	3,500	0.19	3,500	0.19	3,500	0.19	1,750	0.19	1,450	0.16	1,750	0.19	3,500	0.19
D435FT-11.5	11.5	3,350	0.19	3,350	0.19	3,350	0.19	1,675	0.19	1,375	0.16	1,675	0.19	3,350	0.19
D435FT-12	12	3,200	0.20	3,200	0.20	3,200	0.20	1,600	0.20	1,300	0.17	1,600	0.20	3,200	0.20
D435FT-12.5	12.5	3,075	0.20	3,075	0.20	3,075	0.20	1,535	0.20	1,275	0.17	1,530	0.20	3,075	0.20
D435FT-13	13	2,950	0.21	2,950	0.21	2,950	0.21	1,475	0.21	1,250	0.17	1,475	0.21	2,950	0.21
D435FT-13.5	13.5	2,825	0.21	2,825	0.21	2,825	0.21	1,410	0.21	1,225	0.17	1,410	0.21	2,825	0.21
D435FT-14	14	2,700	0.22	2,700	0.22	2,700	0.22	1,350	0.22	1,200	0.18	1,350	0.22	2,700	0.22
D435FT-14.5	14.5	2,625	0.23	2,625	0.23	2,625	0.23	1,310	0.23	1,150	0.18	1,310	0.23	2,625	0.23
D435FT-15	15	2,550	0.24	2,550	0.24	2,550	0.24	1,275	0.24	1,100	0.19	1,275	0.24	2,550	0.24
D435FT-15.5	15.5	2,475	0.24	2,475	0.24	2,475	0.24	1,230	0.24	1,050	0.19	1,235	0.24	2,475	0.24
D435FT-16	16	2,400	0.25	2,400	0.25	2,400	0.25	1,200	0.25	1,000	0.20	1,200	0.25	2,400	0.25
D435FT-16.5	16.5	2,325	0.26	2,325	0.26	2,325	0.26	1,175	0.26	975	0.20	1,175	0.26	2,325	0.26
D435FT-17	17	2,250	0.27	2,250	0.27	2,250	0.27	1,150	0.27	950	0.21	1,150	0.27	2,250	0.27
D435FT-17.5	17.5	2,175	0.27	2,175	0.27	2,175	0.27	1,125	0.27	925	0.22	1,125	0.27	2,175	0.27
D435FT-18	18	2,100	0.28	2,100	0.28	2,100	0.28	1,100	0.28	900	0.23	1,100	0.28	2,100	0.28
D435FT-18.5	18.5	2,050	0.28	2,050	0.28	2,050	0.28	1,075	0.28	875	0.23	1,065	0.28	2,050	0.28
D435FT-19	19	2,000	0.29	2,000	0.29	2,000	0.29	1,050	0.29	850	0.24	1,025	0.29	2,000	0.29
D435FT-19.5	19.5	1,950	0.29	1,950	0.29	1,950	0.29	1,025	0.29	825	0.24	980	0.29	1,950	0.29
D435FT-20	20	1,900	0.30	1,900	0.30	1,900	0.30	1,000	0.30	800	0.25	950	0.30	1,900	0.30

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 需使用剛性好、精度高的機床和夾具。
2. 需要選用合適的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工狀況、刀具、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速需同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

D436FT 極超微粒鎢鋼塗層內冷高速鑽頭
Oil-Feed High Performance Drills

Code No. D436FT-Dc

Dc m7	Lc mm	L mm	d h6	AlTiCrN D436FT
3	28	66	6	•
3.1	28	66	6	•
3.2	28	66	6	•
3.3	28	66	6	•
3.4	28	66	6	•
3.5	28	66	6	•
3.6	28	66	6	•
3.7	28	66	6	•
3.8	36	74	6	•
3.9	36	74	6	•
4	36	74	6	•
4.1	36	74	6	•
4.2	36	74	6	•
4.3	36	74	6	•
4.4	36	74	6	•
4.5	36	74	6	•
4.6	36	74	6	•
4.7	36	74	6	•
4.8	44	82	6	•
4.9	44	82	6	•
5	44	82	6	•
5.1	44	82	6	•
5.2	44	82	6	•
5.3	44	82	6	•
5.4	44	82	6	•
5.5	44	82	6	•
5.6	44	82	6	•
5.7	44	82	6	•
5.8	44	82	6	•
5.9	44	82	6	•
6	44	82	6	•
6.1	53	91	8	•
6.2	53	91	8	•
6.3	53	91	8	•
6.4	53	91	8	•
6.5	53	91	8	•
6.6	53	91	8	•
6.7	53	91	8	•
6.8	53	91	8	•
6.9	53	91	8	•
7	53	91	8	•
7.1	53	91	8	•
7.2	53	91	8	•
7.3	53	91	8	•
7.4	53	91	8	•
7.5	53	91	8	•
7.6	53	91	8	•
7.7	53	91	8	•
7.8	53	91	8	•
7.9	53	91	8	•
8	53	91	8	•
8.1	61	103	10	•
8.2	61	103	10	•
8.3	61	103	10	•
8.4	61	103	10	•
8.5	61	103	10	•
8.6	61	103	10	•
8.7	61	103	10	•
8.8	61	103	10	•
8.9	61	103	10	•
9	61	103	10	•
9.1	61	103	10	•
9.2	61	103	10	•
9.3	61	103	10	•
9.4	61	103	10	•
9.5	61	103	10	•
9.6	61	103	10	•
9.7	61	103	10	•
9.8	61	103	10	•
9.9	61	103	10	•
10	61	103	10	•
10.2	71	118	12	•
10.5	71	118	12	•
10.8	71	118	12	•
11	71	118	12	•
11.5	71	118	12	•
12	71	118	12	•
12.5	77	124	14	•
13	77	124	14	•
13.5	77	124	14	•
14	77	124	14	•
14.5	83	133	16	•
15	83	133	16	•
15.5	83	133	16	•
16	83	133	16	•
16.5	93	143	18	•
17	93	143	18	•
17.5	93	143	18	•
18	93	143	18	•
18.5	101	153	20	•
19	101	153	20	•
19.5	101	153	20	•
20	101	153	20	•

Steel < 48HRC

P	H	M	K	N	S
●	●	●	●		○

UMG Carbide

AlTiCrN FT

5×D

2

DIN 6537K

140°

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼體<34HRC Low-alloyed Steel	●
	GR3	高合金鋼體<50HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-56HRC Hardened Steel	○
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	●
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminum	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	○
	GR16	鎳 Nickel	○
	GR17	耐熱鋼 Heat-resistant Steel	○

D436FT 切削條件參考表

Recommanded Milling Conditions

Borehole parameters 鑽孔參數

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.8 不銹鋼 Stainless Steel		GR.9 鑄鐵 Cast Iron	
切削速度 Vc m/min		80~150		80~150		60~150		40~70		32~50		50~80		80~150	
型號 Code No.	刃徑 Dc	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)
D436FT-3	3	13,000	0.09	13,000	0.09	13,000	0.09	6,400	0.09	5,300	0.07	6,300	0.09	13,000	0.09
D436FT-3.5	3.5	11,250	0.09	11,250	0.09	11,250	0.09	5,600	0.09	4,600	0.07	5,500	0.09	11,250	0.09
D436FT-4	4	9,500	0.10	9,500	0.10	9,500	0.10	4,800	0.10	4,000	0.08	4,700	0.10	9,500	0.10
D436FT-4.5	4.5	8,500	0.11	8,500	0.11	8,500	0.11	4,200	0.11	3,600	0.09	4,250	0.11	8,500	0.11
D436FT-5	5	7,600	0.12	7,600	0.12	7,600	0.12	3,800	0.12	3,200	0.10	3,800	0.12	7,600	0.12
D436FT-5.5	5.5	7,000	0.13	7,000	0.13	7,000	0.13	3,500	0.13	2,920	0.11	3,500	0.13	7,000	0.13
D436FT-6	6	6,400	0.14	6,400	0.14	6,400	0.14	3,200	0.14	2,650	0.12	3,200	0.14	6,400	0.14
D436FT-6.5	6.5	6,000	0.14	6,000	0.14	6,000	0.14	3,000	0.15	2,480	0.12	3,000	0.15	6,000	0.14
D436FT-7	7	5,600	0.15	5,600	0.15	5,600	0.15	2,800	0.15	2,320	0.13	2,800	0.15	5,600	0.15
D436FT-7.5	7.5	5,200	0.15	5,200	0.15	5,200	0.15	2,600	0.15	2,160	0.13	2,600	0.15	5,200	0.15
D436FT-8	8	4,800	0.16	4,800	0.16	4,800	0.16	2,400	0.16	2,000	0.14	2,400	0.16	4,800	0.16
D436FT-8.5	8.5	4,550	0.16	4,550	0.16	4,550	0.16	2,275	0.16	1,900	0.14	2,275	0.16	4,550	0.16
D436FT-9	9	4,300	0.17	4,300	0.17	4,300	0.17	2,150	0.17	1,800	0.14	2,150	0.17	4,300	0.17
D436FT-9.5	9.5	4,050	0.17	4,050	0.17	4,050	0.17	2,025	0.17	1,700	0.14	2,025	0.17	4,050	0.17
D436FT-10	10	3,800	0.18	3,800	0.18	3,800	0.18	1,900	0.18	1,600	0.15	1,900	0.18	3,800	0.18
D436FT-10.5	10.5	3,650	0.18	3,650	0.18	3,650	0.18	1,825	0.18	1,525	0.15	1,825	0.18	3,650	0.18
D436FT-11	11	3,500	0.19	3,500	0.19	3,500	0.19	1,750	0.19	1,450	0.16	1,750	0.19	3,500	0.19
D436FT-11.5	11.5	3,350	0.19	3,350	0.19	3,350	0.19	1,675	0.19	1,375	0.16	1,675	0.19	3,350	0.19
D436FT-12	12	3,200	0.20	3,200	0.20	3,200	0.20	1,600	0.20	1,300	0.17	1,600	0.20	3,200	0.20
D436FT-12.5	12.5	3,075	0.20	3,075	0.20	3,075	0.20	1,535	0.20	1,275	0.17	1,530	0.20	3,075	0.20
D436FT-13	13	2,950	0.21	2,950	0.21	2,950	0.21	1,475	0.21	1,250	0.17	1,475	0.21	2,950	0.21
D436FT-13.5	13.5	2,825	0.21	2,825	0.21	2,825	0.21	1,410	0.21	1,225	0.17	1,410	0.21	2,825	0.21
D436FT-14	14	2,700	0.22	2,700	0.22	2,700	0.22	1,350	0.22	1,200	0.18	1,350	0.22	2,700	0.22
D436FT-14.5	14.5	2,625	0.23	2,625	0.23	2,625	0.23	1,310	0.23	1,150	0.18	1,310	0.23	2,625	0.23
D436FT-15	15	2,550	0.24	2,550	0.24	2,550	0.24	1,275	0.24	1,100	0.19	1,275	0.24	2,550	0.24
D436FT-15.5	15.5	2,475	0.24	2,475	0.24	2,475	0.24	1,230	0.24	1,050	0.19	1,235	0.24	2,475	0.24
D436FT-16	16	2,400	0.25	2,400	0.25	2,400	0.25	1,200	0.25	1,000	0.20	1,200	0.25	2,400	0.25
D436FT-16.5	16.5	2,325	0.26	2,325	0.26	2,325	0.26	1,175	0.26	975	0.20	1,175	0.26	2,325	0.26
D436FT-17	17	2,250	0.27	2,250	0.27	2,250	0.27	1,150	0.27	950	0.21	1,150	0.27	2,250	0.27
D436FT-17.5	17.5	2,175	0.27	2,175	0.27	2,175	0.27	1,125	0.27	925	0.22	1,125	0.27	2,175	0.27
D436FT-18	18	2,100	0.28	2,100	0.28	2,100	0.28	1,100	0.28	900	0.23	1,100	0.28	2,100	0.28
D436FT-18.5	18.5	2,050	0.28	2,050	0.28	2,050	0.28	1,075	0.28	875	0.23	1,065	0.28	2,050	0.28
D436FT-19	19	2,000	0.29	2,000	0.29	2,000	0.29	1,050	0.29	850	0.24	1,025	0.29	2,000	0.29
D436FT-19.5	19.5	1,950	0.29	1,950	0.29	1,950	0.29	1,025	0.29	825	0.24	980	0.29	1,950	0.29
D436FT-20	20	1,900	0.30	1,900	0.30	1,900	0.30	1,000	0.30	800	0.25	950	0.30	1,900	0.30

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好，精密高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工狀況，刀具，使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速同比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

D437FT 極超微粒鎢鋼塗層內冷高速鑽頭
Oil-Feed High Performance Drills

Code No. D437FT-Dc

Dc m7	Lc mm	L mm	d h6	AlTiCrN D437FT
3	34	74	6	•
3.1	34	74	6	•
3.2	34	74	6	•
3.3	34	74	6	•
3.4	34	74	6	•
3.5	34	74	6	•
3.6	34	74	6	•
3.7	34	74	6	•
3.8	45	85	6	•
3.9	45	85	6	•
4	45	85	6	•
4.1	45	85	6	•
4.2	45	85	6	•
4.3	45	85	6	•
4.4	45	85	6	•
4.5	45	85	6	•
4.6	45	85	6	•
4.7	45	85	6	•
4.8	57	97	6	•
4.9	57	97	6	•
5	57	97	6	•
5.1	57	97	6	•
5.2	57	97	6	•
5.3	57	97	6	•
5.4	57	97	6	•
5.5	57	97	6	•
5.6	57	97	6	•
5.7	57	97	6	•
5.8	57	97	6	•
5.9	57	97	6	•
6	57	97	6	•
6.1	66	106	8	•
6.2	66	106	8	•
6.3	66	106	8	•
6.4	66	106	8	•
6.5	66	106	8	•
6.6	66	106	8	•
6.7	66	106	8	•
6.8	66	106	8	•
6.9	66	106	8	•
7	66	106	8	•
7.1	76	116	8	•
7.2	76	116	8	•
7.3	76	116	8	•
7.4	76	116	8	•
7.5	76	116	8	•
7.6	76	116	8	•
7.7	76	116	8	•
7.8	76	116	8	•
7.9	76	116	8	•
8	76	116	8	•
8.1	95	139	10	•
8.2	95	139	10	•
8.3	95	139	10	•
8.4	95	139	10	•
8.5	95	139	10	•
8.6	95	139	10	•
8.7	95	139	10	•
8.8	95	139	10	•
8.9	95	139	10	•
9	95	139	10	•
9.1	95	139	10	•
9.2	95	139	10	•
9.3	95	139	10	•
9.4	95	139	10	•
9.5	95	139	10	•
9.6	95	139	10	•
9.7	95	139	10	•
9.8	95	139	10	•
9.9	95	139	10	•
10	95	139	10	•
10.2	114	163	12	•
10.5	114	163	12	•
10.8	114	163	12	•
11	114	163	12	•
11.5	114	163	12	•
12	114	163	12	•
12.5	133	182	14	•
13	133	182	14	•
13.5	133	182	14	•
14	133	182	14	•
14.5	152	204	16	•
15	152	204	16	•
15.5	152	204	16	•
16	152	204	16	•
16.5	171	223	18	•
17	171	223	18	•
17.5	171	223	18	•
18	171	223	18	•
18.5	190	244	20	•
19	190	244	20	•
19.5	190	244	20	•
20	190	244	20	•

Steel < 48HRC

P	H	M	K	N	S
●	●	●	●		○

UMG Carbide

AlTiCrN FT

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼硬<34HRC Low-alloyed Steel	●
	GR3	高合金鋼硬<50HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-56HRC Hardened Steel	○
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	●
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminum	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	○
	GR16	鎳 Nickel	○
	GR17	耐熱鋼 Heat-resistant Steel	○

D437FT 切削條件參考表

Recommanded Milling Conditions

Borehole parameters 鑽孔參數

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (~24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (~30HRC)		GR.4 硬化鋼 Hardened Steel (30~38HRC)		GR.5 硬化鋼 Hardened Steel (38~48HRC)		GR.8 不鏽鋼 Stainless Steel		GR.9 鑄鐵 Cast Iron	
切削速度 Vc m/min		80~150		80~150		80~150		40~70		32~50		50~80		80~150	
型號 Code No.	刃徑 Dc	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸轉速 (min-1)	Feed 進給速度 (mm/rev)
D437FT-3	3	13,000	0.09	13,000	0.09	13,000	0.09	6,400	0.09	5,300	0.07	6,300	0.09	13,000	0.09
D437FT-3.5	3.5	11,250	0.09	11,250	0.09	11,250	0.09	5,600	0.09	4,600	0.07	5,500	0.09	11,250	0.09
D437FT-4	4	9,500	0.10	9,500	0.10	9,500	0.10	4,800	0.10	4,000	0.08	4,700	0.10	9,500	0.10
D437FT-4.5	4.5	8,500	0.11	8,500	0.11	8,500	0.11	4,200	0.11	3,600	0.09	4,250	0.11	8,500	0.11
D437FT-5	5	7,600	0.12	7,600	0.12	7,600	0.12	3,800	0.12	3,200	0.10	3,800	0.12	7,600	0.12
D437FT-5.5	5.5	7,000	0.13	7,000	0.13	7,000	0.13	3,500	0.13	2,920	0.11	3,500	0.13	7,000	0.13
D437FT-6	6	6,400	0.14	6,400	0.14	6,400	0.14	3,200	0.14	2,650	0.12	3,200	0.14	6,400	0.14
D437FT-6.5	6.5	6,000	0.14	6,000	0.14	6,000	0.14	3,000	0.15	2,480	0.12	3,000	0.15	6,000	0.14
D437FT-7	7	5,600	0.15	5,600	0.15	5,600	0.15	2,800	0.15	2,320	0.13	2,800	0.15	5,600	0.15
D437FT-7.5	7.5	5,200	0.15	5,200	0.15	5,200	0.15	2,600	0.15	2,160	0.13	2,600	0.15	5,200	0.15
D437FT-8	8	4,800	0.16	4,800	0.16	4,800	0.16	2,400	0.16	2,000	0.14	2,400	0.16	4,800	0.16
D437FT-8.5	8.5	4,550	0.16	4,550	0.16	4,550	0.16	2,275	0.16	1,900	0.14	2,275	0.16	4,550	0.16
D437FT-9	9	4,300	0.17	4,300	0.17	4,300	0.17	2,150	0.17	1,800	0.14	2,150	0.17	4,300	0.17
D437FT-9.5	9.5	4,050	0.17	4,050	0.17	4,050	0.17	2,025	0.17	1,700	0.14	2,025	0.17	4,050	0.17
D437FT-10	10	3,800	0.18	3,800	0.18	3,800	0.18	1,900	0.18	1,600	0.15	1,900	0.18	3,800	0.18
D437FT-10.5	10.5	3,650	0.18	3,650	0.18	3,650	0.18	1,825	0.18	1,525	0.15	1,825	0.18	3,650	0.18
D437FT-11	11	3,500	0.19	3,500	0.19	3,500	0.19	1,750	0.19	1,450	0.16	1,750	0.19	3,500	0.19
D437FT-11.5	11.5	3,350	0.19	3,350	0.19	3,350	0.19	1,675	0.19	1,375	0.16	1,675	0.19	3,350	0.19
D437FT-12	12	3,200	0.20	3,200	0.20	3,200	0.20	1,600	0.20	1,300	0.17	1,600	0.20	3,200	0.20
D437FT-12.5	12.5	3,075	0.20	3,075	0.20	3,075	0.20	1,535	0.20	1,275	0.17	1,530	0.20	3,075	0.20
D437FT-13	13	2,950	0.21	2,950	0.21	2,950	0.21	1,475	0.21	1,250	0.17	1,475	0.21	2,950	0.21
D437FT-13.5	13.5	2,825	0.21	2,825	0.21	2,825	0.21	1,410	0.21	1,225	0.17	1,410	0.21	2,825	0.21
D437FT-14	14	2,700	0.22	2,700	0.22	2,700	0.22	1,350	0.22	1,200	0.18	1,350	0.22	2,700	0.22
D437FT-14.5	14.5	2,625	0.23	2,625	0.23	2,625	0.23	1,310	0.23	1,160	0.18	1,310	0.23	2,625	0.23
D437FT-15	15	2,550	0.24	2,550	0.24	2,550	0.24	1,275	0.24	1,100	0.19	1,275	0.24	2,550	0.24
D437FT-15.5	15.5	2,475	0.24	2,475	0.24	2,475	0.24	1,230	0.24	1,050	0.19	1,235	0.24	2,475	0.24
D437FT-16	16	2,400	0.25	2,400	0.25	2,400	0.25	1,200	0.25	1,000	0.20	1,200	0.25	2,400	0.25
D437FT-16.5	16.5	2,325	0.26	2,325	0.26	2,325	0.26	1,175	0.26	975	0.20	1,175	0.26	2,325	0.26
D437FT-17	17	2,250	0.27	2,250	0.27	2,250	0.27	1,150	0.27	950	0.21	1,150	0.27	2,250	0.27
D437FT-17.5	17.5	2,175	0.27	2,175	0.27	2,175	0.27	1,125	0.27	925	0.22	1,125	0.27	2,175	0.27
D437FT-18	18	2,100	0.28	2,100	0.28	2,100	0.28	1,100	0.28	900	0.23	1,100	0.28	2,100	0.28
D437FT-18.5	18.5	2,050	0.28	2,050	0.28	2,050	0.28	1,075	0.28	875	0.23	1,065	0.28	2,050	0.28
D437FT-19	19	2,000	0.29	2,000	0.29	2,000	0.29	1,050	0.29	850	0.24	1,025	0.29	2,000	0.29
D437FT-19.5	19.5	1,950	0.29	1,950	0.29	1,950	0.29	1,025	0.29	825	0.24	980	0.29	1,950	0.29
D437FT-20	20	1,900	0.30	1,900	0.30	1,900	0.30	1,000	0.30	800	0.25	950	0.30	1,900	0.30

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好，精密高的設備和夾具。
2. 需要選擇用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工狀況、刀具、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速同比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

D441FT / D442FT / D443FT 極超微粒鎢鋼塗層內冷高速鑽頭
Oil-Feed High Performance Drills

Code No. D441FT-Dc

Dc m7	Lc mm	L mm	d h6	12XD D441FT
3	54	92	6	●
3.5	54	92	6	●
4	64	102	6	●
4.5	64	102	6	●
5	83	121	6	●
5.5	83	121	6	●
6	83	121	6	●
6.5	110	148	8	●
7	110	148	8	●
8	110	148	8	●
8.5	138	180	10	●
9	138	180	10	●
10	138	180	10	●
11	158	206	12	●
12	158	206	12	●

Code No. D442FT-Dc

Dc m7	Lc mm	L mm	d h6	16XD D442FT
3	57	100	6	●
3.5	78	120	6	●
4	78	120	6	●
4.5	100	140	6	●
5	100	140	6	●
5.5	110	150	6	●
6	120	160	6	●
6.5	135	175	8	●
7	135	175	8	●
8	152	192	8	●
8.5	162	206	10	●
9	162	206	10	●
10	180	224	10	●
11	198	247	12	●
12	216	265	12	●

Code No. D443FT-Dc

Dc m7	Lc mm	L mm	d h6	20XD D443FT
3	65	107	6	●
3.5	92	134	6	●
4	92	134	6	●
4.5	118	158	6	●
5	118	158	6	●
5.5	132	170	6	●
6	144	182	6	●
6.5	162	200	8	●
7	162	200	8	●
8	184	222	8	●
8.5	198	240	10	●
9	198	240	10	●
10	220	262	10	●
11	242	289	12	●
12	264	311	12	●

Steel < 52HRC

P	H	M	K	N	S
●	●	●	●		○

UMG Carbide

AlTiCrN FT

12XD 16XD 20XD

2

135°

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鋼<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鋼<28HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-56HRC Hardened Steel	○
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	●
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	
	GR11	銅 Copper	
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	○
	GR16	鎳 Nickel	○
	GR17	耐熱鋼 Heat-resistant Steel	○

Borehole parameters 鑽孔參數

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (-24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (-36HRC)		GR.4 硬化鋼 Hardened Steel (36-38HRC)		GR.5 不銹鋼 Stainless Steel		GR.9 鑄鐵 Cast Iron	
切削速度 Vc m/min		60~125		60~125		60~125		40~80		40~80		50~80	
型號 Code No.	刃徑 Dc	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 旋轉速度 (min-1)	Feed 進給速度 (mm/rev)
D441FT/D442FT/D443FT-3	3	7,500	0.06	7,500	0.06	7,500	0.06	5,300	0.06	5,300	0.06	7,500	0.06
D441FT/D442FT/D443FT-3.5	3.5	6,850	0.07	6,850	0.07	6,850	0.07	5,150	0.07	5,150	0.07	6,500	0.07
D441FT/D442FT/D443FT-4	4	6,400	0.08	6,400	0.08	6,400	0.08	5,000	0.08	5,000	0.08	5,600	0.08
D441FT/D442FT/D443FT-4.5	4.5	6,100	0.09	6,100	0.09	6,100	0.09	4,750	0.09	4,750	0.09	5,050	0.09
D441FT/D442FT/D443FT-5	5	5,800	0.10	5,800	0.10	5,800	0.10	4,500	0.10	4,500	0.10	4,500	0.10
D441FT/D442FT/D443FT-5.5	5.5	5,300	0.11	5,300	0.11	5,300	0.11	4,150	0.11	4,150	0.11	4,150	11.00
D441FT/D442FT/D443FT-6	6	4,800	0.12	4,800	0.12	4,800	0.12	3,800	0.12	3,800	0.12	3,800	0.12
D441FT/D442FT/D443FT-6.5	6.5	4,500	0.13	4,500	0.13	4,500	0.13	3,550	0.13	3,550	0.13	3,550	0.13
D441FT/D442FT/D443FT-7	7	4,200	0.14	4,200	0.14	4,200	0.14	3,300	0.14	3,300	0.14	3,300	0.14
D441FT/D442FT/D443FT-8	8	3,600	0.16	3,600	0.16	3,600	0.16	2,800	0.16	2,800	0.16	2,800	0.16
D441FT/D442FT/D443FT-8.5	8.5	3,430	0.17	3,430	0.17	3,430	0.17	2,675	0.17	2,675	0.17	2,675	0.17
D441FT/D442FT/D443FT-9	9	3,250	0.18	3,250	0.18	3,250	0.18	2,550	0.18	2,550	0.18	2,550	0.18
D441FT/D442FT/D443FT-10	10	2,900	0.20	2,900	0.20	2,900	0.20	2,300	0.20	2,300	0.20	2,300	0.20
D441FT/D442FT/D443FT-11	11	2,650	0.22	2,650	0.22	2,650	0.22	2,100	0.22	2,100	0.22	2,100	0.22
D441FT/D442FT/D443FT-12	12	2,400	0.24	2,400	0.24	2,400	0.24	1,900	0.24	1,900	0.24	1,900	0.24

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精密高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件做調整。
4. 如果機台轉速低於表中的參數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

D419FT 極超微粒鎢鋼塗層內冷高速鑽頭

Combined Drill and Chamfer Tool

Code No. D419FT-thread

For thread size	D1 mm	L1 mm	L2 mm	L mm	d h6	AlTiCrN D419FT
M 3	2.5	8.8	28	66	6	●
M 4	3.3	11.4	28	66	6	●
M 5	4.2	13.6	28	66	6	●
M 6	5	16.5	41	79	8	●
M 8	6.8	21	47	89	10	●
M10	8.5	25.5	55	102	12	●
M12	10.2	30	60	107	14	●

Steel < 48HRC

P	H	M	K	N	S
●	●	○	●	○	

UMG Carbide

AlTiCrN FT

Work Material

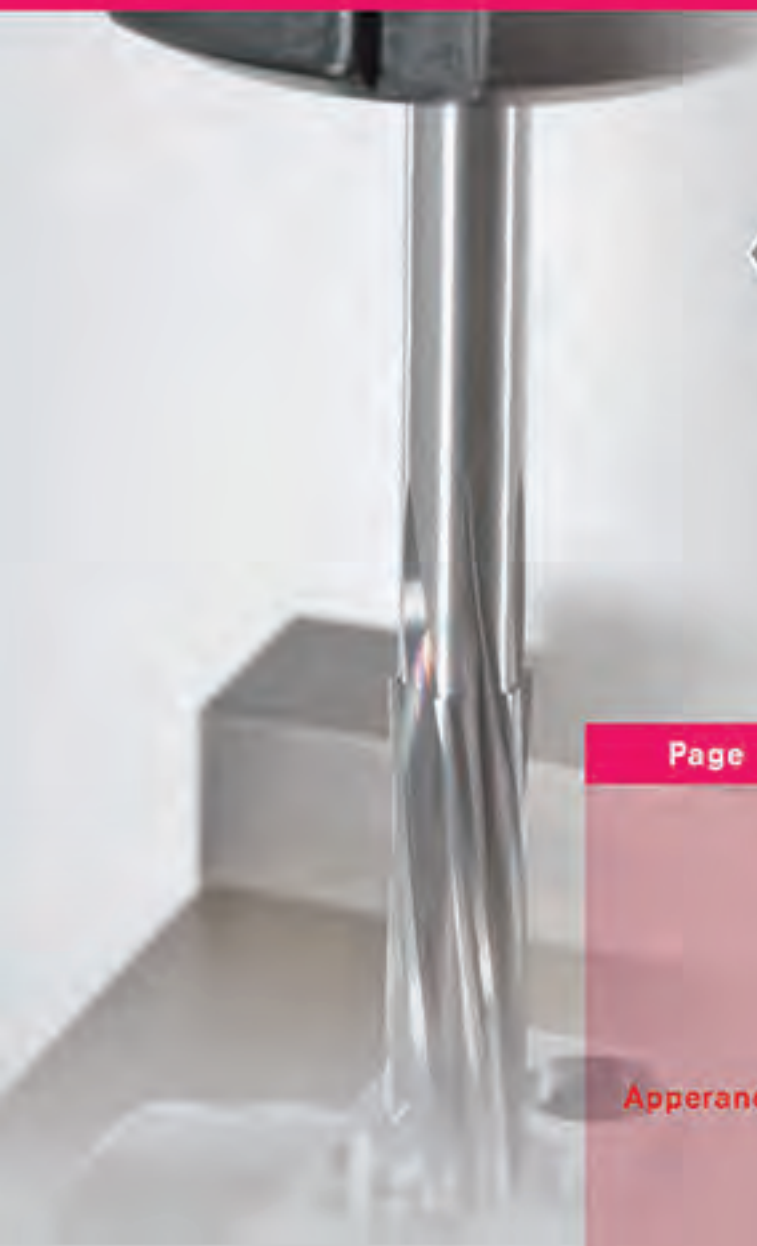
P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鋼<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-56HRC Hardened Steel	
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	○
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	○
	GR11	銅 Copper	○
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Borehole parameters 鑽孔參數

被削材 Work Material		GR.1 碳鋼 Carbon Steel		GR.2 低合金鋼 Low-alloyed Steel (-24HRC)		GR.3 高合金鋼 Hi-alloyed Steel (-30HRC)		GR.4 硬化鋼 Hardened Steel (30-38HRC)		GR.5 硬化鋼 Hardened Steel (38-48HRC)		GR.9 鑄鐵 Cast Iron	
切削速度 Vc m/min		60~100		60~100		60~100		40~65		30~45		60~100	
型號 Code No.	刃徑 Dc	RPM 主軸速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸速度 (min-1)	Feed 進給速度 (mm/rev)	RPM 主軸速度 (min-1)	Feed 進給速度 (mm/rev)
D419FT-M3	2.5	10,200	0.06	10,200	0.06	10,200	0.06	5,100	0.06	5,100	0.05	10,200	0.06
D419FT-M4	3.3	7,720	0.08	7,720	0.08	7,720	0.08	3,860	0.08	3,860	0.07	7,720	0.08
D419FT-M5	4.2	6,060	0.1	6,060	0.1	6,060	0.1	3,030	0.1	3,030	0.09	6,060	0.1
D419FT-M6	5	5,000	0.12	5,000	0.12	5,000	0.12	3,000	0.12	3,000	0.12	5,000	0.12
D419FT-M8	6.8	3,700	0.15	3,700	0.15	3,700	0.15	2,250	0.15	2,250	0.15	3,700	0.15
D419FT-M10	8.5	3,050	0.160	3,050	0.160	3,050	0.160	1,825	0.16	1,825	0.16	3,050	0.160
D419FT-M12	10.2	2,550	0.18	2,550	0.18	2,550	0.18	1,600	0.18	1,600	0.18	2,550	0.18

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, tha Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振顫，請降低切削條件。



鉸刀
Reamers

Page	317	319	321	323	325	327
Apperance						
Code No	R300	R301	R302	R303	R308	R309
Carbide	MG Carbide	MG Carbide	MG Carbide	MG Carbide	MG Carbide	MG Carbide
Coating	Uncoated Blank	Uncoated Blank	Uncoated Blank	Uncoated Blank	Uncoated Blank	Uncoated Blank
Helix Angle	 0°	 7°	 7°	 7°	 7°	 7°
No.of Flutes	 Z	 Z	 Z	 Z	 Z	 Z

歐規
DIN

7leaders®
The Art of Cutting

329

R329

MG
Carbide

Uncoated
Blank

R300 超微粒鎢鋼機械鉸刀
Machine Reamers

Code No. R300-Dc

Dc H7	Lc mm	L mm	d mm	Z teeth	Blank R300
3	15	61	3	4	●
3.5	18	70	3.5	4	●
4	19	75	4	4	●
4.5	21	80	4.5	4	●
5	23	86	5	6	●
6	26	93	6	6	●
7	31	109	7	6	●
8	33	117	8	6	●
9	36	125	9	6	●
10	38	133	10	6	●
11	41	142	10	6	●
12	44	151	10	6	●
13	44	151	10	6	●
14	47	160	12.5	6	●
15	50	162	12.5	6	●
16	52	170	12.5	6	●
18	56	182	14.0	6	●
20	60	195	16.0	6	●

※ 3-9.5 Solid Carbide
※ 10.0-20.0 Carbide Tipped
※ 3-9.5 全鎢鋼
※ 10.0-20.0 鑲刃鎢鋼

Steel < 56HRC

P	H	M	K	N	S
●	●		●	○	

MG Carbide

Uncoated Blank

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-56HRC Hardened Steel	○
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminum	○
	GR11	銅 Copper	○
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Universal reamer cutting parameters 通用鉸刀切削參數

被削材 Work Material		GR1 碳鋼 Carbon Steel		GR2 低合金鋼 Unalloyed Steel (<250HB)		GR3 高合金鋼 Hi-alloyed Steel (<300HB)		GR4 硬化鋼 Hardened Steel (<45HRC)		GR5 硬化鋼 Hardened Steel (45~55HRC)		GR8 不鏽鋼 Stainless Steel		GR9 鑄鐵 Cast Iron		GR10 鋁 Aluminium		GR11 銅 Copper	
切削速度 Vc m/min		10~20		10~20		8~15		5~10		4~10		8~15		8~18		15~30		10~25	
型號 Order No.	刃徑 Dc	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)
R300-3	3	0.03~0.05	0.05~0.15	0.01~0.03	0.05~0.15	0.028~0.03	0.05~0.13	0.015~0.027	0.05~0.15	0.04~0.02	0.02~0.05	0.015~0.03	0.05~0.15	0.008~0.015	0.05~0.1	0.010~0.03	0.1~0.2	0.015~0.03	0.05~0.15
R300-4	4	0.025~0.045	0.1~0.2	0.03~0.045	0.1~0.2	0.025~0.045	0.1~0.2	0.02~0.04	0.1~0.2	0.015~0.03	0.03~0.08	0.025~0.045	0.1~0.2	0.025~0.045	0.05~0.1	0.03~0.045	0.1~0.2	0.025~0.045	0.1~0.2
R300-5	5	0.04~0.08	0.1~0.2	0.04~0.06	0.1~0.2	0.04~0.06	0.1~0.2	0.02~0.03	0.1~0.2	0.015~0.035	0.03~0.08	0.04~0.06	0.1~0.2	0.04~0.06	0.05~0.1	0.04~0.08	0.1~0.2	0.04~0.08	0.1~0.2
R300-6	6	0.05~0.09	0.1~0.2	0.05~0.09	0.1~0.2	0.05~0.08	0.1~0.2	0.04~0.08	0.1~0.2	0.03~0.05	0.03~0.08	0.05~0.09	0.1~0.2	0.05~0.08	0.05~0.1	0.05~0.09	0.1~0.2	0.05~0.09	0.1~0.2
R300-8	8	0.06~0.10	0.1~0.2	0.06~0.12	0.1~0.2	0.06~0.10	0.1~0.2	0.05~0.1	0.1~0.2	0.025~0.055	0.03~0.08	0.06~0.12	0.1~0.2	0.08~0.12	0.05~0.1	0.07~0.12	0.1~0.2	0.06~0.12	0.1~0.2
R300-10	10	0.07~0.12	0.1~0.2	0.07~0.11	0.1~0.2	0.06~0.12	0.1~0.2	0.06~0.12	0.1~0.2	0.025~0.06	0.03~0.08	0.08~0.12	0.1~0.2	0.07~0.13	0.05~0.1	0.08~0.17	0.1~0.2	0.07~0.13	0.1~0.2
R300-12	12	0.09~0.15	0.1~0.2	0.09~0.14	0.1~0.2	0.08~0.12	0.1~0.2	0.06~0.13	0.1~0.2	0.03~0.075	0.03~0.08	0.09~0.15	0.1~0.2	0.08~0.15	0.05~0.1	0.08~0.15	0.1~0.2	0.08~0.15	0.1~0.2
R300-14	14	0.09~0.16	0.1~0.2	0.1~0.15	0.1~0.2	0.08~0.15	0.1~0.2	0.07~0.15	0.1~0.2	0.04~0.075	0.03~0.08	0.09~0.15	0.1~0.2	0.1~0.15	0.05~0.1	0.09~0.2	0.1~0.2	0.09~0.15	0.1~0.2
R300-15	15	0.1~0.2	0.1~0.2	0.1~0.2	0.1~0.2	0.1~0.2	0.1~0.2	0.08~0.13	0.1~0.2	0.04~0.08	0.03~0.08	0.1~0.2	0.1~0.2	0.1~0.2	0.05~0.1	0.1~0.22	0.1~0.2	0.1~0.2	0.1~0.2
R300-18	18	0.12~0.18	0.1~0.2	0.12~0.2	0.1~0.2	0.11~0.20	0.1~0.2	0.1~0.18	0.1~0.2	0.04~0.09	0.03~0.08	0.11~0.21	0.1~0.2	0.12~0.2	0.05~0.1	0.12~0.27	0.1~0.2	0.11~0.21	0.1~0.2
R300-20	20	0.12~0.22	0.1~0.2	0.13~0.22	0.1~0.2	0.15~0.22	0.1~0.2	0.1~0.2	0.1~0.2	0.04~0.09	0.03~0.08	0.13~0.22	0.1~0.2	0.15~0.23	0.05~0.1	0.13~0.3	0.1~0.2	0.12~0.23	0.1~0.2

※ Please note that regarding to cutting speed of carbide tipped, please refer to this parameter. You should adjust feed and finishing allowance according to the pratical cutting situation.

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

※注意有刃式鉸刀切削速度可參照此參數表，進給速度和切削餘量請依實際切削狀況作調整。

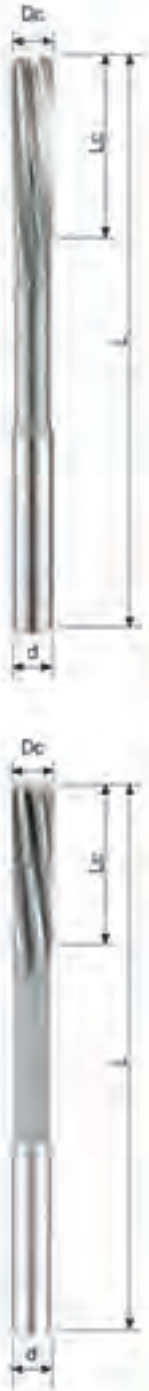
1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速應同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

R301 超微粒鎢鋼機械鉸刀
Machine Reamers

Code No. R301-Dc

Dc H7	Lc mm	L mm	d mm	Z teeth	Blank R301
3	15	61	3	4	●
3.5	18	70	3.5	4	●
4	19	75	4	4	●
4.5	21	80	4.5	4	●
5	23	86	5	6	●
5.5	26	93	5.5	6	●
6	26	93	6	6	●
6.5	28	101	6.5	6	●
7	31	109	7	6	●
7.5	31	109	7.5	6	●
8	33	117	8	6	●
8.5	33	117	8.5	6	●
9	36	125	9	6	●
9.5	36	125	9.5	6	●
10	38	133	10	6	●
10.5	38	133	10	6	●
11	41	142	10	6	●
11.5	41	142	10	6	●
12	44	151	10	6	●
12.5	44	151	10	6	●
13	44	151	10	6	●
13.5	47	160	12.5	6	●
14	47	160	12.5	6	●
14.5	50	162	12.5	6	●
15	50	162	12.5	6	●
15.5	52	170	12.5	6	●
16	52	170	12.5	6	●
17	54	175	14	6	●
18	56	182	14	6	●
19	58	189	16	6	●
20	60	195	16	6	●

※ 3-9.5 Solid Carbide
※ 10.0-20.0 Carbide Tipped
※ 3-9.5 全鎢鋼
※ 10.0-20.0 鑲刃鎢鋼



Steel < 56HRC

P	H	M	K	N	S
●	●		●	○	

MG Carbide

Uncoated Blank

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-56HRC Hardened Steel	○
	GR7	硬化鋼 56-66HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	○
	GR11	銅 Copper	○
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Universal reamer cutting parameters 通用鉸刀切削參數

被削材 Work Material		GR1 碳鋼 Carbon Steel		GR2		GR3		GR4		GR5		GR8		GR9 鑄鐵 Cast Iron		GR10 鋁 Aluminum		GR11 銅 Copper	
切削速度 Vc m/min		10~20		10~20		8~15		5~10		4~10		8~15		8~18		15~30		10~25	
號數	刃徑	Feed 進給速度 (mm/tooth)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)
R301-3	3																		
R301-4	4																		
R301-5	5																		
R301-6	6																		
R301-8	8																		
R301-10	10																		
R301-12	12																		
R301-14	14																		
R301-16	16																		
R301-18	18																		
R301-20	20																		

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

R302 超微粒鎢鋼長柄機械鉸刀
Machine Reamers Long Length

Code No. R302-Dc

Dc H7	Lc mm	L mm	d mm	Z teeth	Blank R302
3	15	100	3	4	●
3.5	18	112	3.5	4	●
4	19	119	4	4	●
4.5	21	126	4.5	4	●
5	23	132	5	6	●
6	26	139	6	6	●
7	31	156	7	6	●
8	33	165	8	6	●
9	36	175	9	6	●
10	38	184	10	6	●
11	41	195	10	6	●
12	44	205	10	6	●
13	44	205	10	6	●
14	47	214	12.5	6	●
15	50	220	12.5	6	●
16	52	227	12.5	6	●
17	54	235	14	6	●
18	56	241	14	6	●
19	58	247	16	6	●
20	60	254	16	6	●

※ 3-9.0 Solid Carbide
※ 10.0-20.0 Carbide Tipped

※ 3-9.0 全鎢鋼
※ 10.0-20.0 焊刃鎢鋼

Steel < 56HRC

P	H	M	K	N	S
●	●		●	○	

MG Carbide

Uncoated Blank

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-54HRC Hardened Steel	○
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminum	○
	GR11	銅 Copper	○
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

General center drill parameters 通用中心鑽參數

被削材 Work Material		GR1 碳鋼 Carbon Steel		GR2 低合金鋼 Low-alloyed Steel (<28HRC)		GR3 高合金鋼 High-alloyed Steel (<30HRC)		GR4 調質鋼 [illegible]		GR5 硬化鋼 Hardened Steel [illegible]		GR8 不鏽鋼 Stainless Steel		GR9 鑄鐵 Cast Iron		GR10 鋁 Aluminium		GR11 銅 Copper	
切削速度 Vc m/min		10~20		10~20		8~15		5~10		4~10		8~15		8~18		15~30		10~25	
型號	直徑 D	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)
R302-3	3	[illegible]	0.05~0.15	[illegible]	0.05~0.15	[illegible]	0.05~0.15	[illegible]	0.05~0.15	[illegible]	[illegible]	[illegible]	0.05~0.15	[illegible]	0.05~0.1	[illegible]	0.1~0.2	[illegible]	0.05~0.15
R302-4	4	[illegible]	0.1~0.2	[illegible]	0.1~0.2	[illegible]	0.1~0.2	[illegible]	0.1~0.2	[illegible]	[illegible]	[illegible]	0.1~0.2	[illegible]	0.05~0.1	[illegible]	0.1~0.2	[illegible]	0.1~0.2
R302-5	5	[illegible]	0.1~0.2	0.04~0.06	0.1~0.2	[illegible]	0.1~0.2	[illegible]	0.1~0.2	[illegible]	[illegible]	0.04~0.08	0.1~0.2	[illegible]	0.05~0.1	0.04~0.06	0.1~0.2	0.04~0.08	0.1~0.2
R302-6	6	0.06~0.09	0.1~0.2	0.05~0.09	0.1~0.2	0.05~0.08	0.1~0.2	0.04~0.08	0.1~0.2	[illegible]	[illegible]	0.05~0.08	0.1~0.2	0.05~0.1	0.05~0.1	[illegible]	0.1~0.2	0.06~0.08	0.1~0.2
R302-8	8	[illegible]	0.1~0.2	[illegible]	0.1~0.2	0.06~0.12	0.1~0.2	0.05~0.1	0.1~0.2	[illegible]	[illegible]	0.06~0.12	0.1~0.2	[illegible]	0.05~0.1	[illegible]	0.1~0.2	[illegible]	0.1~0.2
R302-10	10	0.07~0.13	0.1~0.2	0.07~0.13	0.1~0.2	[illegible]	0.1~0.2	[illegible]	0.1~0.2	[illegible]	[illegible]	[illegible]	0.1~0.2	[illegible]	0.05~0.1	[illegible]	0.1~0.2	[illegible]	0.1~0.2
R302-12	12	[illegible]	0.1~0.2	[illegible]	0.1~0.2	[illegible]	0.1~0.2	[illegible]	0.1~0.2	[illegible]	[illegible]	[illegible]	0.1~0.2	[illegible]	0.05~0.1	[illegible]	0.1~0.2	[illegible]	0.1~0.2
R302-14	14	[illegible]	0.1~0.2	[illegible]	0.1~0.2	[illegible]	0.1~0.2	[illegible]	0.1~0.2	[illegible]	[illegible]	[illegible]	0.1~0.2	[illegible]	0.05~0.1	[illegible]	0.1~0.2	[illegible]	0.1~0.2
R302-15	15	0.1~0.2	0.1~0.2	0.1~0.2	0.1~0.2	0.1~0.2	0.1~0.2	[illegible]	0.1~0.2	[illegible]	[illegible]	0.1~0.2	0.1~0.2	0.1~0.2	0.05~0.1	[illegible]	0.1~0.2	0.1~0.2	0.1~0.2
R302-16	16	[illegible]	0.1~0.2	[illegible]	0.1~0.2	[illegible]	0.1~0.2	[illegible]	0.1~0.2	[illegible]	[illegible]	[illegible]	0.1~0.2	[illegible]	0.05~0.1	[illegible]	0.1~0.2	[illegible]	0.1~0.2
R302-20	20	[illegible]	0.1~0.2	[illegible]	0.1~0.2	[illegible]	0.1~0.2	0.1~0.2	0.1~0.2	[illegible]	[illegible]	[illegible]	0.1~0.2	[illegible]	0.05~0.1	[illegible]	0.1~0.2	[illegible]	0.1~0.2

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度應按照轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

R303 超微粒鎢鋼斜柄機械鉸刀
Machine Reamers Carbide Tipped

Code No. R303-Dc

Dc H7	Lc mm	L mm	d h7	Z teeth	Blank R303
10	38	168	1	6	●
11	41	175	1	6	●
12	44	182	1	6	●
13	44	182	1	6	●
14	47	189	1	6	●
15	50	204	2	6	●
16	52	210	2	6	●
17	54	214	2	6	●
18	56	219	2	6	●
19	58	223	2	6	●
20	60	228	2	6	●
22	64	237	2	6	●
24	68	268	3	8	●
25	68	268	3	8	●
26	70	273	3	8	●
28	71	277	3	8	●
30	73	281	3	8	●
32	77	317	4	8	●
35	78	321	4	8	●
36	79	325	4	8	●
38	81	329	4	8	●
40	81	329	4	8	●

Steel < 56HRC

P	H	M	K	N	S
●	●		●	○	

MG Carbide

Uncoated Blank

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-54HRC Hardened Steel	○
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	○
	GR11	銅 Copper	○
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Universal reamer cutting parameters 通用鉸刀切削參數

被削材 Work Material		GR1 碳鋼 Carbon Steel		GR2 低合金鋼 Low-alloyed Steel (<25HRC)		GR3 高合金鋼 Hi-alloyed Steel (<30HRC)		GR4 硬化鋼 Hardened Steel (<35HRC)		GR5 硬化鋼 Hardened Steel (35~45HRC)		GR8 不銹鋼 Stainless Steel		GR9 鑄鐵 Cast Iron		GR10 鋁 Aluminum		GR11 銅 Copper	
切削速度 Vc m/min		10~20		10~20		8~15		5~10		4~10		8~15		8~18		15~30		10~25	
型號 Cat.No.	刃徑 D	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)
R303-10	10	0.07~0.13	0.1~0.2	0.07~0.15	0.1~0.2	0.06~0.13	0.1~0.2	0.05~0.15	0.1~0.2	0.035~0.06	0.03~0.08	0.06~0.12	0.1~0.2	0.07~0.13	0.05~0.1	0.08~0.15	0.1~0.2	0.07~0.15	0.1~0.2
R303-12	12	0.08~0.15	0.1~0.2	0.08~0.15	0.1~0.2	0.08~0.15	0.1~0.2	0.06~0.13	0.1~0.2	0.03~0.07	0.03~0.08	0.08~0.15	0.1~0.2	0.08~0.15	0.05~0.1	0.08~0.15	0.1~0.2	0.08~0.15	0.1~0.2
R303-14	14	0.09~0.16	0.1~0.2	0.1~0.18	0.1~0.2	0.08~0.16	0.1~0.2	0.07~0.13	0.1~0.2	0.04~0.07	0.03~0.08	0.09~0.15	0.1~0.2	0.1~0.15	0.05~0.1	0.08~0.2	0.1~0.2	0.08~0.15	0.1~0.2
R303-16	16	0.1~0.2	0.1~0.2	0.1~0.2	0.1~0.2	0.1~0.2	0.1~0.2	0.08~0.16	0.1~0.2	0.04~0.08	0.03~0.08	0.1~0.2	0.1~0.2	0.1~0.2	0.05~0.1	0.1~0.22	0.1~0.2	0.1~0.2	0.1~0.2
R303-18	18	0.12~0.18	0.1~0.2	0.12~0.2	0.1~0.2	0.11~0.21	0.1~0.2	0.1~0.18	0.1~0.2	0.04~0.08	0.03~0.08	0.11~0.21	0.1~0.2	0.12~0.2	0.05~0.1	0.12~0.27	0.1~0.2	0.1~0.21	0.1~0.2
R303-20	20	0.12~0.22	0.1~0.2	0.12~0.22	0.1~0.2	0.12~0.22	0.1~0.2	0.1~0.2	0.1~0.2	0.04~0.08	0.03~0.08	0.12~0.22	0.1~0.2	0.12~0.25	0.05~0.1	0.13~0.3	0.1~0.2	0.12~0.25	0.1~0.2
R303-22	22	0.12~0.22	0.1~0.2	0.12~0.22	0.1~0.2	0.12~0.22	0.1~0.2	0.1~0.2	0.1~0.2	0.04~0.08	0.03~0.08	0.12~0.22	0.1~0.2	0.12~0.25	0.05~0.1	0.13~0.3	0.1~0.2	0.12~0.25	0.1~0.2
R303-24	24	0.12~0.22	0.1~0.2	0.12~0.22	0.1~0.2	0.12~0.22	0.1~0.2	0.1~0.2	0.1~0.2	0.04~0.08	0.03~0.08	0.12~0.22	0.1~0.2	0.12~0.25	0.05~0.1	0.13~0.3	0.1~0.2	0.12~0.25	0.1~0.2
R303-26	26	0.12~0.22	0.1~0.2	0.12~0.22	0.1~0.2	0.12~0.22	0.1~0.2	0.1~0.22	0.1~0.2	0.04~0.08	0.03~0.08	0.12~0.22	0.1~0.2	0.12~0.25	0.05~0.1	0.13~0.3	0.1~0.2	0.12~0.25	0.1~0.2
R303-28	28	0.12~0.22	0.1~0.2	0.12~0.22	0.1~0.2	0.12~0.22	0.1~0.2	0.1~0.2	0.1~0.2	0.04~0.08	0.03~0.08	0.12~0.22	0.1~0.2	0.12~0.25	0.05~0.1	0.13~0.3	0.1~0.2	0.12~0.25	0.1~0.2
R303-30	30	0.12~0.22	0.1~0.2	0.12~0.22	0.1~0.2	0.12~0.22	0.1~0.2	0.1~0.2	0.1~0.2	0.04~0.08	0.03~0.08	0.12~0.22	0.1~0.2	0.12~0.25	0.05~0.1	0.13~0.3	0.1~0.2	0.12~0.25	0.1~0.2
R303-32	32	0.12~0.22	0.1~0.2	0.12~0.22	0.1~0.2	0.12~0.22	0.1~0.2	0.1~0.2	0.1~0.2	0.04~0.08	0.03~0.08	0.12~0.22	0.1~0.2	0.12~0.25	0.05~0.1	0.13~0.3	0.1~0.2	0.12~0.25	0.1~0.2
R303-35	35	0.12~0.22	0.1~0.2	0.12~0.22	0.1~0.2	0.12~0.22	0.1~0.2	0.1~0.2	0.1~0.2	0.04~0.08	0.03~0.08	0.12~0.22	0.1~0.2	0.12~0.25	0.05~0.1	0.13~0.3	0.1~0.2	0.12~0.25	0.1~0.2
R303-36	36	0.15~0.25	0.1~0.2	0.15~0.25	0.1~0.2	0.15~0.25	0.1~0.2	0.1~0.2	0.1~0.2	0.04~0.08	0.03~0.08	0.12~0.22	0.1~0.2	0.12~0.25	0.05~0.1	0.13~0.3	0.1~0.2	0.12~0.25	0.1~0.2
R303-38	38	0.15~0.25	0.1~0.2	0.15~0.25	0.1~0.2	0.15~0.25	0.1~0.2	0.1~0.2	0.1~0.2	0.04~0.08	0.03~0.08	0.12~0.22	0.1~0.2	0.12~0.25	0.05~0.1	0.13~0.3	0.1~0.2	0.12~0.25	0.1~0.2
R303-40	40	0.15~0.25	0.1~0.2	0.15~0.25	0.1~0.2	0.15~0.25	0.1~0.2	0.1~0.2	0.1~0.2	0.04~0.08	0.03~0.08	0.12~0.22	0.1~0.2	0.12~0.25	0.05~0.1	0.13~0.3	0.1~0.2	0.12~0.25	0.1~0.2

※ Please note that regarding to cutting speed of carbide tipped, please refer to this parameter. You should adjust feed and finishing allowance according to the pratical cutting situation.

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

※注意焊刃式鉸刀切削速度可參照此參數表，進給速度和切削餘量請依實際切削狀況作調整。

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

R308 超微粒鎢鋼機械鉸刀,每0.1mm一尺寸
Machine Reamers In Steps of 0.1mm

Code No. R308-Dc

Dc H7	Lc mm	L mm	Z teeth	Blank R308
1	6	34	4	●
1.1	7	36	4	●
1.2	7	38	4	●
1.3	7	38	4	●
1.4	8	40	4	●
1.5	8	40	4	●
1.6	9	43	4	●
1.7	9	43	4	●
1.8	10	46	4	●
1.9	10	46	4	●
2	11	49	4	●
2.1	11	49	4	●
2.2	12	53	4	●
2.3	12	53	4	●
2.4	14	57	4	●
2.5	14	57	4	●
2.6	14	57	4	●
2.7	15	61	4	●
2.8	15	61	4	●
2.9	15	61	4	●
3	15	61	4	●
3.1	16	65	4	●
3.2	16	65	4	●
3.3	16	65	4	●
3.4	18	70	4	●
3.5	18	70	4	●
3.6	18	70	4	●
3.7	18	70	4	●
3.8	19	75	4	●
3.9	19	75	4	●
4	19	75	4	●
4.1	19	75	4	●
4.2	19	75	4	●
4.3	21	80	4	●
4.4	21	80	4	●
4.5	21	80	4	●
4.6	21	80	6	●
4.7	21	80	6	●
4.8	23	86	6	●
4.9	23	86	6	●
5	23	86	6	●
5.1	23	86	6	●
5.2	23	86	6	●
5.3	23	86	6	●
5.4	26	93	6	●
5.5	26	93	6	●
5.6	26	93	6	●
5.7	26	93	6	●
5.8	26	93	6	●
5.9	26	93	6	●
6	26	93	6	●
6.1	28	101	6	●
6.2	28	101	6	●
6.3	28	101	6	●
6.4	28	101	6	●
6.5	28	101	6	●
6.6	28	101	6	●
6.7	31	101	6	●
6.8	31	109	6	●
6.9	31	109	6	●
7	31	109	6	●
7.1	31	109	6	●
7.2	31	109	6	●
7.3	31	109	6	●
7.4	31	109	6	●
7.5	31	109	6	●
7.6	33	117	6	●
7.7	33	117	6	●
7.8	33	117	6	●
7.9	33	117	6	●
8	33	117	6	●
8.1	33	117	6	●
8.2	33	117	6	●
8.3	33	117	6	●
8.4	33	117	6	●
8.5	33	117	6	●
8.6	36	125	6	●
8.7	36	125	6	●
8.8	36	125	6	●
8.9	36	125	6	●
9	36	125	6	●
9.1	36	125	6	●
9.2	36	125	6	●
9.3	36	125	6	●
9.4	36	125	6	●
9.5	36	125	6	●
9.6	38	133	6	●
9.7	38	133	6	●
9.8	38	133	6	●
9.9	38	133	6	●
10	38	133	6	●
10.1	38	133	6	●
10.2	38	133	6	●
10.3	38	133	6	●
10.4	38	133	6	●
10.5	38	133	6	●
10.6	38	133	6	●
10.7	41	142	6	●
10.8	41	142	6	●
10.9	41	142	6	●
11	41	142	6	●
11.1	41	142	6	●
11.2	41	142	6	●
11.3	41	142	6	●
11.4	41	142	6	●
11.5	41	142	6	●
11.6	41	142	6	●
11.7	41	142	6	●
11.8	41	142	6	●
11.9	44	151	6	●
12	44	151	6	●

≥ Dc-d

Steel < 56HRC

P	H	M	K	N	S
●	●		●	○	

MG Carbide

Uncoated Blank

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-54HRC Hardened Steel	○
	GR7	硬化鋼 56-68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminum	○
	GR11	銅 Copper	○
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

General center drill parameters 通用中心鑽參數

被削材 Work Material		GR1 碳鋼 Carbon Steel		GR3 [illegible]		GR5 高合金鋼 [illegible]		GRA [illegible]		GR5 [illegible]		GR8 [illegible]		GR9 鑄鐵 Cast Iron		GR10 鋁 Aluminum		GR11 銅 Copper	
切削速率 Vc m/min		10~20		10~20		8~15		5~10		4~10		8~15		8~18		15~30		10~25	
型號 Code No.	刃徑 Dc	Feed 進給速度 (mm/tooth)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)
R308-1	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R308-1.5	1.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R308-2	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R308-2.5	2.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R308-3	3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R308-3.5	3.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R308-4	4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R308-4.5	4.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R308-5	5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R308-5.5	5.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R308-6	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R308-6.5	6.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R308-7	7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R308-7.5	7.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R308-8	8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R308-8.5	8.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R308-9	9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R308-10	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R308-11	11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R308-12	12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整
4. 如果機台轉速低於表中所列數值，則進給速度與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

Code No. R309-Dc

Dc +0.003 -0	Lc mm	L mm	d h6	Z teeth	Blank R309
2.95	15	61	3	4	●
2.96	15	61	3	4	●
2.97	15	61	3	4	●
2.98	15	61	3	4	●
2.99	15	61	3	4	●
3	15	61	3	4	●
3.01	15	61	3	4	●
3.02	15	61	3	4	●
3.03	15	61	3	4	●
3.04	15	61	3	4	●
3.05	15	61	3	4	●
3.95	19	75	4	4	●
3.96	19	75	4	4	●
3.97	19	75	4	4	●
3.98	19	75	4	4	●
3.99	19	75	4	4	●
4	19	75	4	4	●
4.01	19	75	4	4	●
4.02	19	75	4	4	●
4.03	19	75	4	4	●
4.04	19	75	4	4	●
4.05	19	75	4	4	●
4.95	23	86	5	6	●
4.96	23	86	5	6	●
4.97	23	86	5	6	●
4.98	23	86	5	6	●
4.99	23	86	5	6	●
5	23	86	5	6	●
5.01	23	86	5	6	●
5.02	23	86	5	6	●
5.03	23	86	5	6	●
5.04	23	86	5	6	●
5.05	23	86	5	6	●
5.95	26	93	6	6	●
5.96	26	93	6	6	●
5.97	26	93	6	6	●
5.98	26	93	6	6	●
5.99	26	93	6	6	●
6	26	93	6	6	●
6.01	26	93	6	6	●
6.02	26	93	6	6	●
6.03	26	93	6	6	●
6.04	26	93	6	6	●
6.05	26	93	6	6	●
6.95	31	109	7	6	●
6.96	31	109	7	6	●
6.97	31	109	7	6	●
6.98	31	109	7	6	●
6.99	31	109	7	6	●
7	31	109	7	6	●
7.01	31	109	7	6	●
7.02	31	109	7	6	●
7.03	31	109	7	6	●
7.04	31	109	7	6	●
7.05	31	109	7	6	●
7.95	33	117	8	6	●
7.96	33	117	8	6	●
7.97	33	117	8	6	●
7.98	33	117	8	6	●
7.99	33	117	8	6	●

Dc +0.003 -0	Lc mm	L mm	d h6	Z teeth	Blank R309
8	33	117	8	6	●
8.01	33	117	8	6	●
8.02	33	117	8	6	●
8.03	33	117	8	6	●
8.04	33	117	8	6	●
8.05	33	117	8	6	●
8.95	36	125	9	6	●
8.96	36	125	9	6	●
8.97	36	125	9	6	●
8.98	36	125	9	6	●
8.99	36	125	9	6	●
9	36	125	9	6	●
9.01	36	125	9	6	●
9.02	36	125	9	6	●
9.03	36	125	9	6	●
9.04	36	125	9	6	●
9.05	36	125	9	6	●
9.95	38	133	10	6	●
9.96	38	133	10	6	●
9.97	38	133	10	6	●
9.98	38	133	10	6	●
9.99	38	133	10	6	●
10	38	133	10	6	●
10.01	38	133	10	6	●
10.02	38	133	10	6	●
10.03	38	133	10	6	●
10.04	38	133	10	6	●
10.05	38	133	10	6	●
11.95	44	151	12	6	●
11.96	44	151	12	6	●
11.97	44	151	12	6	●
11.98	44	151	12	6	●
11.99	44	151	12	6	●
12	44	151	12	6	●
12.01	44	151	12	6	●
12.02	44	151	12	6	●
12.03	44	151	12	6	●
12.04	44	151	12	6	●
12.05	44	151	12	6	●

Steel < 56HRC

P	H	M	K	N	S
●	●		●	○	

MG Carbide

Uncoated Blank

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30-38HRC Hardened Steel	●
	GR5	硬化鋼 38-48HRC Hardened Steel	●
	GR6	硬化鋼 48-54HRC Hardened Steel	○
	GR7	硬化鋼 56-58HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminum	○
	GR11	銅 Copper	○
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	
	GR16	鎳 Nickel	
	GR17	耐熱鋼 Heat-resistant Steel	

Universal reamer cutting parameters 通用鉸刀切削參數

被削材 Work Material		GR1 碳鋼 Carbon Steel		GR2 低合金鋼 Low-alloyed Steel (~24HRC)		GR3 高合金鋼 High-alloyed Steel (~30HRC)		GR4 硬化鋼 Hardened Steel ([illegible])		GR5 硬化鋼 Hardened Steel ([illegible])		GR8 不鏽鋼 Stainless Steel		GR9 鑄鐵 Cast Iron		GR10 鋁 Aluminium		GR11 銅 Copper	
切削速度 Vc m/min		10~20		10~20		8~15		5~10		4~10		8~15		8~18		15~30		10~25	
型番 Code No.	刃徑 Dc	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給速度 (mm/rev)	Finishing allowance 切削餘量 (mm)
R309-3	3	0.02~0.03	0.05~0.15	0.018~0.03	0.05~0.15	0.018~0.03	0.05~0.15	0.015~0.02	0.05~0.15	0.01~0.02	0.03~0.08	0.018~0.03	0.05~0.15	0.03~0.045	0.05~0.1	0.018~0.03	0.1~0.2	0.018~0.03	0.05~0.15
R309-4	4	0.03~0.045	0.1~0.2	0.03~0.045	0.1~0.2	0.03~0.045	0.1~0.2	0.02~0.04	0.1~0.2	0.01~0.03	0.03~0.08	0.03~0.045	0.1~0.2	0.03~0.045	0.05~0.1	0.03~0.045	0.1~0.2	0.03~0.045	0.1~0.2
R309-5	5	0.04~0.08	0.1~0.2	0.04~0.08	0.1~0.2	0.04~0.08	0.1~0.2	[illegible]	0.1~0.2	[illegible]	0.03~0.08	0.04~0.08	0.1~0.2	0.04~0.08	0.05~0.1	0.04~0.06	0.1~0.2	0.04~0.08	0.1~0.2
R309-6	6	0.05~0.1	0.1~0.2	0.05~0.1	0.1~0.2	0.05~0.08	0.1~0.2	0.04~0.08	0.1~0.2	0.02~0.04	0.03~0.08	0.05~0.08	0.1~0.2	0.05~0.08	0.05~0.1	0.05~0.08	0.1~0.2	0.05~0.08	0.1~0.2
R309-7	7	0.05~0.1	0.1~0.2	0.05~0.1	0.1~0.2	0.05~0.08	0.1~0.2	0.04~0.08	0.1~0.2	0.03~0.05	0.03~0.08	0.05~0.08	0.1~0.2	0.05~0.08	0.05~0.1	0.05~0.08	0.1~0.2	0.05~0.08	0.1~0.2
R309-8	8	0.08~0.15	0.1~0.2	0.08~0.13	0.1~0.2	0.08~0.12	0.1~0.2	0.05~0.1	0.1~0.2	0.025~0.035	0.03~0.08	0.08~0.12	0.1~0.2	0.08~0.12	0.05~0.1	0.07~0.12	0.1~0.2	0.08~0.12	0.1~0.2
R309-9	9	0.08~0.15	0.1~0.2	0.08~0.13	0.1~0.2	0.08~0.12	0.1~0.2	0.05~0.1	0.1~0.2	0.025~0.035	0.03~0.08	0.08~0.12	0.1~0.2	0.08~0.12	0.05~0.1	0.07~0.12	0.1~0.2	0.08~0.12	0.1~0.2
R309-10	10	0.07~0.13	0.1~0.2	0.07~0.13	0.1~0.2	0.06~0.12	0.1~0.2	0.05~0.11	0.1~0.2	0.025~0.035	0.03~0.08	0.08~0.12	0.1~0.2	0.07~0.13	0.05~0.1	0.09~0.17	0.1~0.2	0.07~0.13	0.1~0.2
R309-11	11	0.07~0.13	0.1~0.2	0.07~0.13	0.1~0.2	0.06~0.12	0.1~0.2	0.05~0.12	0.1~0.2	0.025~0.035	0.03~0.08	0.08~0.12	0.1~0.2	0.07~0.13	0.05~0.1	0.09~0.17	0.1~0.2	0.07~0.13	0.1~0.2
R309-12	12	0.08~0.15	0.1~0.2	0.08~0.15	0.1~0.2	0.08~0.15	0.1~0.2	0.06~0.11	0.1~0.2	0.03~0.075	0.03~0.08	0.08~0.13	0.1~0.2	0.08~0.15	0.05~0.1	0.10~0.18	0.1~0.2	0.08~0.15	0.1~0.2

※ Please note that regarding to cutting speed of carbide tipped, please refer to this parameter. You should adjust feed and finishing allowance according to the pratical cutting situation.

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate [fz] and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

※注意焊刃式鉸刀切削速度可參照此參數表，進給速度和切削餘量請依實際切削狀況作調整。

1. 請使用剛性好、精度高的設備和夾具。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的參考值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

R329 超微粒鎢鋼右螺旋NC機械鉸刀(附底刃)

NC Machine Reamers Right Hand Helix (End Cutting)

Code No. R329-Dc

Dc +0.005 -0	Lc mm	L mm	d h6	Z teeth	Blank R329
2.95	15	61	3	4	●
2.96	15	61	3	4	●
2.97	15	61	3	4	●
2.98	15	61	3	4	●
2.99	15	61	3	4	●
3	15	61	3	4	●
3.01	15	61	3	4	●
3.02	15	61	3	4	●
3.03	15	61	3	4	●
3.04	15	61	3	4	●
3.05	15	61	3	4	●
3.95	19	75	4	4	●
3.96	19	75	4	4	●
3.97	19	75	4	4	●
3.98	19	75	4	4	●
3.99	19	75	4	4	●
4	19	75	4	4	●
4.01	19	75	4	4	●
4.02	19	75	4	4	●
4.03	19	75	4	4	●
4.04	19	75	4	4	●
4.05	19	75	4	4	●
4.95	23	86	5	4	●
4.96	23	86	5	4	●
4.97	23	86	5	4	●
4.98	23	86	5	4	●
4.99	23	86	5	4	●
5	23	86	5	4	●
5.01	23	86	5	4	●
5.02	23	86	5	4	●
5.03	23	86	5	4	●
5.04	23	86	5	4	●
5.05	23	86	5	4	●
5.95	26	93	6	4	●
5.96	26	93	6	4	●
5.97	26	93	6	4	●
5.98	26	93	6	4	●
5.99	26	93	6	4	●
6	26	93	6	4	●
6.01	26	93	6	4	●
6.02	26	93	6	4	●
6.03	26	93	6	4	●
6.04	26	93	6	4	●
6.05	26	93	6	4	●
6.95	31	109	8	4	●
6.96	31	109	7	4	●
6.97	31	109	7	4	●
6.98	31	109	7	4	●
6.99	31	109	7	4	●
7	31	109	7	4	●
7.01	31	109	7	4	●
7.02	31	109	7	4	●
7.03	31	109	7	4	●
7.04	31	109	7	4	●
7.05	31	109	7	4	●
7.95	33	117	7	4	●
7.96	33	117	8	4	●
7.97	33	117	8	4	●
7.98	33	117	8	4	●
7.99	33	117	8	4	●

Dc +0.005 -0	Lc mm	L mm	d h6	Z teeth	Blank R329
8	33	117	8	4	●
8.01	33	117	8	4	●
8.02	33	117	8	4	●
8.03	33	117	8	4	●
8.04	33	117	8	4	●
8.05	33	117	8	4	●
8.95	36	125	9	4	●
8.96	36	125	9	4	●
8.97	36	125	9	4	●
8.98	36	125	9	4	●
8.99	36	125	9	4	●
9	36	125	9	4	●
9.01	36	125	9	4	●
9.02	36	125	9	4	●
9.03	36	125	9	4	●
9.04	36	125	9	4	●
9.05	36	125	9	4	●
9.95	38	133	10	4	●
9.96	38	133	10	4	●
9.97	38	133	10	4	●
9.98	38	133	10	4	●
9.99	38	133	10	4	●
10	38	133	10	4	●
10.01	38	133	10	4	●
10.02	38	133	10	4	●
10.03	38	133	10	4	●
10.04	38	133	10	4	●
10.05	38	133	10	4	●
11.95	44	151	12	4	●
11.96	44	151	12	4	●
11.97	44	151	12	4	●
11.98	44	151	12	4	●
11.99	44	151	12	4	●
12	44	151	12	4	●
12.01	44	151	12	4	●
12.02	44	151	12	4	●
12.03	44	151	12	4	●
12.04	44	151	12	4	●
12.05	44	151	12	4	●

※ The Reamers with internal coolant for stop holes The bottom can be perfectly processed.

※ 盲孔用附內冷可加工底部通到精確面。

Steel < 56HRC

P	H	M	K	N	S
●	●	●	●	○	○

MG Carbide

Uncoated Blank

Work Material

P	GR1	碳鋼 Carbon Steel	●
	GR2	低合金鋼鋼<24HRC Low-alloyed Steel	●
	GR3	高合金鋼鋼<30HRC Hi-alloyed Steel	●
H	GR4	硬化鋼 30~38HRC Hardened Steel	●
	GR5	硬化鋼 38~48HRC Hardened Steel	●
	GR6	硬化鋼 48~54HRC Hardened Steel	○
	GR7	硬化鋼 54~68HRC Hardened Steel	
M	GR8	不銹鋼 Stainless Steel	●
K	GR9	鑄鐵 Cast Iron	●
N	GR10	鋁 Aluminium	○
	GR11	銅 Copper	○
	GR12	塑膠 Plastics	
	GR13	複合材料 FRP CFRP Composite Material	
	GR14	石墨 Graphite	
S	GR15	鈦合金 Titanium	○
	GR16	鎳 Nickel	○
	GR17	耐熱鋼 Heat-resistant Steel	○

Universal reamer cutting parameters 通用鉸刀切削參數

被削材 Work Material		GR1 碳鋼 Carbon Steel		GR2 低合金鋼 Low-alloyed Steel (<28HRC)		GR3 高合金鋼 Hi-alloyed Steel (<38HRC)		GR4 硬化鋼 Hardened Steel ([illegible])		GR5 硬化鋼 Hardened Steel ([illegible])		GR8 不鏽鋼 Stainless Steel		GR9 鑄鐵 Cast Iron		GR10 鋁 Aluminium		GR11 銅 Copper	
切削速度 Vc m/min		10~20		10~20		8~15		5~10		4~10		8~15		8~18		15~30		10~25	
型號 Code No.	刃徑 Dc	Feed 進給量 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給量 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給量 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給量 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給量 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給量 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給量 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給量 (mm/rev)	Finishing allowance 切削餘量 (mm)	Feed 進給量 (mm/rev)	Finishing allowance 切削餘量 (mm)
R329-3	3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R329-4	4	0.025~0.045	0.1~0.2	[illegible]	0.1~0.2	[illegible]	0.1~0.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.1~0.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R329-5	5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R329-6	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R329-7	7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R329-8	8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R329-9	9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R329-10	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R329-11	11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R329-12	12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

1. Please work with good rigidity / high precision facilities and collet chuck.
2. Please choose proper cutting fluid.
3. The cutting data is reference value only. Please adjust it according to your real working conditions.
4. If RPM is lower the reference value, the Feed rate (fz) and RPM should be reduced by the same proportion.
5. If vibration occurs during cutting, please reduce cutting parameter.

1. 請使用剛性好、精度高的設備和夾頭。
2. 請選擇適用於工件材料的切削液。
3. 此切削條件表中的數值為切削條件的基準值，實際加工時，請考慮加工形狀、目的、使用機台等因素，對切削條件進行調整。
4. 如果機台轉速低於表中所列數值，則進給速度應與轉速按同一比例降低。
5. 切削加工時如果發生振動，請降低切削條件。

Interchangeable Multi-purpose End Mill Cutter
交換式多功能立銑刀頭

1. Double-contact surface (taper and face)
2. Solid carbide cutter head and body shank
3. High accuracy, rigidity and efficiency in cutting
4. High economy value with various interchangeable cutter heads
5. Trapezoidal-designed thread reduces thread chipping
6. Runout within 5μm

1. 雙面拘束(斜度+平面)
2. 全碳化鎢鋼刀柄刀頭
3. 高精度、高剛性、高效率的切削加工
4. 經濟效益大，多種刀頭可替換
5. 螺紋採用梯形設計，不易崩牙
6. 同心度5μm以內

D×L×dl (Ll×Dl)	Code No.
10×70×2.0 (15×9.7)	EMH10U1007015
10×90×2.0 (30×9.7)	EMH10U1009030
10×110×2.0	EMH10S1011000
12×80×2.5 (18×11.7)	EMH12U1208018
12×100×2.5 (36×11.7)	EMH12U1210036
12×120×2.5	EMH12S1212000
16×90×3.5 (24×15.5)	EMH16U1609024
16×120×3.5 (48×15.5)	EMH16U1612048
16×150×3.5	EMH16S1615000
20×100×5.0 (30×19.5)	EMH20U2010030
20×130×5.0 (60×19.5)	EMH20U2013060
20×180×5.0	EMH20S2018000
25×110×5.0 (38×24.5)	EMH25U2511038
25×160×5.0 (75×24.5)	EMH25U2516075
25×210×5.0	EMH25S2521000

※dl: coolant hole

E140HX 超微粒鎢鋼塗層多用途立銑刀
Multipurpose End Mills

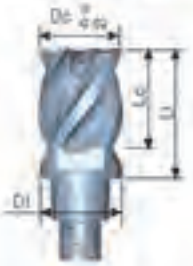
MG Carbide | AlTiCrN HX | 41° | 4 | 75° | 90°

E140HX-Cutter

Code No.	Dc 0 -0.02	Lc mm	Ll mm	dl mm	AlTiCrN HX
EMH10-SM10	10	11	16	9.7	●
EMH12-SM12	12	13	19	11.7	●
EMH14-SM14	14	15	22	11.7	○
EMH16-SM16	16	17	25	15.5	●
EMH18-SM18	18	19	28	15.5	○
EMH20-SM20	20	21	31	19.5	●
EMH25-SM25	25	26	39	24.5	●

Steel < 48HRC

P	H	M	K	N	S
●	●	●	●	○	○



E143HX 超微粒鎢鋼強力鋁用立銑刀
End Mills For Aluminum

MG Carbide | AlTiCrN HX | 40° | 3 | 75° | 90°

E143HX-Cutter

Code No.	Dc 0 -0.02	Lc mm	Ll mm	dl mm	Blank
EMH10-SA10	10	11	16	9.7	●
EMH12-SA12	12	13	19	11.7	●
EMH14-SA14	14	15	22	11.7	○
EMH16-SA16	16	17	25	15.5	●
EMH18-SA18	18	19	28	15.5	○
EMH20-SA20	20	21	31	19.5	●
EMH25-SA25	25	26	39	24.5	●

Aluminium

P	H	M	K	N	S
				●	

B263TX 極超微粒鎢鋼塗層圓頭立銑刀
Ball Nose End Mills

SMG Carbide | AlTiSiN TX | 30° | 2 | 75° | U

B263TX-Cutter

Code No.	Dc 0 -0.02	R ±0.01	Lc mm	Ll mm	dl mm	AlTiSiN TX
EMH10-BE10	10	5	11	16	9.7	●
EMH12-BE12	12	6	13	19	11.7	●
EMH16-BE16	16	8	17	25	15.5	●
EMH20-BE20	20	10	21	31	19.5	●
EMH25-BE25	25	12.5	26	39	24.5	●

Steel < 62HRC

P	H	M	K	N	S
●	●		○		

B254TX 極超微粒鎢鋼塗層4刃圓頭立銑刀
Ball Nose End Mills - 4 Flutes

SMG Carbide | AlTiSiN TX | 45° | 4 | 75° | U

B254TX-Cutter

Code No.	Dc 0 -0.02	R ±0.01	Lc mm	Ll mm	dl mm	AlTiSiN TX
EMH10-BH10	10	5	11	16	9.7	●
EMH12-BH12	12	6	13	19	11.7	●
EMH16-BH16	16	8	17	25	15.5	●
EMH20-BH20	20	10	21	31	19.5	●
EMH25-BH25	25	12.5	26	39	24.5	●

Hardened Steel 40-70HRC

P	H	M	K	N	S
	●		○		○

Work Material

P	GR1	碳鋼 Carbon Steel
	GR2	低合金鋼鐵<24HRC Low-alloyed Steel
	GR3	高合金鋼鐵<30HRC Hi-alloyed Steel
H	GR4	硬化鋼 30-38HRC Hardened Steel
	GR5	硬化鋼 39-48HRC Hardened Steel
	GR6	硬化鋼 49-58HRC Hardened Steel
	GR7	硬化鋼 59-68HRC Hardened Steel
M	GR8	不銹鋼 Stainless Steel
K	GR9	鑄鐵 Cast Iron
N	GR10	鋁 Aluminium
	GR11	銅 Copper
	GR12	塑膠 Plastics
	GR13	複合材料 FRP CFRP Composite Material
	GR14	石墨 Graphite
S	GR15	鈦合金 Titanium
	GR16	鎳 Nickel
	GR17	耐熱鋼 Heat-resistant Steel

Technical Data - Materials 技術性資料 – 材料

	Materials Groups		N/mm2	HB	JIS	DIN
P	GR.1	非合金鋼鐵 Non-alloyed Steel	≤700	≤210	SS330 SS400 SS490 S10C S15C S20C S25C S30C S35C S40C S45C S50C S55C S58C SUM22 SUM22L SUM24 SUM25 SK3 SUP4	RST37-1 St37-3 St37-2 9SMn28 9SMnPb28 9SMnPb36 Ck15 Ck25 Ck30 Ck45 Cf53C10 C15 C20 C22C35 C45 C55 C60 Ck55 Ck60 C105W1 C105W1
P	GR.2	低合金鋼鐵<24HRC Low-alloyed Steel	700-1000	210-300	SCR415 SCR420 SCR430 SCR440 SCR445 SCM420 SCM445 SCM430 SCM440 SK1 SK2 SK3 SK5 SK6 SK7	St 44-2 St 52-3 100Cr6 31NiCrMo12 40NiCrMo22 17CrNiMo6 15Cr3 42Cr13 55Cr3 16CrMn5 36NiCr6 14NiCr10 34Cr4 41Cr4 16MnCr5 25CrMo4 34CrMo4 41CrMo4 42CrMo4 32CrMo12 50CrV4 41CrAlMo7 100Cr6 105WCr6
P	GR.3	高合金鋼鐵<30HRC Hi-alloyed Steel	>1000	>300	SKD1 SKD2 SKD3 SKD4 SKD11 SKD12 SKD61 P20 P21 P30 SUP3 SUP4 SUP6 SUP3 SUP6 SUP7 SUP9 SUP10 SKH2 SKH3 SKH52 SKH55	X210Cr12 X40CrMoV5 1 X100CrMoV5 1 X210CrW12 45WCrV7 X30WCrV9 3 X30WCrV9 3KU X165CrMoV12 X45CrSi93 S6-5-2 S6/5/2 S6/5/2/5 S2/9/2 X210Cr12 G
H	GR.4	硬化鋼 30-38HRC Hardened Steel				
H	GR.5	硬化鋼 38-48HRC Hardened Steel				
H	GR.6	硬化鋼 48-56HRC Hardened Steel				
H	GR.7	硬化鋼 56-68HRC Hardened Steel				
M	GR.8	不銹鋼 Stainless Steel	500-950	250-320	SUS301 SUS302 SUS303 SUS304 SUS316 SUS321 SUS410 SUS416 SUS420 SUS420J2 SUS430 SUS431 SUS440	X12CrNi17-7 X12CrNi18-8 X10CrNiS18-9 X5CrNi18-10 X5CrMo17-12-2 X6CrNiTi18-10 X10Cr13 X12CrS13 X30Cr13 X12CrMoS17 X20CrNi17-2 X65CrMo14
K	GR.9	鑄鐵 Cast Iron		180-280	FC100 FC150 FC200 FC250 FC300 FC350 FCD400 FCD500 FCD600 FCD700 FCMB310 FCMW330 FCMW370 FCMP490 FCMP540 FCMP590 FCMP690	GG10 GG15 GG20 GG25 GG30 GG35 GGG40 GGG50 GGG60 GGG70 GTS-35 GTS-45 GTS-55 GTS-65 GTS65-02 GTS-70-02
N	GR.10	鋁 Aluminium		Si<10%	A1050 A1080 A2014 A3003 A5052 A6061 A7075 MP1	Al99 ,5 Al99,8 AlMnCu AlCuSiMn AlMgSiCu AlZnMgCu4,5 MgAl3Zn G-AlSi5Mg
N	GR.10	鋁 Aluminium		Si10%>	A1050 A1080 A2014 A3003 A5052 A6061 A7075 MP1	GD-AlSi12 GD-AlSi10Mg G-AlSi10Mg AlSi17Cu4 AlSi21CuNiMg AlSi25CuNiMg
N	GR.11	銅 Copper		<250	C1220P C3710P C2400P C5210P C3602BE C3601BE C3604BE C3771BE C4622BE C4430P C6711P BC3 BC6	CuZn36Pb3 CuZn39Pb2 CuZn39Pb3 CuZn40Pb2 CuZn28Sn1 CuZn38Sn1 CuZn15 CuZn36 CuZn40 2CuZn10Zn2 CuAl5 CuAl5Fe3 CuAl10Ni5Fe4 CuBe2F40 CuSi3Mn G-CuSn5ZnPb G-CuSn10Zn
N	GR.11	銅 Copper		>250	C1700P C1720P C5212P C6782BE	CuBe1.7 F55 CuBe1.7 F110 CuBe2 F70 CuBe2 F125 CuZn40Al1 CuAl11Ni6Fe5 AMPCO 20
N	GR.12	塑膠 Plastics			PP PS POM PC PA PMMA TFE CTFE	
N	GR.13	複合材料 FRP CFRP Composite Material			GFK KFK AFK	
N	GR.14	石墨 Graphite				
S	GR.15	鈦合金 Titanium	700-1250	210-370	TP[TR]270H◎ TP[TR]340H◎ TP[TR]550H(C) TP[TR]480H◎ TP[TR]270Pd◎ TP[TR]340Pd TP[TR]550Pd◎ TP[TR]480Pd◎ TAP6400	Ti 1 Ti 2 Ti 3 Ti 4 Ti 1 Pd Ti 2 Pd Ti 3 Pd Ti99,7 Ti99,8 TiAl6V4 TiAl6V4ELI TiAl5Sn2,5 TiAl4Mo4Sn4Si0,5 TiCu2
S	GR.16	鎳 Nickel	900-1200	260-350	Incoloy 800 Incoloy825 1 Inconel 400 Inconel 625 Inconel 600 Inconel 700 Inconel 713 Inconel 718 Haynes 600 Hastelloy C Nimocast PD36 Nimonic PE13 Nimonic 90 Nimonic 75 Rene 95 ,Monel400, Mar-M432, Waspaloy ,Jessop G64 AirResist213 Jetalloy209	
S	GR.17	耐熱鋼 Heat-resistant Steel	900-1400	210-400	SUH309 SUH310 SUH330 SUH1 SUH31 SUH35 SUH321 SUH420 SUH420J1	X15CrNiSi20-12 X15CrNiSi25-20 X45CrSi9-3 X45CrNiW18-9 X53CrMnNiN21-9 X10CrNiTi18-9 X6Cr17 X20Cr13

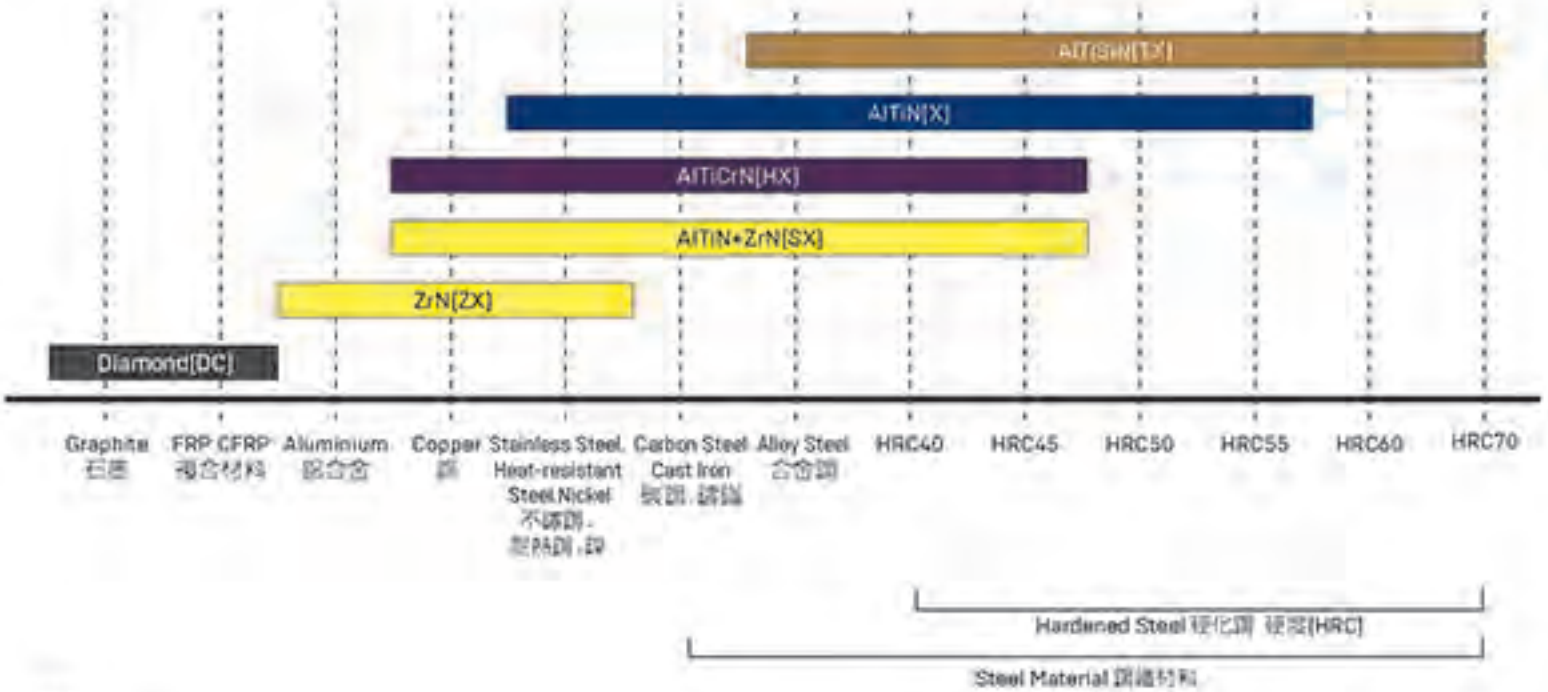
AISI/SAE	BS	GB
1010 1015 1020 1025 1030 1035 1040 1045 1050 1055 1060 W1 W210 1213 12L13 12L14	220M07 030M15 060A35 080M46 060A35 080M46 060A52 070M55 080A62 070M55 080 A 62 0604 9% BW 1A BW2	Q215AF Q235A-D 10 15 20 25 30 35 40 45 50 55 60 Y12 Y15pb
9840 4340 5132 5140 5115 4120 4137, 4135 4140, 4142 4140 L3 L6 ASTM A350LF5 8620 8740 5010 5140 5155 9262 52100	708M40 708M40 722M24 735A50 905M20 311-TYPE7 520A16 523M15 527A60 534A99 4360 43C 4360 50B	15Cr 20Cr 30Cr 40Cr 45Cr 20CrMo 15CrMo 30CrMo 42CrMo
D2 A13 A2 S1 H21 HW3 D3 M2 M35 M7 HNV3	BD3 BH13 BA2 BS1 BH21 401S45 4959BA2 BM2 BM35	Cr12 Cr12MoV Cr12MoV1 Cr4Mo1V 4Cr5MoSiV1 W18Cr4V W18Cr4V5Co5 W6Mo5Cr4V2Co5 W6Mo5Cr4V3 55CrMnA 65 60Si2Mn 50CrVa
AISI301 AISI302 AISI303 AISI304 AISI316 AISI321 AISI410 AISI416 AISI420 AISI430 AISI431 AISI440	403S15 410S21 420S45 431S29 430S17 304S11 303S21 304C12 321S12 316S16 317S12 403S17	1Cr17Ni7 1Cr18Ni9 Y1Cr18Ni9 0Cr18Ni9 0Cr17Ni12Mo2 0Cr18Ni9Ti 1Cr13 Y1Cr13 3Cr13 1Cr17 7Cr17 2Cr13 Y3Cr13
No20B No25B No30B No35B No45B No50B 60-40-18 80-55-06 A43D2 100-70-03 32510 40010 50B06 70B03 A220-70003 A220-80002	Grade150 Grade220 Grade260 Grade300 Grade350 Grade400 SNG420/2 SNG500/7 SNG600/3 SNG700/2 8290/6 BS40/12 P440/7 P510/4 P570/3 P690/2	HT-100 HT-150 HT-200 HT-250 HT-300 HT350 QT400-15 QT450-10 QT500-7 QT600-3 QT700-2 KTH-330-08 KTZ-450-06 KTZ-550-04 KTZ-700-02
2014 3003 5052 6061 7075 AZ31C A296.0 A332.1	LM4 LM12 LM16 LM21 LM22 LM24 LM25 LM27	L1 L3 LD10 LF2 LF21 LD2 LC4 LC9
S12A SC84A SC102A AA336 A332 B26M520.0	LM5 LM6 LM9 LM13 LM28 LM29 LM30	ZL104 Y104 Y102 ZL102 ZL301
C36000 C37700 C44300 C46200 C83400 C90500 CT-00 10-N 7SCu-5Al 7YCuH-5Pb-7Sn-1Fe IC Am CDA544 CDA656.00	CA104 CZ124 CZ122 CZ108 CZ104 CDA544 CDA65400 CDA656	ZCuSn5Pb5Zn5 G-CuSn10Z HPb 61-1 HPb 59-1 HSn 62-1
C17000 C17200		QBe1.7 QBe2 HAl 60-1-1
AMS R54520 AMS R56400 AMS R56401 Gr.1 Gr.2 Gr.3 Gr.4 Gr.11 Gr.7 Gr.5	TA14/17 TA10-13 TA28 TA11	TA0 TA1 TA2 TA3 TA9 TC4
AISI309 AISA310 HNV3 EV9 AISI321 AISI430 AISI420	330C11 Hr5 203-4 3146-3 HR8 3072-76 Hr401.601	2Cr23Ni13 2Cr25Ni20 4Cr9Si2 5Cr21Mn9Ni4N 0Cr18Ni11Ti 1Cr17 2Cr13

塗層特性 Features of Coating

塗層種類 Type	顏色 Color	奈米硬度 [HV] Hardness	奈米厚度 [μm] Thickness	摩擦係數 Coefficient of Friction	最高應用溫度 [°C] Heat Resistance	刃具材質 Cutting Tools Material	應用 Application
AlTiSiN (TX)	Tan 古銅色	4300	1~3	0.3	1200	Solid Carbide 硬化鎢鋼	Hardened steel 中高硬度調質硬化鋼 HRC<70
AlTiN (X)	Blue black 藍黑色	4000	1~3	0.6	900	Solid Carbide 硬化鎢鋼	Carbon steel, Alloyed steel, Hardened steel, Cast iron 碳鋼、合金鋼硬化鋼、鑄鐵 HRC<60
AlTiN+ZrN (SX)	Yellow brown 金黃色	3800	1~4	0.4	800	Solid Carbide 硬化鎢鋼	Carbon steel, Alloyed steel, Stainless steel, Cast iron 多用途材質碳鋼、合金鋼 不鏽鋼、鑄鐵 HRC<48
AlTiCrN (HX)	Purple black 紫黑色	3800	1~4	0.25	800	Solid Carbide 硬化鎢鋼	Carbon steel, Alloyed steel, Stainless steel, Cast iron 多用途材質碳鋼、合金鋼 不鏽鋼、鑄鐵 HRC<48
ZrN (ZX)	Yellow brown 金黃色	2800	1~4	0.5	550	Solid Carbide 硬化鎢鋼	Aluminium, Copper, Stainless steel, Titanium, Hard-cut material 鋁合金、不鏽鋼、鈦合金等難切削材
TiN (N)	Golden 金黃色	2400	1~7	0.35	600	HSS 高速鋼	General steel, Wear parts 一般鋼質材料耐磨零件
TiCN (C)	Blue grey 藍灰色	3000	1~4	0.2	400	HSS 高速鋼	General corrosion parts 耐腐蝕性零件

各塗層與被切削材的適用性 Usage of each coating for Milling Steel

刀具材質：碳化鎢鋼 Cutting Tools Material:Solid Carbide



Hardness Conversion Table / 硬度換算表

HRC	HB	HV10	N/mm²
	71	75	240
	76	80	255
	81	85	270
	86	90	285
	90	95	305
	95	100	320
	100	105	335
	105	110	350
	109	115	370
	114	120	385
	119	125	400
	124	130	415
	128	135	430
	133	140	450
	138	145	465
	143	150	480
	147	155	495
	152	160	510
	157	165	530
	162	170	545
	166	175	560
	171	180	575
	176	185	595
	181	190	610
	185	195	625
	190	200	640
	195	205	660
	199	210	675
	204	215	690
	209	220	705
	214	225	720
	219	230	740
	223	235	755
	228	240	770
	233	245	785
22	238	250	800
23	242	255	820
24	247	260	835
25	255	268	860
26	258	272	870
27	265	280	900

HRC	HB	HV10	N/mm²
28	273	287	920
29	278	293	940
30	287	302	970
31	295	310	995
32	301	317	1020
33	311	327	1050
34	319	336	1080
35	328	345	1110
36	337	355	1140
37	346	364	1170
38	354	373	1200
39	363	382	1230
40	372	392	1260
41	383	403	1300
42	393	413	1330
43	402	423	1360
44	413	434	1400
45	424	446	1440
46	435	458	1480
47	449	473	1530
48	460	484	1570
49	472	497	1620
50	488	514	1680
51	501	527	1730
52	517	544	1790
53	532	560	1845
54	549	578	1910
55	567	596	1980
56	584	615	2050
57	607	639	2140
58	622	655	
59		675	
60		698	
61		720	
62		745	
63		773	
64		800	
65		829	
66		864	
67		900	
68		940	

Metric MM

MM

$$Vc = \frac{\pi \times Dc \times N}{1000}$$

$$N = \frac{Vc \times 1000}{\pi \times Dc}$$

$$Vf = N \times Z \times fz$$

$$T = \frac{L}{Vf}$$

Vc=	Cutting Speed 切削速度	m/min
Dc=	Cutter Diameter 切削直徑	mm
N =	RPM 回轉速度	rev/min
Vf =	Feed Speed 每分鐘進給	mm/min
fz =	Feed Per Tooth 每刃進給	mm/tooth
fn =	Feed Per Revolution 每轉進給	mm/rev
Z =	Number of Flutes 刃數	Z
T =	Time of Cut In Minutes 切削時間	mm
L =	Cut Length 切削長度	mm
Ap=	Axial depth of cut 軸向切削深度	mm
Ae=	Radial depth of cut 切削寬度	mm

English INCH

INCH

$$Vc = \frac{\pi \times Dc \times N}{12}$$

$$N = \frac{Vc \times 12}{\pi \times Dc}$$

$$Vf = N \times Z \times fz$$

$$T = \frac{L}{Vf}$$

Vc=	Cutting Speed 切削速度	inch/min
Dc=	Cutter Diameter 切削直徑	inch
N =	RPM 回轉速度	rev/min
Vf =	Feed Speed 每分鐘進給	inch/min
fz =	Feed Per Tooth 每刃進給	inch/tooth
fn =	Feed Per Revolution 每轉進給	inch/rev
Z =	Number of Flutes 刃數	Z
T =	Time of Cut In Minutes 切削時間	inch
L =	Cut Length 切削長度	inch
Ap=	Axial depth of cut 軸向切削深度	inch
Ae=	Radial depth of cut 切削寬度	inch

ISO Tolerance measure table (μm)

ISO公差測量表

Φmm	<3	3-6	6-10	10-18	18-30	30-50	50-65	65-80
e7	- 14 - 24	- 20 - 32	- 25 - 40	- 32 - 50	- 40 - 61	- 50 - 75	- 60 - 90	- 60 - 90
e8	- 14 - 28	- 20 - 38	- 25 - 47	- 32 - 59	- 40 - 73	- 50 - 89	- 60 - 106	- 60 - 106
e9	- 14 - 39	- 20 - 50	- 25 - 61	- 32 - 75	- 40 - 92	- 50 - 112	- 60 - 134	- 60 - 134
h5	0 - 4	0 - 5	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 13
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16	0 - 19	0 - 19
h7	0 - 10	0 - 12	0 - 15	0 - 18	0 - 21	0 - 25	0 - 30	0 - 30
h8	0 - 14	0 - 18	0 - 22	0 - 27	0 - 33	0 - 39	0 - 46	0 - 46
h9	0 - 25	0 - 30	0 - 36	0 - 43	0 - 52	0 - 62	0 - 74	0 - 74
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84	0 - 100	0 - 120	0 - 120
h11	0 - 60	0 - 75	0 - 90	0 - 110	0 - 130	0 - 160	0 - 190	0 - 190
h16	0 - 600	0 - 750	0 - 900	0 - 1100	0 - 1300	0 - 1600	0 - 1900	0 - 1900
js14	+ 125 - 125	+ 150 - 150	+ 180 - 180	+ 215 - 215	+ 260 - 260	+ 310 - 310	+ 370 - 370	+ 370 - 370
js16	+ 300 - 300	+ 375 - 375	+ 450 - 450	+ 550 - 550	+ 650 - 650	+ 800 - 800	+ 950 - 950	+ 950 - 950
k11	+ 60 0	+ 75 0	+ 90 0	+ 110 0	+ 130 0	+ 160 0	+ 190 0	+ 190 0
k12	+ 100 0	+ 120 0	+ 150 0	+ 180 0	+ 210 0	+ 250 0	+ 300 0	+ 300 0
m6	+ 8 + 2	+ 12 + 4	+ 15 + 6	+ 18 + 7	+ 21 + 8	+ 25 + 9	+ 30 + 11	+ 30 + 11
m7	+ 12 + 2	+ 16 + 4	+ 21 + 6	+ 25 + 7	+ 29 + 8	+ 34 + 9	+ 41 + 11	+ 41 + 11
z9	+ 51 + 26	+ 65 + 35	+ 78 + 42	+ 103 + 60	+ 140 + 88	+ 198 + 136	+ 246 + 172	+ 284 + 210
H5	+ 4 0	+ 5 0	+ 6 0	+ 8 0	+ 9 0	+ 11 0	+ 13 0	+ 13 0
H6	+ 6 0	+ 8 0	+ 9 0	+ 11 0	+ 13 0	+ 16 0	+ 19 0	+ 19 0
H7	+ 10 0	+ 12 0	+ 15 0	+ 18 0	+ 21 0	+ 25 0	+ 30 0	+ 30 0
H8	+ 14 0	+ 18 0	+ 22 0	+ 27 0	+ 33 0	+ 39 0	+ 46 0	+ 46 0
H9	+ 25 0	+ 30 0	+ 36 0	+ 43 0	+ 52 0	+ 62 0	+ 74 0	+ 74 0
H10	+ 40 0	+ 48 0	+ 58 0	+ 70 0	+ 84 0	+ 100 0	+ 120 0	+ 120 0
H11	+ 60 0	+ 75 0	+ 90 0	+ 110 0	+ 130 0	+ 160 0	+ 190 0	+ 190 0
P6	- 6 - 12	- 9 - 17	- 12 - 21	- 15 - 26	- 18 - 31	- 21 - 37	- 26 - 45	- 26 - 45
P7	- 6 - 16	- 8 - 20	- 9 - 24	- 11 - 29	- 14 - 35	- 17 - 42	- 21 - 51	- 21 - 51
P9	- 6 - 31	- 12 - 42	- 15 - 51	- 18 - 61	- 22 - 74	- 26 - 88	- 32 - 106	- 32 - 106

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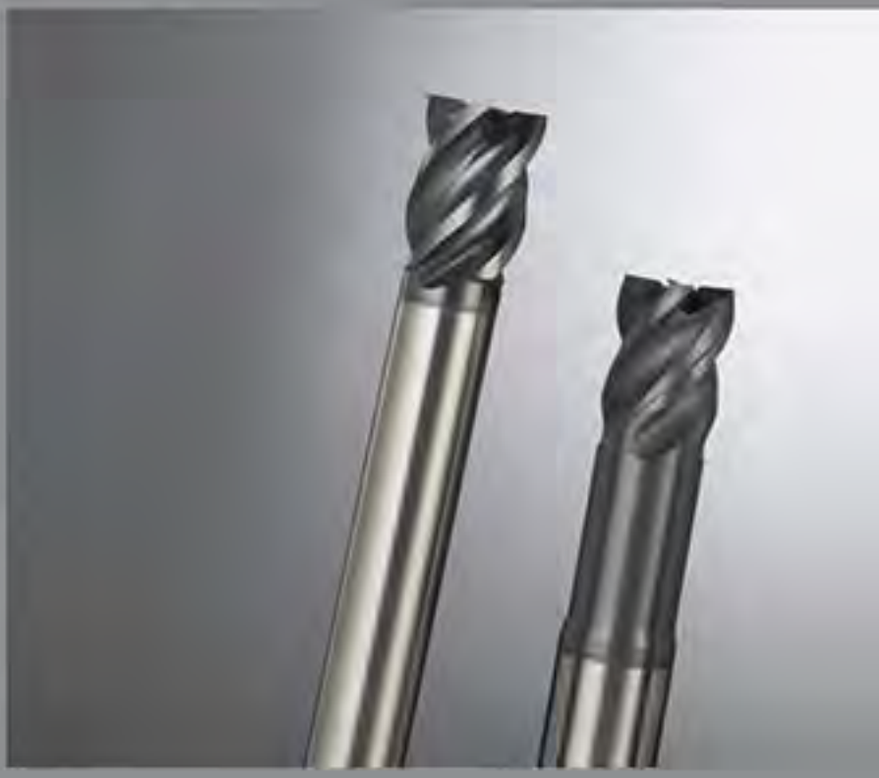
The Art of Cutting



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