



超硬鑽頭系列

Vol.1

# TD DRILL

TAIHO TOOL Carbide Drill Series



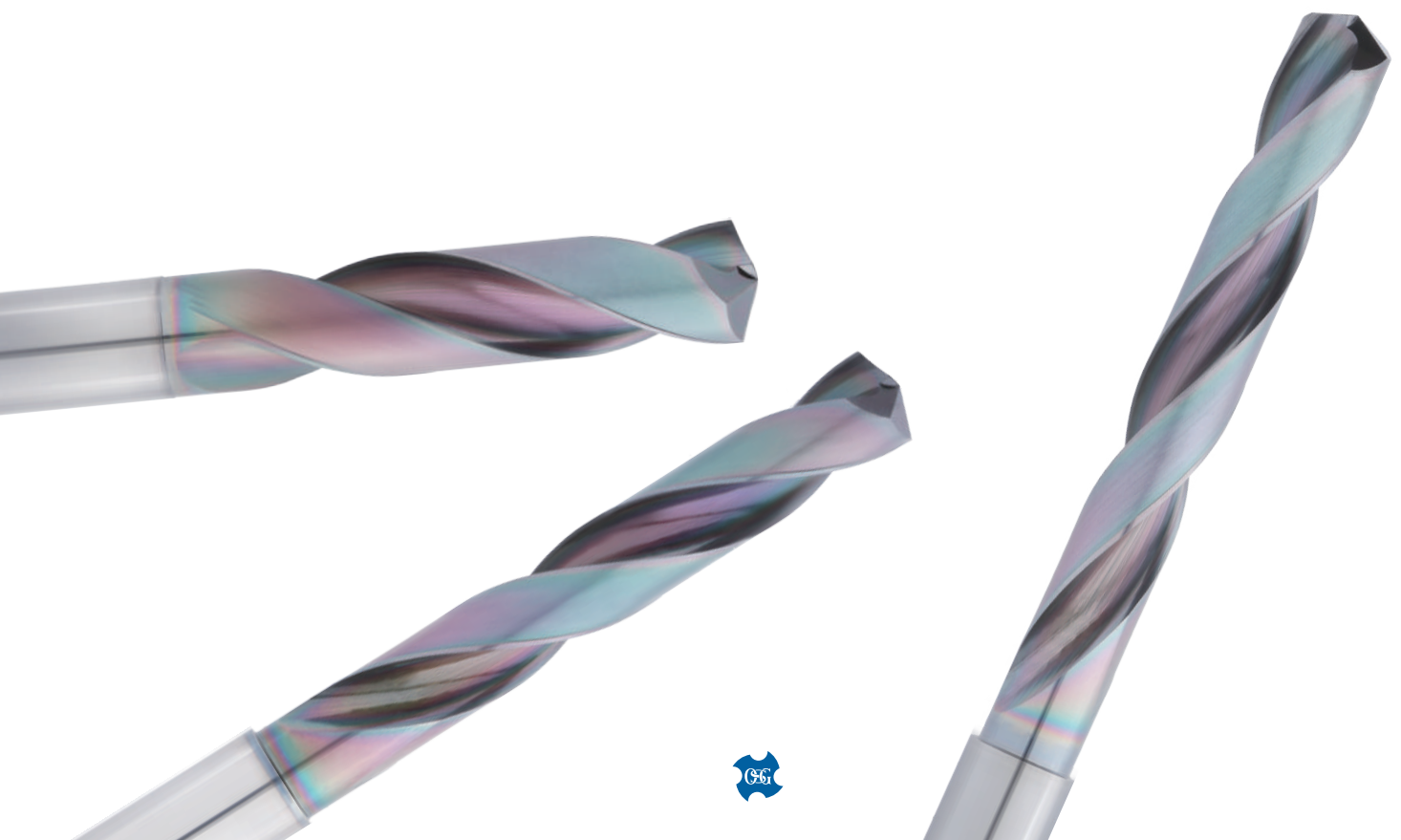
# Carbide Drill TD Series

## 超硬鑽頭TD系列

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# 超硬微小鑽頭 TDM Micro Revolution Carbide Drill $\varnothing 0.5 \sim \varnothing 2.9$

## 可對應於多種材料(含不鏽鋼)的加工

Applied to process various materials (including stainless steel)

採用OSG小徑專用鎢鋼材料大幅提升工具韌性，降低加工時的崩刃風險

Using OSG special tungsten steel material for small diameter. Significantly improve tool toughness and reduce the risk of chipping during processing.

全尺寸外徑容許差  
0~-0.008mm的高精度仕様！

High precision design of drill diameter tolerance within 0/-0.008mm for all sizes!

具銳利切刃與排穴性極佳的溝槽如不鏽鋼等難加工材料，亦可順利排出鐵屑

Sharp cutting edge and ideal flute shape for chip evacuation allow the drill to process on highly sticky materials such as stainless steels.

實現長壽命的EgiAs表面鍍層

EgiAs coating enables long tool life.

適合於自動車床加工的刃長及柄長設計

Blade length and handle length design are suitable for automatic lathe processing.



# 超硬鑽頭 TD Carbide Drill $\phi 3 \sim \phi 13$

## 可對應於多種材料(含不鏽鋼)的加工

Applied to process various materials (including stainless steel)

能將鐵屑細緻斷屑  
的弧刃型

Wavy point form breaks chip into small manageable pieces

有效提升鐵屑排出性  
的寬溝設計

Wide flute room facilitates stable chip evacuation

實現長壽命的EgiAs  
表面鍍層

EgiAs coating enables long tool life



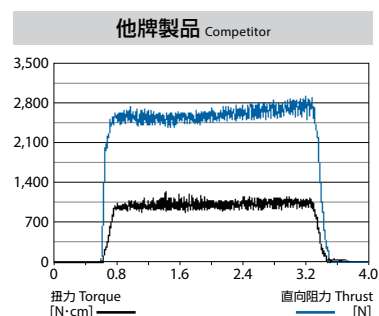
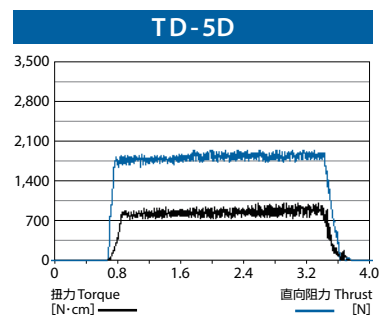
### 低阻力、安定扭力

Low thrust resistance and stable torque

#### 弧刃型樣式可實現低阻力與安定加工

Low thrust resistance and stable torque are possible by the new wavy point form.

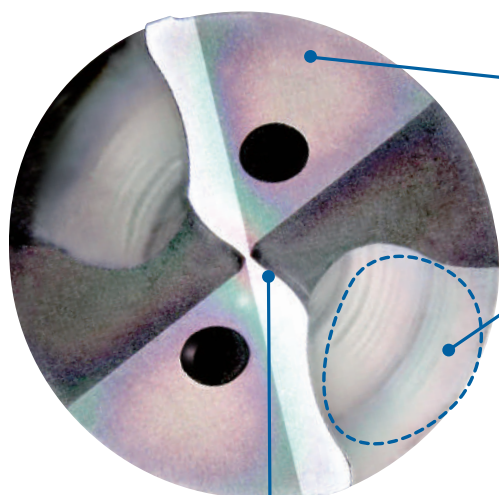
使用工具 Tool	TD-5D
尺寸 Size	$\phi 10$
被削材 Work Material	SCM440
切削速度 Cutting Speed	70m/min ( $2,229\text{min}^{-1}$ )
進給速度 Feed	668mm/min (0.3mm/rev)
孔深 Depth of Hole	30mm (盲孔) Blind
切削油 Coolant	水溶性切削油 (外部給油) Water-Soluble (External)
使用機械 Machine	立式加工機 (BT40) Vertical Machining Center



# 中心出水超硬鑽頭 TDO Carbide Drill (with Oil Hole) $\phi 2 \sim \phi 12$

## 對應各種加工深度最合適的樣式

Optimum specifications for every drilling depth



### 實現長壽命的EgiAs表面鍍層

EgiAs coating enables long tool life

### 有效提升鐵屑排出性的寬溝設計

Wide flute room facilitates stable chip evacuation

### 良好的折屑性

Enables the creation of compact cutting chips.



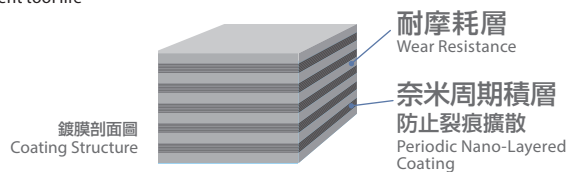
### 表面處理 Coating

### 高耐磨耗性、高韌性的 EgiAs 鍍膜塗層

EgiAs coating with high toughness and wear resistance characteristics

具高耐磨耗性、耐熱性，與優良韌性的鍍膜塗層，能夠實現長壽命和壽命安定化。

Constructed with extreme toughness, high wear and heat resistance characteristics to ensure stable and consistent tool life



塗層顏色 Coating Color	塗層構造 Coating Structure	硬度(GPa) Hardness	酸化開始 溫度(°C) Oxidation Temperature	耐熱性 Heat Resistance	附著力 Adhesion Strength	表面粗度 Surface Resistance	耐磨耗性 Wear Resistance	耐凝著性 Welding Resistance	韌性 Toughness
干涉色 Interference Color	Cr、Si系奈米 周期積層 Periodical Nano Layer and wear resistance layer	40	1,100	◎	◎	○	◎	◎	◎

標準(Fair) ○ -> 最適合(Best) ◎

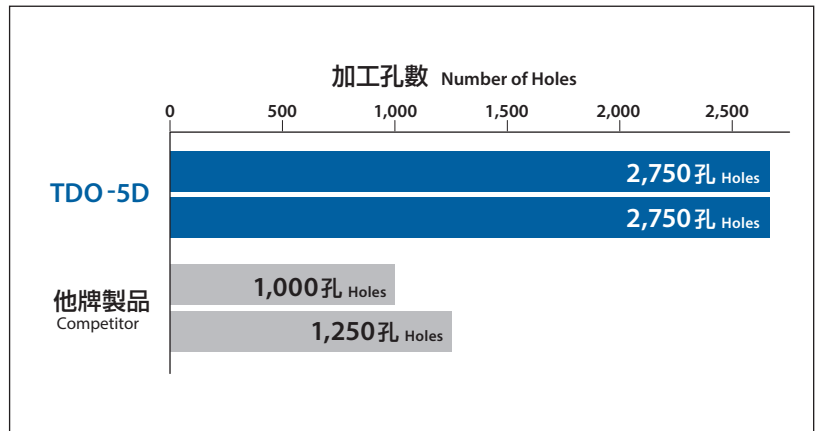


■ 絕佳耐久性完勝他牌製品 Distinctive durability overwhelms competitors

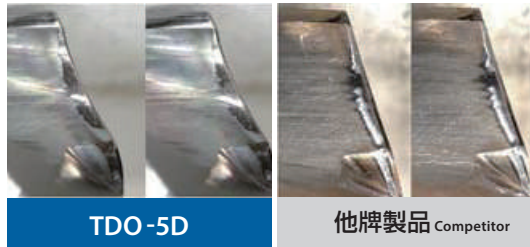
EgiAs鍍膜塗層在抑制磨耗上發揮了絕佳效果

Superior protection against friction with OSG's EgiAs coating

使用工具 Tool	TDO-5D	他牌製品 Competitor
尺寸 Size	φ 10	
被削材 Work Material	S50C	
切削速度 Cutting Speed	100m/min (3,185min <sup>-1</sup> )	
進給速度 Feed	796mm/min (0.25mm/rev)	
孔深 Depth of Hole	50mm (盲孔) Blind	
切削油 Coolant	水溶性切削油 (內部給油) Water-Soluble (Internal)	
使用機械 Machine	臥式加工機 (BT40) Horizontal Machining center (BT40)	



500孔加工後 After drilling 500 holes

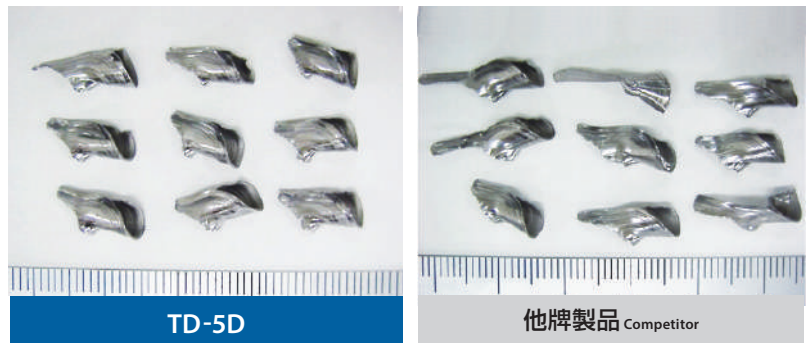


■ 鐵屑形狀比較測試 The chips test of a drills.

鐵屑可穩定細小分段，實現穩定的長壽命表現

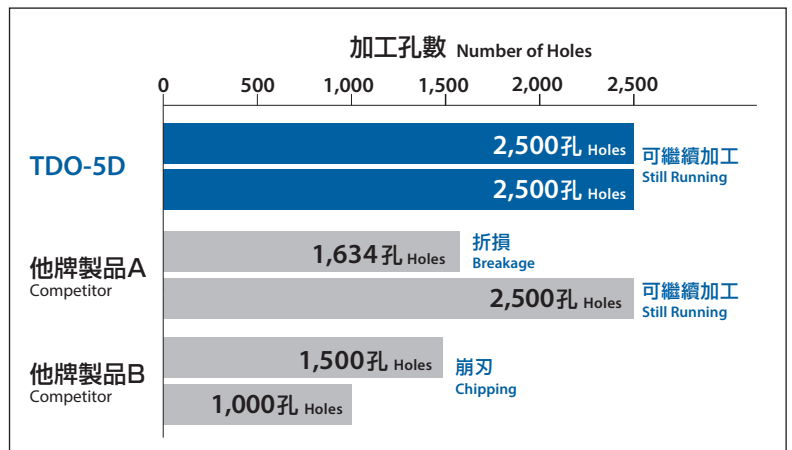
Chips can be steadily discharged to achieve stable and good tool life.

使用工具 Tool	TD-5D	他牌製品 Competitor
尺寸 Size	φ 13	
被削材 Work Material	S50C	
切削速度 Cutting Speed	1,999m/min <sup>-1</sup>	
進給速度 Feed	400mm/min (0.2mm/rev)	
加工深度 Depth of Hole	26mm (盲孔) Blind	
切削油 Coolant	水溶性切削油 Water-Soluble	
使用機械 Machine	立式加工機 Vertical Machining Center	



## ■ 沃斯田鐵系不銹鋼加工 Machining Austenitic Stainless Steel

使用工具 Tool	TDO-5D	他牌製品A Competitor	他牌製品B Competitor
尺寸 Size	Φ10		
被削材 Work Material	SUS304		
切削速度 Cutting Speed	70m/min (2,229min <sup>-1</sup> )		
進給速度 Feed	446mm/min (0.20mm/rev)		
孔深 Depth of Hole	50mm (通孔) (Through)		
切削油 Coolant	水溶性切削油 (內部給油 · 1.5MPa) Water-Soluble (Internal)		
使用機械 Machine	臥式加工機 Horizontal Machining Center		

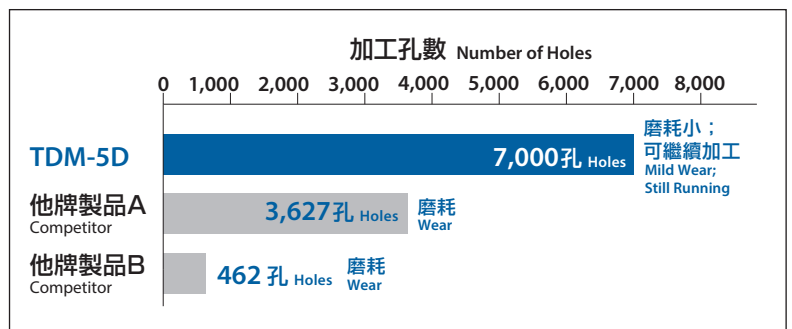


## ■ 微小孔不銹鋼加工 Micro Hole For Stainless Steel Processing

使用工具 Tool	TDM-5D	他牌製品A Competitor	他牌製品B Competitor
尺寸 Size	Φ0.5		
被削材 Work Material	SUS304		
切削速度 Cutting Speed	15m/min (9,550min <sup>-1</sup> )		
進給速度 Feed	48mm/min (0.005mm/rev)		
啄鑽量 Step Feed	0.05mm (0.1D)		
加工深度 Depth of Hole	1.5mm (3D盲孔) Blind		
切削油 Coolant	水溶性切削油 Water-Soluble		
使用機械 Machine	立式加工機 Vertical Machining Center		

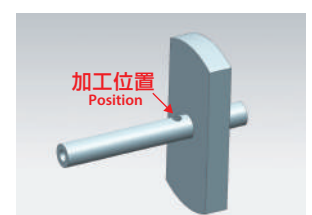
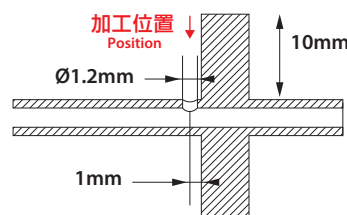
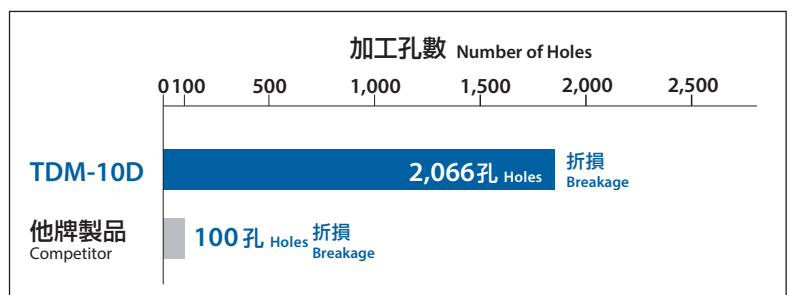
### ■ 導引鑽 Pilot Drill

使用工具 Tool	FX-LDS	偏擺精度 Tolerance of Run Out	柄部1μm以內 Within 1μm at shank
尺寸 Size	Φ0.5 X 90°	試驗內容 Test Result	7,000孔耐久性 7,000holes tool life



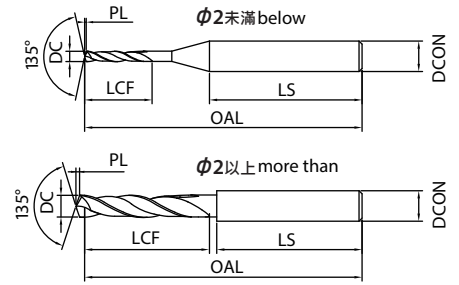
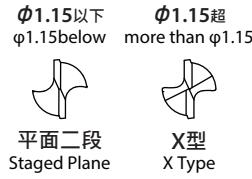
## ■ 不銹鋼加工(車床) Machining Stainless Steel (Lathe)

使用工具 Tool	TDM-10D	他牌製品 Competitor
尺寸 Size	Φ1.2	
被削材 Work Material	SUS304	
切削速度 Cutting Speed	2,500 rpm	
進給速度 Feed	0.024 (mm/rev)	
加工深度 Depth of Hole	3mm	
切削油 Coolant	油性切削油 (外部給油) Soluble Oil (External)	
使用機械 Machine	自動車床 Automatic Lathe	



# TDM-5D

# TDM-10D/7D



單位unit : mm

單位unit : mm

商品編號 EDP NO.	直徑 DC	倍數 Type	溝長 LCF	全長 OAL	柄徑 DCON	柄長 LS	先端 PL
700050	0.5	5D	3	38	3	30	0.09
700060	0.6	5D	3.5	38	3	30	0.11
700070	0.7	5D	4.5	38	3	30	0.13
700080	0.8	5D	5	38	3	30	0.15
700090	0.9	5D	5.5	38	3	30	0.16
700091	0.91	5D	5.5	38	3	30	0.16
700100	1	5D	6	38	3	28	0.2
710100		10D	11	44	3	30	0.2
700110	1.1	5D	7	38	3	28	0.2
710110		10D	12	44	3	28	0.2
700111	1.11	5D	7	38	3	28	0.2
700115	1.15	5D	7	38	3	28	0.2
700120	1.2	5D	8	38	3	28	0.2
710120		10D	12	44	3	30	0.2
700127	1.27	5D	8	38	3	28	0.3
700129	1.29	5D	8	38	3	28	0.3
700130	1.3	5D	8	38	3	28	0.3
710130		10D	16	49	3	30	0.3
700140	1.4	5D	9	44	3	30	0.3
710140		10D	17	49	3	30	0.3
700145	1.45	5D	9	44	3	30	0.3
700147	1.47	5D	9	44	3	30	0.3
700150	1.5	5D	9	44	3	30	0.3
710150		10D	18	49	3	30	0.3
700160	1.6	5D	10	44	3	30	0.3
710160		10D	19	49	3	28	0.3
700170	1.7	5D	10	44	3	30	0.4
710170		10D	20	49	3	28	0.4
700180	1.8	5D	11	44	3	30	0.4
710180		10D	20	49	3	28	0.4

商品編號 EDP NO.	直徑 DC	倍數 Type	溝長 LCF	全長 OAL	柄徑 DCON	柄長 LS	先端 PL
700182	1.82	5D	11	44	3	30	0.4
700183	1.83	5D	11	44	3	30	0.4
700184	1.84	5D	11	44	3	30	0.4
700185	1.85	5D	11	44	3	30	0.4
700190	1.9	5D	11	44	3	30	0.4
710190		10D	20	49	3	28	0.4
700200	2	5D	12	44	3	28	0.4
720200		7D	20	52	3	30	0.4
700210	2.1	5D	12	44	3	28	0.4
720210		7D	20	52	3	30	0.4
700220	2.2	5D	13	44	3	28	0.4
720220		7D	20	52	3	30	0.4
700225	2.25	5D	13	44	3	28	0.4
700229	2.29	5D	13	44	3	28	0.4
700230	2.3	5D	13	44	3	28	0.4
720230		7D	20	52	3	30	0.4
700240	2.4	5D	14	44	3	28	0.6
720240		7D	22	52	3	28	0.6
700250	2.5	5D	14	44	3	28	0.6
720250		7D	22	52	3	28	0.6
700260	2.6	5D	14	44	3	28	0.6
720260		7D	23	52	3	28	0.6
700270	2.7	5D	14	44	3	28	0.6
720270		7D	23	52	3	28	0.6
700277	2.77	5D	14	44	3	28	0.6
700280	2.8	5D	15	44	3	28	0.7
720280		7D	23	52	3	28	0.7
700283	2.83	5D	15	44	3	28	0.7
700290	2.9	5D	15	44	3	28	0.7
720290		7D	23	52	3	28	0.7

※特殊品訂製，刃徑可0.01間隔

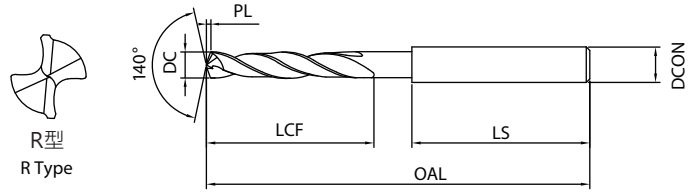
※ Customized with special product, outer diameter can be designed from 0.01mm

被削材 Work Material	低碳鋼 軟鋼	中碳鋼	高碳鋼	合金鋼	調質鋼		不鏽鋼	銅	延展 鋁合金	鑄鐵	球墨鑄鐵
	Low Carbon Steel Mild Steel	Medium Carbon Steel	High Carbon Steel	Alloy Steel	Hardened Steel	35~45 HRC	Stainless Steel	Copper	Aluminum	Cast Iron	Ductile Cast Iron
製品記號 Abbreviation	C~0.25%	C0.25% ~0.45%	C0.45%~	SCM	~35 HRC		SUS	Cu	AL	FC	FCD
TDM-5D/10D/7D	◎	◎	◎	◎	○		◎	◎	◎	○	○





# TD-3D/5D



CARBIDE EgiAs h8 30° SHRINK FIT DIN 6537

單位unit : mm

單位unit : mm

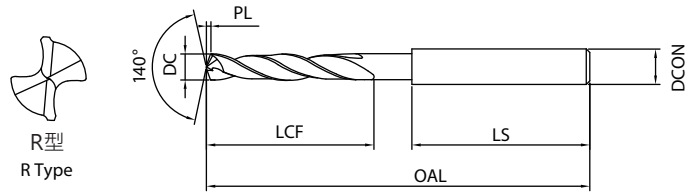
商品編號 EDP NO.	直徑 DC	倍數 Type	溝長 LCF	全長 OAL	柄徑 DCON	柄長 LS	先端 PL
730300	3	3D	20	62	4	36	0.5
740300		5D	28	66	4	36	0.5
730310	3.1	3D	20	62	4	36	0.7
740310		5D	28	66	4	36	0.7
730320	3.2	3D	20	62	4	36	0.7
740320		5D	28	66	4	36	0.7
730330	3.3	3D	20	62	4	36	0.7
740330		5D	28	66	4	36	0.7
730340	3.4	3D	20	62	4	36	0.7
740340		5D	28	66	4	36	0.7
730350	3.5	3D	20	62	4	36	0.7
740350		5D	28	66	4	36	0.7
730360	3.6	3D	20	62	4	36	0.7
740360		5D	28	66	4	36	0.7
730367	3.67	3D	20	62	4	36	0.7
730370	3.7	3D	20	62	4	36	0.7
740370		5D	28	66	4	36	0.7
730371	3.71	3D	20	62	4	36	0.7
730380	3.8	3D	24	66	4	36	0.7
740380		5D	36	74	4	36	0.7
730390	3.9	3D	24	66	4	36	0.7
740390		5D	36	74	4	36	0.7
730400	4	3D	24	66	6	36	0.7
740400		5D	36	74	6	36	0.7
730410	4.1	3D	24	66	6	36	0.9
740410		5D	36	74	6	36	0.9
730420	4.2	3D	24	66	6	36	0.9
740420		5D	36	74	6	36	0.9

商品編號 EDP NO.	直徑 DC	倍數 Type	溝長 LCF	全長 OAL	柄徑 DCON	柄長 LS	先端 PL
730430	4.3	3D	24	66	6	36	0.9
740430		5D	36	74	6	36	0.9
730440	4.4	3D	24	66	6	36	0.9
740440		5D	36	74	6	36	0.9
730450	4.5	3D	24	66	6	36	0.9
740450		5D	36	74	6	36	0.9
730460	4.6	3D	24	66	6	36	0.9
740460		5D	36	74	6	36	0.9
730464	4.64	3D	24	66	6	36	0.9
730465	4.65	3D	24	66	6	36	0.9
730470	4.7	3D	24	66	6	36	0.9
740470		5D	36	74	6	36	0.9
730480	4.8	3D	28	66	6	36	0.9
740480		5D	44	82	6	36	0.9
730490	4.9	3D	28	66	6	36	0.9
740490		5D	44	82	6	36	0.9
730500	5	3D	28	66	6	36	0.9
740500		5D	44	82	6	36	0.9
730510	5.1	3D	28	66	6	36	1.1
740510		5D	44	82	6	36	1.1
730520	5.2	3D	28	66	6	36	1.1
740520		5D	44	82	6	36	1.1
730530	5.3	3D	28	66	6	36	1.1
740530		5D	44	82	6	36	1.1
730540	5.4	3D	28	66	6	36	1.1
740540		5D	44	82	6	36	1.1
730550	5.5	3D	28	66	6	36	1.1
740550		5D	44	82	6	36	1.1

※特殊品訂製，刃徑可0.01間隔  
 ※Customized with special product, outer diameter can be designed from 0.01mm

被削材 Work Material	低碳鋼 軟鋼	中碳鋼	高碳鋼	合金鋼	調質鋼		不鏽鋼	銅	延展 鋁合金	鑄鐵	球墨鑄鐵
	Low Carbon Steel Mild Steel	Medium Carbon Steel	High Carbon Steel	Alloy Steel	Hardened Steel	35~45 HRC	Stainless Steel	Copper	Aluminum	Cast Iron	Ductile Cast Iron
製品記號 Abbreviation	C~0.25%	C0.25% ~0.45%	C0.45%~	SCM	~35 HRC	35~45 HRC	SUS	Cu	AL	FC	FCD
TD-3D/5D	◎	◎	◎	◎	○		◎	◎	◎	○	○

# TD-3D/5D



CARBIDE EgiAs h8 30° SHRINK FIT DIN 6537

單位unit : mm

單位unit : mm

商品編號 EDP NO.	直徑 DC	倍數 Type	溝長 LCF	全長 OAL	柄徑 DCON	柄長 LS	先端 PL
730552	5.52	3D	28	66	6	36	1.1
730554	5.54	3D	28	66	6	36	1.1
730560	5.6	3D	28	66	6	36	1.1
740560		5D	44	82	6	36	1.1
730570	5.7	3D	28	66	6	36	1.1
740570		5D	44	82	6	36	1.1
730580	5.8	3D	28	66	6	36	1.1
740580		5D	44	82	6	36	1.1
730590	5.9	3D	28	66	6	36	1.1
740590		5D	44	82	6	36	1.1
730600	6	3D	28	66	6	36	1.1
740600		5D	44	82	6	36	1.1
730610	6.1	3D	34	79	8	36	1.3
740610		5D	53	91	8	36	1.3
730620	6.2	3D	34	79	8	36	1.3
740620		5D	53	91	8	36	1.3
730630	6.3	3D	34	79	8	36	1.3
740630		5D	53	91	8	36	1.3
730640	6.4	3D	34	79	8	36	1.3
740640		5D	53	91	8	36	1.3
730650	6.5	3D	34	79	8	36	1.3
740650		5D	53	91	8	36	1.3
730660	6.6	3D	34	79	8	36	1.3
740660		5D	53	91	8	36	1.3
730670	6.7	3D	34	79	8	36	1.3
740670		5D	53	91	8	36	1.3
730680	6.8	3D	34	79	8	36	1.3
740680		5D	53	91	8	36	1.3

商品編號 EDP NO.	直徑 DC	倍數 Type	溝長 LCF	全長 OAL	柄徑 DCON	柄長 LS	先端 PL
730690	6.9	3D	34	79	8	36	1.3
740690		5D	53	91	8	36	1.3
730700	7	3D	34	79	8	36	1.3
740700		5D	53	91	8	36	1.3
730710	7.1	3D	41	79	8	36	1.5
740710		5D	53	91	8	36	1.5
730720	7.2	3D	41	79	8	36	1.5
740720		5D	53	91	8	36	1.5
730730	7.3	3D	41	79	8	36	1.5
740730		5D	53	91	8	36	1.5
730736	7.36	3D	41	79	8	36	1.5
730738	7.38	3D	41	79	8	36	1.5
730740	7.4	3D	41	79	8	36	1.5
740740		5D	53	91	8	36	1.5
730750	7.5	3D	41	79	8	36	1.5
740750		5D	53	91	8	36	1.5
730760	7.6	3D	41	79	8	36	1.5
740760		5D	53	91	8	36	1.5
730770	7.7	3D	41	79	8	36	1.5
740770		5D	53	91	8	36	1.5
730780	7.8	3D	41	79	8	36	1.5
740780		5D	53	91	8	36	1.5
730790	7.9	3D	41	79	8	36	1.5
740790		5D	53	91	8	36	1.5
730800	8	3D	41	79	8	36	1.5
740800		5D	53	91	8	36	1.5
730810	8.1	3D	47	89	10	40	1.6
740810		5D	61	103	10	40	1.6

※特殊品訂製，刃徑可0.01間隔  
 ※Customized with special product, outer diameter can be designed from 0.01mm



單位unit : mm

商品編號 EDP NO.	直徑 DC	倍數 Type	溝長 LCF	全長 OAL	柄徑 DCON	柄長 LS	先端 PL
730820	8.2	3D	47	89	10	40	1.6
740820		5D	61	103	10	40	1.6
730830	8.3	3D	47	89	10	40	1.6
740830		5D	61	103	10	40	1.6
730840	8.4	3D	47	89	10	40	1.6
740840		5D	61	103	10	40	1.6
730850	8.5	3D	47	89	10	40	1.6
740850		5D	61	103	10	40	1.6
730860	8.6	3D	47	89	10	40	1.6
740860		5D	61	103	10	40	1.6
730870	8.7	3D	47	89	10	40	1.6
740870		5D	61	103	10	40	1.6
730880	8.8	3D	47	89	10	40	1.6
740880		5D	61	103	10	40	1.6
730890	8.9	3D	47	89	10	40	1.6
740890		5D	61	103	10	40	1.6
730900	9	3D	47	89	10	40	1.6
740900		5D	61	103	10	40	1.6
730910	9.1	3D	47	89	10	40	1.8
740910		5D	61	103	10	40	1.8
730920	9.2	3D	47	89	10	40	1.8
740920		5D	61	103	10	40	1.8
730924	9.24	3D	47	89	10	40	1.8
730926	9.26	3D	47	89	10	40	1.8
730930	9.3	3D	47	89	10	40	1.8
740930		5D	61	103	10	40	1.8
730938	9.38	3D	47	89	10	40	1.8

單位unit : mm

商品編號 EDP NO.	直徑 DC	倍數 Type	溝長 LCF	全長 OAL	柄徑 DCON	柄長 LS	先端 PL
730940	9.4	3D	47	89	10	40	1.8
740940		5D	61	103	10	40	1.8
730950	9.5	3D	47	89	10	40	1.8
740950		5D	61	103	10	40	1.8
730960	9.6	3D	47	89	10	40	1.8
740960		5D	61	103	10	40	1.8
730970	9.7	3D	47	89	10	40	1.8
740970		5D	61	103	10	40	1.8
730980	9.8	3D	47	89	10	40	1.8
740980		5D	61	103	10	40	1.8
730990	9.9	3D	47	89	10	40	1.8
740990		5D	61	103	10	40	1.8
731000	10	3D	47	89	10	40	1.8
741000		5D	61	103	10	40	1.8
731010	10.1	3D	55	102	12	45	2.0
741010		5D	71	118	12	45	2.0
731020	10.2	3D	55	102	12	45	2.0
741020		5D	71	118	12	45	2.0
731030	10.3	3D	55	102	12	45	2.0
741030		5D	71	118	12	45	2.0
731040	10.4	3D	55	102	12	45	2.0
741040		5D	71	118	12	45	2.0
731050	10.5	3D	55	102	12	45	2.0
741050		5D	71	118	12	45	2.0
731060	10.6	3D	55	102	12	45	2.0
741060		5D	71	118	12	45	2.0
731070	10.7	3D	55	102	12	45	2.0
741070		5D	71	118	12	45	2.0

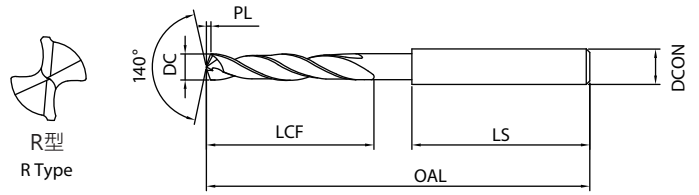
※特殊品訂製，刃徑可0.01間隔

※ Customized with special product, outer diameter can be designed from 0.01mm

被削材 Work Material  製品記號 Abbreviation	低碳鋼 軟鋼	中碳鋼	高碳鋼	合金鋼	調質鋼		不鏽鋼	銅	延展 鋁合金	鑄鐵	球墨鑄鐵
	Low Carbon Steel Mild Steel	Medium Carbon Steel	High Carbon Steel	Alloy Steel	Hardened Steel		Stainless Steel	Copper	Aluminum	Cast Iron	Ductile Cast Iron
	C~0.25%	C0.25% ~0.45%	C0.45%~	SCM	~35 HRC	35~45 HRC	SUS	Cu	AL	FC	FCD
TD-3D/5D	◎	◎	◎	◎	○		◎	◎	◎	○	○



# TD-3D/5D



CARBIDE EgiAs h8 30° SHRINK FIT DIN 6537

單位unit : mm

單位unit : mm

商品編號 EDP NO.	直徑 DC	倍數 Type	溝長 LCF	全長 OAL	柄徑 DCON	柄長 LS	先端 PL
731080	10.8	3D	55	102	12	45	2.0
741080		5D	71	118	12	45	2.0
731090	10.9	3D	55	102	12	45	2.0
741090		5D	71	118	12	45	2.0
731100	11	3D	55	102	12	45	2.0
741100		5D	71	118	12	45	2.0
731110	11.1	3D	55	102	12	45	2.2
741110		5D	71	118	12	45	2.2
731120	11.2	3D	55	102	12	45	2.2
741120		5D	71	118	12	45	2.2
731124	11.24	3D	55	102	12	45	2.2
731130	11.3	3D	55	102	12	45	2.2
741130		5D	71	118	12	45	2.2
731137	11.37	3D	55	102	12	45	2.2
731140	11.4	3D	55	102	12	45	2.2
741140		5D	71	118	12	45	2.2
731150	11.5	3D	55	102	12	45	2.2
741150		5D	71	118	12	45	2.2
731160	11.6	3D	55	102	12	45	2.2
741160		5D	71	118	12	45	2.2
731170	11.7	3D	55	102	12	45	2.2
741170		5D	71	118	12	45	2.2
731180	11.8	3D	55	102	12	45	2.2
741180		5D	71	118	12	45	2.2
731190	11.9	3D	55	102	12	45	2.2
741190		5D	71	118	12	45	2.2
731200	12	3D	55	102	12	45	2.2
741200		5D	71	118	12	45	2.2

商品編號 EDP NO.	直徑 DC	倍數 Type	溝長 LCF	全長 OAL	柄徑 DCON	柄長 LS	先端 PL
731210	12.1	3D	60	107	14	45	2.4
741210		5D	77	124	14	45	2.4
731220	12.2	3D	60	107	14	45	2.4
741220		5D	77	124	14	45	2.4
731230	12.3	3D	60	107	14	45	2.4
741230		5D	77	124	14	45	2.4
731240	12.4	3D	60	107	14	45	2.4
741240		5D	77	124	14	45	2.4
731250	12.5	3D	60	107	14	45	2.4
741250		5D	77	124	14	45	2.4
731260	12.6	3D	60	107	14	45	2.4
741260		5D	77	124	14	45	2.4
731270	12.7	3D	60	107	14	45	2.4
741270		5D	77	124	14	45	2.4
731280	12.8	3D	60	107	14	45	2.4
741280		5D	77	124	14	45	2.4
731290	12.9	3D	60	107	14	45	2.4
741290		5D	77	124	14	45	2.4
731300	13	3D	60	107	14	45	2.4
741300		5D	77	124	14	45	2.4

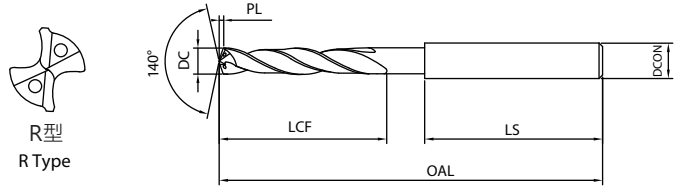
※特殊品訂製，刃徑可0.01間隔

※Customized with special product, outer diameter can be designed from 0.01mm

被削材 Work Material	低碳鋼 軟鋼	中碳鋼	高碳鋼	合金鋼	調質鋼		不鏽鋼	銅	延展 鋁合金	鑄鐵	球墨鑄鐵
	Low Carbon Steel Mild Steel	Medium Carbon Steel	High Carbon Steel	Alloy Steel	Hardened Steel		Stainless Steel	Copper	Aluminum	Cast Iron	Ductile Cast Iron
	C~0.25%	C0.25% ~0.45%	C0.45%~	SCM	~35 HRC	35~45 HRC	SUS	Cu	AL	FC	FCD
TD-3D/5D	◎	◎	◎	◎	○		◎	◎	◎	○	○



# TDO-5D



CARBIDE EgiAs h8 30° SHRINK FIT DIN 6537

單位unit : mm

單位unit : mm

商品編號 EDP NO.	直徑 DC	倍數 Type	溝長 LCF	全長 OAL	柄徑 DCON	柄長 LS	先端 PL
750200	2	5D	18	49	3	30.0	0.4
750210	2.1	5D	19	49	3	28.0	0.4
750220	2.2	5D	20	49	3	28.0	0.4
750230	2.3	5D	20	49	3	28.0	0.4
750240	2.4	5D	20	49	3	28.0	0.6
750250	2.5	5D	20	66	3	36.0	0.6
750260	2.6	5D	24	66	3	36.0	0.6
750270	2.7	5D	25	66	3	36.0	0.6
750280	2.8	5D	26	66	3	36.0	0.7
750290	2.9	5D	27	66	3	36.0	0.7
750300	3	5D	28	66	3	36.0	0.5
750310	3.1	5D	28	66	4	36.0	0.7
750320	3.2	5D	28	66	4	36.0	0.7
750330	3.3	5D	28	66	4	36.0	0.7
750340	3.4	5D	28	66	4	36.0	0.7
750350	3.5	5D	28	66	4	36.0	0.7
750360	3.6	5D	28	66	4	36.0	0.7
750370	3.7	5D	28	66	4	36.0	0.7
750380	3.8	5D	36	74	4	36.0	0.7
750390	3.9	5D	36	74	4	36.0	0.7
750400	4	5D	36	74	4	36.0	0.7
750410	4.1	5D	36	74	6	36.0	0.7
750420	4.2	5D	36	74	6	36.0	0.7
750430	4.3	5D	36	74	6	36.0	0.7
750440	4.4	5D	36	74	6	36.0	0.7
750450	4.5	5D	36	74	6	36.0	0.7

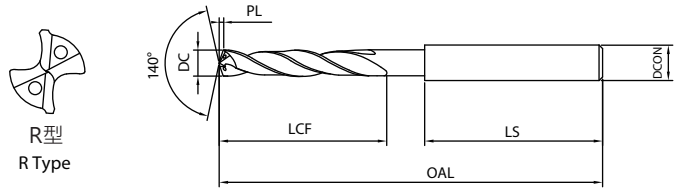
商品編號 EDP NO.	直徑 DC	倍數 Type	溝長 LCF	全長 OAL	柄徑 DCON	柄長 LS	先端 PL
750460	4.6	5D	36	74	6	36.0	0.7
750470	4.7	5D	36	74	6	36.0	0.7
750480	4.8	5D	44	82	6	36.0	0.9
750490	4.9	5D	44	82	6	36.0	0.9
750500	5	5D	44	82	6	36.0	0.9
750510	5.1	5D	44	82	6	36.0	1.1
750520	5.2	5D	44	82	6	36.0	1.1
750530	5.3	5D	44	82	6	36.0	1.1
750540	5.4	5D	44	82	6	36.0	1.1
750550	5.5	5D	44	82	6	36.0	1.1
750560	5.6	5D	44	82	6	36.0	1.1
750570	5.7	5D	44	82	6	36.0	1.1
750580	5.8	5D	44	82	6	36.0	1.1
750590	5.9	5D	44	82	6	36.0	1.1
750600	6	5D	44	82	6	36.0	1.1
750610	6.1	5D	53	91	8	36.0	1.3
750620	6.2	5D	53	91	8	36.0	1.3
750630	6.3	5D	53	91	8	36.0	1.3
750640	6.4	5D	53	91	8	36.0	1.3
750650	6.5	5D	53	91	8	36.0	1.3
750660	6.6	5D	53	91	8	36.0	1.3
750670	6.7	5D	53	91	8	36.0	1.3
750680	6.8	5D	53	91	8	36.0	1.3
750690	6.9	5D	53	91	8	36.0	1.3
750700	7	5D	53	91	8	36.0	1.3
750710	7.1	5D	53	91	8	36.0	1.5

※特殊品訂製，刃徑可0.01間隔

※ Customized with special product, outer diameter can be designed from 0.01mm

被削材 Work Material	低碳鋼 軟鋼	中碳鋼	高碳鋼	合金鋼	調質鋼		不鏽鋼	銅	延展 鋁合金	鑄鐵	球墨鑄鐵
	Low Carbon Steel Mild Steel	Medium Carbon Steel	High Carbon Steel	Alloy Steel	Hardened Steel		Stainless Steel	Copper	Aluminum Rolled	Cast Iron	Ductile Cast Iron
	C~0.25%	C0.25% ~0.45%	C0.45%~	SCM	~35 HRC	35~45 HRC	SUS	Cu	AL	FC	FCD
TDO-5D	◎	◎	◎	◎	○		◎	◎	◎	○	○

# TDO-5D



CARBIDE EgiAs h8 30° SHRINK FIT DIN 6537

單位unit : mm

單位unit : mm

商品編號 EDP NO.	直徑 DC	倍數 Type	溝長 LCF	全長 OAL	柄徑 DCON	柄長 LS	先端 PL
750720	7.2	5D	53	91	8	36.0	1.5
750730	7.3	5D	53	91	8	36.0	1.5
750740	7.4	5D	53	91	8	36.0	1.5
750750	7.5	5D	53	91	8	36.0	1.5
750760	7.6	5D	53	91	8	36.0	1.5
750770	7.7	5D	53	91	8	36.0	1.5
750780	7.8	5D	53	91	8	36.0	1.5
750790	7.9	5D	53	91	8	36.0	1.5
750800	8	5D	53	91	8	36.0	1.5
750810	8.1	5D	61	103	10	40.0	1.6
750820	8.2	5D	61	103	10	40.0	1.6
750830	8.3	5D	61	103	10	40.0	1.6
750840	8.4	5D	61	103	10	40.0	1.6
750850	8.5	5D	61	103	10	40.0	1.6
750860	8.6	5D	61	103	10	40.0	1.6
750870	8.7	5D	61	103	10	40.0	1.6
750880	8.8	5D	61	103	10	40.0	1.6
750890	8.9	5D	61	103	10	40.0	1.6
750900	9	5D	61	103	10	40.0	1.6
750910	9.1	5D	61	103	10	40.0	1.8
750920	9.2	5D	61	103	10	40.0	1.8
750930	9.3	5D	61	103	10	40.0	1.8
750940	9.4	5D	61	103	10	40.0	1.8
750950	9.5	5D	61	103	10	40.0	1.8
750960	9.6	5D	61	103	10	40.0	1.8
750970	9.7	5D	61	103	10	40.0	1.8

商品編號 EDP NO.	直徑 DC	倍數 Type	溝長 LCF	全長 OAL	柄徑 DCON	柄長 LS	先端 PL
750980	9.8	5D	61	103	10	40.0	1.8
750990	9.9	5D	61	103	10	40.0	1.8
751000	10	5D	61	103	10	40.0	1.8
751010	10.1	5D	71	118	12	45.0	2
751020	10.2	5D	71	118	12	45.0	2
751030	10.3	5D	71	118	12	45.0	2
751040	10.4	5D	71	118	12	45.0	2
751050	10.5	5D	71	118	12	45.0	2
751060	10.6	5D	71	118	12	45.0	2
751070	10.7	5D	71	118	12	45.0	2
751080	10.8	5D	71	118	12	45.0	2
751090	10.9	5D	71	118	12	45.0	2
751100	11	5D	71	118	12	45.0	2
751110	11.1	5D	71	118	12	45.0	2.2
751120	11.2	5D	71	118	12	45.0	2.2
751130	11.3	5D	71	118	12	45.0	2.2
751140	11.4	5D	71	118	12	45.0	2.2
751150	11.5	5D	71	118	12	45.0	2.2
751160	11.6	5D	71	118	12	45.0	2.2
751170	11.7	5D	71	118	12	45.0	2.2
751180	11.8	5D	71	118	12	45.0	2.2
751190	11.9	5D	71	118	12	45.0	2.2
751200	12	5D	71	118	12	45.0	2.2

※特殊品訂製，刃徑可0.01間隔

※ Customized with special product, outer diameter can be designed from 0.01mm

被削材 Work Material	低碳鋼 軟鋼	中碳鋼	高碳鋼	合金鋼	調質鋼		不鏽鋼	銅	延展 鋁合金	鑄鐵	球墨鑄鐵
	Low Carbon Steel Mild Steel	Medium Carbon Steel	High Carbon Steel	Alloy Steel	Hardened Steel		Stainless Steel	Copper	Aluminum	Cast Iron	Ductile Cast Iron
	C~0.25%	C0.25% ~0.45%	C0.45%~	SCM	~35 HRC	35~45 HRC	SUS	Cu	AL	FC	FCD
TDO-5D	◎	◎	◎	◎	○		◎	◎	◎	○	○

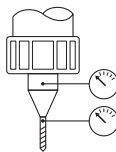


# TDM-5D/7D/10D

切削材 Work Material	碳鋼 Carbon Steel S15C · S50C ~900N/mm <sup>2</sup>			合金鋼 Alloy Steel SCM440 ~1,060N/mm <sup>2</sup>			特殊鋼 · 不鏽鋼 Special Alloy Steel · Stainless Steel SUS300系 · SUS400系 · SUJ2		
切削速度 Cutting Speed	20~80m/min			20~56m/min			15~40m/min		
直徑 Drill Dia.(mm)	回轉速度 Speed(min <sup>-1</sup> )	進給量 Feed Rate (mm/rev)	啄鑽量 Step Feed (mm)	回轉速度 Speed(min <sup>-1</sup> )	進給量 Feed Rate (mm/rev)	啄鑽量 Step Feed (mm)	回轉速度 Speed(min <sup>-1</sup> )	進給量 Feed Rate (mm/rev)	啄鑽量 Step Feed (mm)
0.5	15,000	0.007	0.25~0.50	14,000	0.007	0.25~0.50	13,000	0.007	0.25~0.50
1.0	12,000	0.020	0.25~0.50	11,000	0.020	0.25~0.50	10,000	0.020	0.25~0.50
1.5	10,000	0.020 ~ 0.040	0.25~0.50	8,400	0.020 ~ 0.040	0.25~0.50	6,800	0.030 ~ 0.050	0.25~0.50
2.0	8,000	0.030 ~ 0.050	0.25~0.50	6,500	0.030~ 0.050	0.25~0.50	5,000	0.040 ~ 0.060	0.25~0.50
2.5	6,400	0.037 ~ 0.062	0.25~0.50	5,200	0.037 ~ 0.062	0.25~0.50	4,000	0.050 ~ 0.075	0.25~0.50
2.9	5,500	0.043 ~ 0.072	0.25~0.50	4,500	0.043 ~ 0.072	0.25~0.50	3,500	0.058 ~ 0.087	0.25~0.50

切削材 Work Material	銅 · 銅合金 Copper · Copper Alloys (C<0.3%) S1020 · S2600			鋁合金 Aluminum A5052 · A7075			鋁合金鑄件 Aluminum Alloy AC4C · ADC		
切削速度 Cutting Speed	20~45m/min			32~80m/min			32~63m/min		
直徑 Drill Dia.(mm)	回轉速度 Speed(min <sup>-1</sup> )	進給量 Feed Rate (mm/rev)	啄鑽量 Step Feed (mm)	回轉速度 Speed(min <sup>-1</sup> )	進給量 Feed Rate (mm/rev)	啄鑽量 Step Feed (mm)	回轉速度 Speed(min <sup>-1</sup> )	進給量 Feed Rate (mm/rev)	啄鑽量 Step Feed (mm)
0.5	13,000	0.007	0.10	15,000	0.015	-	15,000	0.007	-
1.0	6,400	0.01	0.25	12,000	0.030	-	12,000	0.010	-
1.5	4,800	0.012 ~ 0.030	0.45	10,000	0.03 ~ 0.08	-	10,000	0.012 ~ 0.030	-
2.0	4,000	0.016 ~ 0.040	0.50 ~ 1.00	8,000	0.04 ~ 0.10	-	8,000	0.016 ~ 0.040	-
2.5	3,200	0.020 ~ 0.050	0.60 ~ 1.25	6,400	0.05 ~ 0.125	-	6,400	0.020 ~ 0.050	-
2.9	2,800	0.022 ~ 0.058	0.70 ~ 1.45	5,500	0.058 ~ 0.145	-	5,500	0.023 ~ 0.058	-

1. 此加工條件表適用於水溶性切削液。
2. 使用品質較佳的水溶性切削液，建議稀釋倍數為20倍。
3. 此加工表適用於孔深度3D以下。若孔深比較深的情況，即使上述條件表中沒有啄鑽量，也請以 0.25D 至 0.5D 作為進給的基準條件。
4. 安裝時的偏擺精度如右圖所示，在主體柄徑部分或柄端應為 0.002mm 或更小。  
(特別是φ0.5以下)



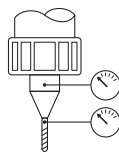
1. The indicated speeds and feeds are for drilling with water-soluble coolant.
2. When using high-quality water-soluble coolant, recommended dilution ration is 20 times.
3. The table above is applied for less than 3D deep drilling operation. When a hole is deeper than 3D, please add step feeding with every 0.25D-0.5D accordingly, even if it is not listed in the above table.
4. The run out of drill spindle should be less than 0.002mm as the picture. (Especially when drill dia. is under 0.5mm.)

# TD-3D/5D

切削材 Work Material	軟鋼・低碳鋼・合金鋼 Mild steel · Low Carbon Steel · Alloy Steel (C<0.3%) SS400 · SCM ~710N/mm <sup>2</sup>		中・高碳鋼 Midum · High Carbon Steel S35C · S50C ~210HB 710N/mm <sup>2</sup>		合金鋼 Alloy Steel SCM · SCr · SNCM 16~28HRC 710~900N/mm <sup>2</sup>	
切削速度 Cutting Speed	70~120m/min		60~120m/min		60~120m/min	
直徑 Drill Dia.(mm)	回轉速度 Speed(min <sup>-1</sup> )	進給量 Feed Rate (mm/rev)	回轉速度 Speed(min <sup>-1</sup> )	進給量 Feed Rate (mm/rev)	回轉速度 Speed(min <sup>-1</sup> )	進給量 Feed Rate (mm/rev)
3	10,600	0.06 ~ 0.12	9,500	0.06 ~ 0.12	9,500	0.06 ~ 0.12
4	8,000	0.08 ~ 0.16	7,200	0.08 ~ 0.16	7,200	0.08 ~ 0.16
6	5,300	0.12 ~ 0.24	4,800	0.12 ~ 0.24	4,800	0.12 ~ 0.24
8	4,000	0.16 ~ 0.28	3,600	0.16 ~ 0.28	3,600	0.16 ~ 0.28
10	3,200	0.20 ~ 0.30	2,900	0.20 ~ 0.30	2,900	0.20 ~ 0.30
12	2,700	0.21 ~ 0.30	2,400	0.21 ~ 0.30	2,400	0.21 ~ 0.30
14	2,300	0.22 ~ 0.35	2,050	0.22 ~ 0.35	2,050	0.22 ~ 0.35
16	2,000	0.25 ~ 0.36	1,800	0.25 ~ 0.36	1,800	0.25 ~ 0.36
18	1,800	0.28 ~ 0.38	1,600	0.28 ~ 0.38	1,600	0.28 ~ 0.38
20	1,600	0.30 ~ 0.40	1,450	0.30 ~ 0.40	1,450	0.30 ~ 0.40

切削材 Work Material	合金鋼 Alloy Steel SCM · SCr · SNCM 28~35HRC 900~1,100N/mm <sup>2</sup>		不銹鋼 Stainless Steel SUS300系 SUS400系 480~800N/mm <sup>2</sup>		鑄鐵・球墨鑄鐵 Cast Iron · Ductile Cast Iron FC250 · FCD450 · FCD600 ~350N/mm <sup>2</sup> · 400~600N/mm <sup>2</sup>	
切削速度 Cutting Speed	50~90m/min		30~60m/min		50~100m/min	
直徑 Drill Dia.(mm)	回轉速度 Speed(min <sup>-1</sup> )	進給量 Feed Rate (mm/rev)	回轉速度 Speed(min <sup>-1</sup> )	進給量 Feed Rate (mm/rev)	回轉速度 Speed(min <sup>-1</sup> )	進給量 Feed Rate (mm/rev)
3	7,400	0.06 ~ 0.12	4,800	0.06 ~ 0.12	8,000	0.06 ~ 0.12
4	5,600	0.08 ~ 0.16	3,600	0.08 ~ 0.16	6,000	0.08 ~ 0.16
6	3,700	0.12 ~ 0.24	2,400	0.12 ~ 0.24	4,000	0.12 ~ 0.24
8	2,800	0.16 ~ 0.28	1,800	0.16 ~ 0.28	3,000	0.16 ~ 0.28
10	2,200	0.20 ~ 0.30	1,450	0.20 ~ 0.30	2,400	0.20 ~ 0.30
12	1,900	0.21 ~ 0.30	1,200	0.21 ~ 0.30	2,000	0.21 ~ 0.30
14	1,400	0.22 ~ 0.35	1,050	0.22 ~ 0.35	1,700	0.22 ~ 0.35
16	1,200	0.25 ~ 0.36	900	0.25 ~ 0.36	1,500	0.25 ~ 0.36
18	1,050	0.28 ~ 0.38	800	0.28 ~ 0.38	1,350	0.28 ~ 0.38
20	950	0.30 ~ 0.40	750	0.30 ~ 0.40	1,200	0.30 ~ 0.40

1. 此加工條件表適用於水溶性切削液。
2. 使用品質較佳的水溶性切削液，建議稀釋倍數為20倍。
3. 此加工表適用於孔深度3D以下。
4. 安裝時的偏擺精度如右圖所示，在主體柄徑部分或柄端應為 **0.002mm或更小**。（特別是φ0.5以下）
5. 3D以上建議搭配啄鑽加工以幫助刀具冷卻。



1. The indicated speeds and feeds are for drilling with **water-soluble coolant**.
2. When using high-quality water-soluble coolant, recommended dilution ratio is 20 times.
3. The table above is applied for less than 3D deep drilling operation.
4. The run out of drill spindle should be **less than 0.002mm** as the picture.(Especially when drill dia. is under 0.5mm)

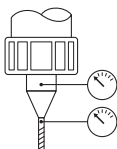


# TDO-5D

切削材 Work Material	軟鋼・低碳鋼 Mild steel · Low Carbon Steel SS400 · S10C ~150HB ~500N/mm <sup>2</sup>		中・高碳鋼 Midium · High Carbon Steel S35C · S50C ~210HB ~710N/mm <sup>2</sup>		合金鋼 Alloy Steel SCM · SCr · SNCM 16~28HB 710~900N/mm <sup>2</sup>		合金鋼 Alloy Steel SCM · SCr · SNCM 28~35HB 900~1,100N/mm <sup>2</sup>	
	80~120m/min		80~160m/min		80~120m/min		60~90m/min	
直徑 Drill Dia.(mm)	回轉速度 Speed(min <sup>-1</sup> )	進給量 Feed Rate (mm/rev)	回轉速度 Speed(min <sup>-1</sup> )	進給量 Feed Rate (mm/rev)	回轉速度 Speed(min <sup>-1</sup> )	進給量 Feed Rate (mm/rev)	回轉速度 Speed(min <sup>-1</sup> )	進給量 Feed Rate (mm/rev)
2	12,700	0.04~0.08	12,700	0.04~0.08	12,700	0.04~0.08	11,100	0.04~0.08
3	10,600	0.06~0.12	10,600	0.06~0.12	10,600	0.06~0.12	7,400	0.06~0.12
4	8,000	0.08~0.16	8,000	0.08~0.16	8,000	0.08~0.16	5,600	0.08~0.16
5	6,400	0.10~0.20	6,400	0.10~0.20	6,400	0.10~0.20	4,500	0.10~0.20
6	5,300	0.12~0.24	5,300	0.12~0.24	5,300	0.12~0.24	3,700	0.12~0.24
7	4,500	0.14~0.26	4,500	0.14~0.26	4,500	0.14~0.26	3,200	0.14~0.26
8	4,000	0.16~0.28	4,000	0.16~0.28	4,000	0.16~0.28	2,800	0.16~0.28
9	3,500	0.18~0.30	3,500	0.18~0.30	3,500	0.18~0.30	2,500	0.18~0.30
10	3,200	0.20~0.30	3,200	0.20~0.30	3,200	0.20~0.30	2,200	0.20~0.30
11	2,900	0.20~0.30	2,900	0.20~0.30	2,900	0.20~0.30	2,000	0.20~0.30
12	2,700	0.21~0.30	2,700	0.21~0.30	2,700	0.21~0.30	1,900	0.21~0.30
14	2,300	0.22~0.35	2,300	0.22~0.35	2,300	0.22~0.35	1,600	0.22~0.35
16	2,000	0.25~0.36	2,000	0.25~0.36	2,000	0.25~0.36	1,400	0.25~0.36
18	1,800	0.28~0.38	1,800	0.28~0.38	1,800	0.28~0.38	1,200	0.28~0.38
20	1,600	0.30~0.40	1,600	0.30~0.40	1,600	0.30~0.40	1,100	0.30~0.40

切削材 Work Material	鑄鐵 Cast Iron FC250 ~350N/mm <sup>2</sup>		球墨鑄鐵 Ductile Cast Iron FCD450 FCD600 400~600N/mm <sup>2</sup>		不銹鋼 Stainless Steel SUS300系 SUS400系 480~800N/mm <sup>2</sup>		特殊鋼・調質鋼・預硬鋼 Special Alloy Steel · Hardened Steel · Prehardened Steel SKD61 (非調質) (Unquenched) 34~40HRC 1,060~1,250N/mm <sup>2</sup>	
	80~120m/min		60~100m/min		40~80m/min		30~60m/min	
直徑 Drill Dia.(mm)	回轉速度 Speed(min <sup>-1</sup> )	進給量 Feed Rate (mm/rev)	回轉速度 Speed(min <sup>-1</sup> )	進給量 Feed Rate (mm/rev)	回轉速度 Speed(min <sup>-1</sup> )	進給量 Feed Rate (mm/rev)	回轉速度 Speed(min <sup>-1</sup> )	進給量 Feed Rate (mm/rev)
2	12,700	0.04~0.08	12,700	0.04~0.08	9,500	0.04~0.08	7,200	0.04~0.06
3	10,600	0.06~0.12	8,500	0.06~0.12	6,400	0.06~0.12	4,800	0.06~0.09
4	8,000	0.08~0.16	6,400	0.08~0.16	4,800	0.08~0.16	3,600	0.08~0.12
5	6,400	0.10~0.20	5,100	0.10~0.20	3,800	0.10~0.20	2,900	0.10~0.15
6	5,300	0.12~0.24	4,200	0.12~0.24	3,200	0.12~0.24	2,400	0.12~0.18
7	4,500	0.14~0.26	3,600	0.14~0.26	2,700	0.14~0.26	2,000	0.14~0.21
8	4,000	0.16~0.28	3,200	0.16~0.28	2,400	0.16~0.28	1,800	0.16~0.24
9	3,500	0.18~0.30	2,800	0.18~0.30	2,100	0.18~0.30	1,600	0.18~0.27
10	3,200	0.20~0.30	2,500	0.20~0.30	1,900	0.20~0.30	1,400	0.20~0.30
11	2,900	0.20~0.30	2,300	0.20~0.30	1,700	0.20~0.30	1,300	0.20~0.30
12	2,700	0.21~0.30	2,100	0.21~0.30	1,600	0.21~0.30	1,200	0.21~0.30
14	2,300	0.22~0.35	1,800	0.22~0.35	1,400	0.22~0.35	1,000	0.22~0.35
16	2,000	0.25~0.36	1,600	0.25~0.36	1,200	0.25~0.36	900	0.25~0.36
18	1,800	0.28~0.38	1,400	0.28~0.38	1,100	0.28~0.38	800	0.28~0.38
20	1,600	0.30~0.40	1,300	0.30~0.40	1,000	0.30~0.40	700	0.30~0.40

1. 此加工條件表適用於水溶性切削液和MQL。
2. 使用品質較佳的水溶性切削液，建議稀釋倍數為20倍以下。
3. 使用非水溶性切削液或水溶性切削液稀釋倍數在20倍以上時，建議降低切削速度30%。
4. 此加工表適用於孔深度5D以下。
5. 安裝鑽頭時，請使用沒有損傷及污垢的夾頭，並保持鑽頭的偏擺精度在 0.02 mm以下。



1. The indicated speeds and feeds are for drilling with water-soluble coolant or MQL.
2. When using high-quality water-soluble coolant, recommended dilution ratio is 20 times.
3. When using non-water-soluble or water-soluble (over 20times dilution), reduce cutting speed by 30%.
4. The cutting conditions are applied for less than 5D deep drilling operation.
5. Equip the drill with a scratch- and dust-free collet and minimize drill deflection to less than 0.02mm.

# 孔與軸的容許差對照表 Table of Tolerances for Holes and Shafts

## ■ 孔的容許差對照表(節錄自JIS B 0401-2:2016(ISO286-2:2010)表3,4,5,6,7,8,9)

Tolerance for Holes(Excerpt from JIS B 0401-2:2016(ISO286-2:2010) Table 3,4,5,6,7,8,9)

(單位: μm) (unit: μm)

圖示尺寸 Illustrated Size (mm)		E			F			G			H				JS		K		M		N	
超 Over	以下 Up to	7	8	9	6	7	8	6	7	6	7	8	9	10	6	7	6	7	6	7	6	7
-	3	+24 +14	+28 +14	+39 +14	+12 +6	+16 +6	+20 +6	+8 +2	+12 +2	+6 0	+10 0	+14 0	+25 0	+40 0	±3	±5	0 -6	0 -10	-2 -8	-2 -12	-4 -10	-4 -14
3	6	+32 +20	+38 +20	+50 +20	+18 +10	+22 +10	+28 +10	+12 +4	+16 +4	+8 0	+12 0	+18 0	+30 0	+48 0	±4	±6	+2 -6	+3 -9	-1 -9	0 -12	-5 -13	-4 -16
6	10	+40 +25	+47 +25	+61 +25	+22 +13	+28 +13	+35 +13	+14 +5	+20 +5	+9 0	+15 0	+22 0	+36 0	+58 0	±4.5	±7.5	+2 -7	+5 -10	-3 -12	0 -15	-7 -16	-4 -19
10	14	+50 +32	+59 +32	+75 +32	+27 +16	+34 +16	+43 +16	+17 +6	+24 +6	+11 0	+18 0	+27 0	+43 0	+70 0	±5.5	±9	+2 -9	+6 -12	-4 -15	0 -18	-9 -20	-5 -23
14	18																					
18	24	+61 +40	+73 +40	+92 +40	+33 +20	+41 +20	+53 +20	+20 +7	+28 +7	+13 0	+21 0	+33 0	+52 0	+84 0	±6.5	±10.5	+2 -11	+6 -15	-4 -17	0 -21	-11 -24	-7 -28
24	30																					
30	40	+75 +50	+89 +50	+112 +50	+41 +25	+50 +25	+64 +25	+34 +9	+47 +9	+22 0	+35 0	+54 0	+87 0	+140 0	±8	±12.5	+3 -13	+7 -18	-4 -20	0 -25	-12 -28	-8 -33
40	50																					
50	65	+90 +60	+106 +60	+134 +60	+49 +30	+60 +30	+76 +30	+29 +10	+40 +10	+19 0	+30 0	+46 0	+74 0	+120 0	±9.5	±15	+4 -15	+9 -21	-5 -24	0 -30	-14 -33	-9 -39
65	80																					
80	100	+107 +72	+126 +72	+159 +72	+58 +36	+71 +36	+90 +36	+34 +12	+47 +12	+22 0	+35 0	+54 0	+87 0	+140 0	±11	±17.5	+4 -18	+10 -25	-6 -28	0 -35	-16 -38	-10 -45
100	120																					
120	140	+125 +85	+148 +85	+185 +85	+68 +43	+83 +43	+106 +43	+39 +14	+54 +14	+25 0	+40 0	+63 0	+100 0	+160 0	±12.5	±20	+4 -21	+12 -28	-8 -33	0 -40	-20 -45	-12 -52
140	160																					
160	180																					

在表的每一行中, 上面的數字表示尺寸公差上限, 下面的數字表示尺寸公差下限。

In every step given in the table, the value on the upper side shows the upper deviation and the value on the lower side, the lower deviation.

## ■ 軸的容許差對照表(節錄自JIS B 0401-2:2016(ISO286-2:2010)表19,20,21,22,23,24,25)

Tolerance for Shafts(Excerpt from JIS B 0401-2:2016(ISO286-2:2010) Table 19,20,21,22,23,24,25)

(單位: μm) (unit: μm)

圖示尺寸 Illustrated Size (mm)		e			f			g			h				js			k		m		n	
超 Over	以下 Up to	7	8	9	6	7	8	5	6	4	5	6	7	8	9	5	6	7	5	6	5	6	6
-	3	-14 -24	-14 -28	-14 -39	-6 -12	-6 -16	-6 -20	-2 -6	-2 -8	0 -3	0 -4	0 -6	0 -10	0 -14	0 -25	±2	±3	±5	+4 0	+6 0	+6 +2	+8 +2	+10 +4
3	6	-20 -32	-20 -38	-20 -50	-10 -18	-10 -22	-10 -28	-4 -9	-4 -12	0 -4	0 -5	0 -8	0 -12	0 -18	0 -30	±2.5	±4	±6	+6 +1	+9 +1	+9 +4	+12 +4	+16 +8
6	10	-25 -40	-25 -47	-25 -61	-13 -22	-13 -28	-13 -35	-5 -11	-5 -14	0 -4	0 -6	0 -9	0 -15	0 -22	0 -36	±3	±4.5	±7.5	+7 +1	+10 +1	+12 +6	+15 +6	+19 +10
10	14	-32 -50	-32 -59	-32 -75	-16 -27	-16 -34	-16 -43	-6 -14	-6 -17	0 -5	0 -8	0 -11	0 -18	0 -27	0 -43	±4	±5.5	±9	+9 +1	+12 +1	+15 +7	+18 +7	+23 +12
14	18																						
18	24	-40 -61	-40 -73	-40 -92	-20 -33	-20 -41	-20 -53	-7 -16	-7 -20	0 -6	0 -9	0 -13	0 -21	0 -33	0 -52	±4.5	±6.5	±10.5	+11 +2	+15 +2	+17 +8	+21 +8	+28 +15
24	30																						
30	40	-50 -75	-50 -89	-50 -112	-25 -41	-25 -50	-25 -64	-9 -20	-9 -25	0 -7	0 -11	0 -16	0 -25	0 -39	0 -62	±5.5	±8	±12.5	+13 +2	+18 +2	+20 +9	+25 +9	+33 +17
40	50																						
50	65	-60 -90	-60 -106	-60 -134	-30 -49	-30 -60	-30 -76	-10 -23	-10 -29	0 -8	0 -13	0 -19	0 -30	0 -46	0 -74	±6.5	±9.5	±15	+15 +2	+21 +2	+24 +11	+30 +11	+39 +20
65	80																						
80	100	-72 -107	-72 -126	-72 -159	-36 -58	-36 -71	-36 -90	-12 -34	-12 -34	0 -10	0 -15	0 -22	0 -35	0 -54	0 -87	±7.5	±11	±17.5	+18 +3	+25 +3	+28 +13	+35 +13	+45 +23
100	120																						
120	140	-85 -125	-85 -148	-85 -185	-43 -68	-43 -83	-43 -106	-14 -32	-14 -39	0 -12	0 -18	0 -25	0 -40	0 -63	0 -100	±9	±12.5	±20	+21 +3	+28 +3	+33 +15	+40 +15	+52 +27
140	160																						
160	180																						

在表的每一行中, 上面的數字表示尺寸公差上限, 下面的數字表示尺寸公差下限。

In every step given in the table, the value on the upper side shows the upper deviation and the value on the lower side, the lower deviation.



# 硬度換算表 Comparison Chart Scale for Hardness

## 鋼的洛氏C硬度近似換算表

Approximate relationship between various hardness scales

(HRC) 洛氏硬度 刻度*注1 Rockwell hardness C scale 150kg Brale	(HV) 維氏硬度 Diamond Pyramid hardness number, Vickers	布氏硬度 (HB) 10mm球 重量29.42kN Brinell hardness 29.42kN			洛氏硬度*注1 Rockwell hardness 29.42kN			洛氏表面硬度 鑽石圓錐壓子 Rockwell hardness			(Hs) 蕭氏硬度 Shore scleroscope hardness number	抗拉強度 N/mm <sup>2</sup> Approx. tensile strength N/mm	(HRC) 洛氏硬度 刻度*注1 Rockwell hardness C scale 150kg Brale
		標準球 Standard 10mm ball	Hultgren球 Hultgren 10mm ball	超硬合金鋼球 Tungsten carbide 10mm	(HRA)A刻度 荷重588.4N 鑽石圓錐壓子 A scale 60Kg Brale	(HRB)B刻度 荷重980.7N 直徑1/16球 B scale 100Kg 1/16-in	(HRD)D刻度 荷重980.7N 鑽石圓錐壓子 D scale 100Kg Brale	15N 刻度荷重 147.1N Superficial 15N	30N 刻度荷重 147.1N Superficial 30N	45N 刻度荷重 147.1N Superficial 45N			
68	940	-	-	-	85.6	-	76.9	93.2	84.4	75.4	97	-	68
67	900	-	-	-	85.0	-	76.1	92.9	83.6	74.2	95	-	67
66	865	-	-	-	84.5	-	75.4	92.5	82.8	73.3	92	-	66
65	832	-	-	739	83.9	-	74.5	92.2	81.9	72.0	91	-	65
64	800	-	-	722	83.4	-	73.8	91.8	81.1	71.0	88	-	64
63	772	-	-	705	82.8	-	73.0	91.4	80.1	69.9	87	-	63
62	746	-	-	688	82.3	-	72.2	91.1	79.3	68.8	85	-	62
61	720	-	-	670	81.8	-	71.5	90.7	78.4	67.7	83	-	61
60	697	-	613	654	81.2	-	70.7	90.2	77.5	66.6	81	-	60
59	674	-	599	634	80.7	-	69.9	89.8	76.6	65.5	80	-	59
58	653	-	587	615	80.1	-	69.2	89.3	75.7	64.3	78	-	58
57	633	-	575	595	79.6	-	68.5	88.9	74.8	63.2	76	-	57
56	613	-	561	577	79.0	-	67.7	88.3	73.9	62.0	75	-	56
55	595	-	546	560	78.5	-	66.9	87.9	73.0	60.9	74	2079	55
54	577	-	534	543	78.0	-	66.1	87.4	72.0	59.8	72	2010	54
53	560	-	519	525	77.4	-	65.4	86.9	71.2	58.6	71	1952	53
52	544	500	508	512	76.8	-	64.6	86.4	70.2	57.4	69	1883	52
51	528	487	494	496	76.3	-	63.8	85.9	69.4	56.1	68	1824	51
50	513	475	481	481	75.9	-	63.1	85.5	68.5	55.0	67	1755	50
49	498	464	469	469	75.2	-	62.1	85.0	67.6	53.8	66	1687	49
48	484	451	455	455	74.7	-	61.4	84.5	66.7	52.5	64	1638	48
47	471	442	443	443	74.1	-	60.8	83.9	65.8	51.4	63	1579	47
46	458	432	432	432	73.6	-	60.0	83.5	64.8	50.3	62	1530	46
45	446	421	421	421	73.1	-	59.2	83.0	64.0	49.0	60	1481	45
44	434	409	409	409	72.5	-	58.5	82.5	63.1	47.8	58	1432	44
43	423	400	400	400	72.0	-	57.7	82.0	62.2	46.7	57	1383	43
42	412	390	390	390	71.5	-	56.9	81.5	61.3	45.5	56	1334	42
41	402	381	381	381	70.9	-	56.2	80.9	60.4	44.3	55	1294	41
40	392	371	371	371	70.4	-	55.4	80.4	59.5	43.1	54	1245	40
39	382	362	362	362	69.9	-	54.6	79.9	58.6	41.9	52	1216	39
38	372	353	353	353	69.4	-	53.8	79.4	57.7	40.8	51	1177	38
37	363	344	344	344	68.9	-	53.1	78.8	56.8	39.6	50	1157	37
36	354	336	336	336	68.4	(109.0)	52.3	78.3	55.9	38.4	49	1118	36
35	345	327	327	327	67.9	(108.5)	51.5	77.7	55.0	37.2	48	1079	35
34	336	319	319	319	67.4	(108.0)	50.8	77.2	54.2	36.1	47	1059	34
33	327	311	311	311	66.8	(107.5)	50.0	76.6	53.3	34.9	46	1030	33
32	318	301	301	301	66.3	(107.0)	49.2	76.1	52.1	33.7	44	1000	32
31	310	294	294	294	65.8	(106.0)	48.4	75.6	51.3	32.5	43	981	31
30	302	286	286	286	65.3	(105.5)	47.7	75.0	50.4	31.3	42	951	30
29	294	279	279	279	64.7	(104.5)	47.0	74.5	49.5	30.1	41	932	29
28	286	271	271	271	64.3	(104.0)	46.1	73.9	48.6	28.9	41	912	28
27	279	264	264	264	63.8	(103.0)	45.2	73.3	47.7	27.8	40	883	27
26	272	258	258	258	63.3	(102.5)	44.6	72.8	46.8	26.7	38	863	26
25	266	253	253	253	62.8	(101.5)	43.8	72.2	45.9	25.5	38	843	25
24	260	247	247	247	62.4	(101.0)	43.1	71.6	45.0	24.3	37	824	24
23	254	243	243	243	62.0	100.0	42.1	71.0	44.0	23.1	36	804	23
22	248	237	237	237	61.5	99.0	41.6	70.5	43.2	22.0	35	785	22
21	243	231	231	231	61.0	98.5	40.9	69.9	42.3	20.7	35	775	21
20	238	226	226	226	60.5	97.8	40.1	69.4	41.5	19.6	34	755	20
(18)	230	219	219	219	-	96.7	-	-	-	-	33	736	(18)
(16)	222	212	212	212	-	95.5	-	-	-	-	32	706	(16)
(14)	213	203	203	203	-	93.9	-	-	-	-	31	677	(14)
(12)	204	194	194	194	-	92.3	-	-	-	-	29	647	(12)
(10)	196	187	187	187	-	90.7	-	-	-	-	28	618	(10)
(8)	188	179	179	179	-	89.5	-	-	-	-	27	598	(8)
(6)	180	171	171	171	-	87.1	-	-	-	-	26	579	(6)
(4)	173	165	165	165	-	85.5	-	-	-	-	25	549	(4)
(2)	166	158	158	158	-	83.5	-	-	-	-	24	530	(2)
(0)	160	152	152	152	-	81.7	-	-	-	-	24	520	(0)

粗體字的數字取自ASTM E 140 表2(與SAE-ASM-ASTM一併整合)\*注1 表中括弧( )內的數字為不常使用的範圍。

Figures shown in boldface is based on ASTM E140 Figure 2, which is jointly coordinated by SAE, ASM and ASTM. In above chart, figures with ( ) are not commonly used.





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#### ⚠️ 安全使用注意事項

- 使用工具時，工具可能有破損的風險，請務必使用上蓋、護目鏡、安全鞋等等防護物品，以策安全。
- 請勿空手碰觸切屑與切刃。
- 工具切刃銳利度下降時，請停止使用。
- 發生異音、異常震動時，請立刻停止使用。
- 請勿修改工具樣式。
- 加工前，請確認工具尺寸。

#### ⚠️ Safe use of cutting tools

- Use safety cover, safety glasses and safety shoes during operation.
- Do not touch cutting edges and chips with bare hands.
- Stop cutting when the tool becomes dull.
- Stop cutting operation immediately if you hear any abnormal cutting sounds.
- Do not modify tools.
- Please use appropriate tools for the operation. Check dimensions to ensure proper selection.

#### 大實精密工具

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