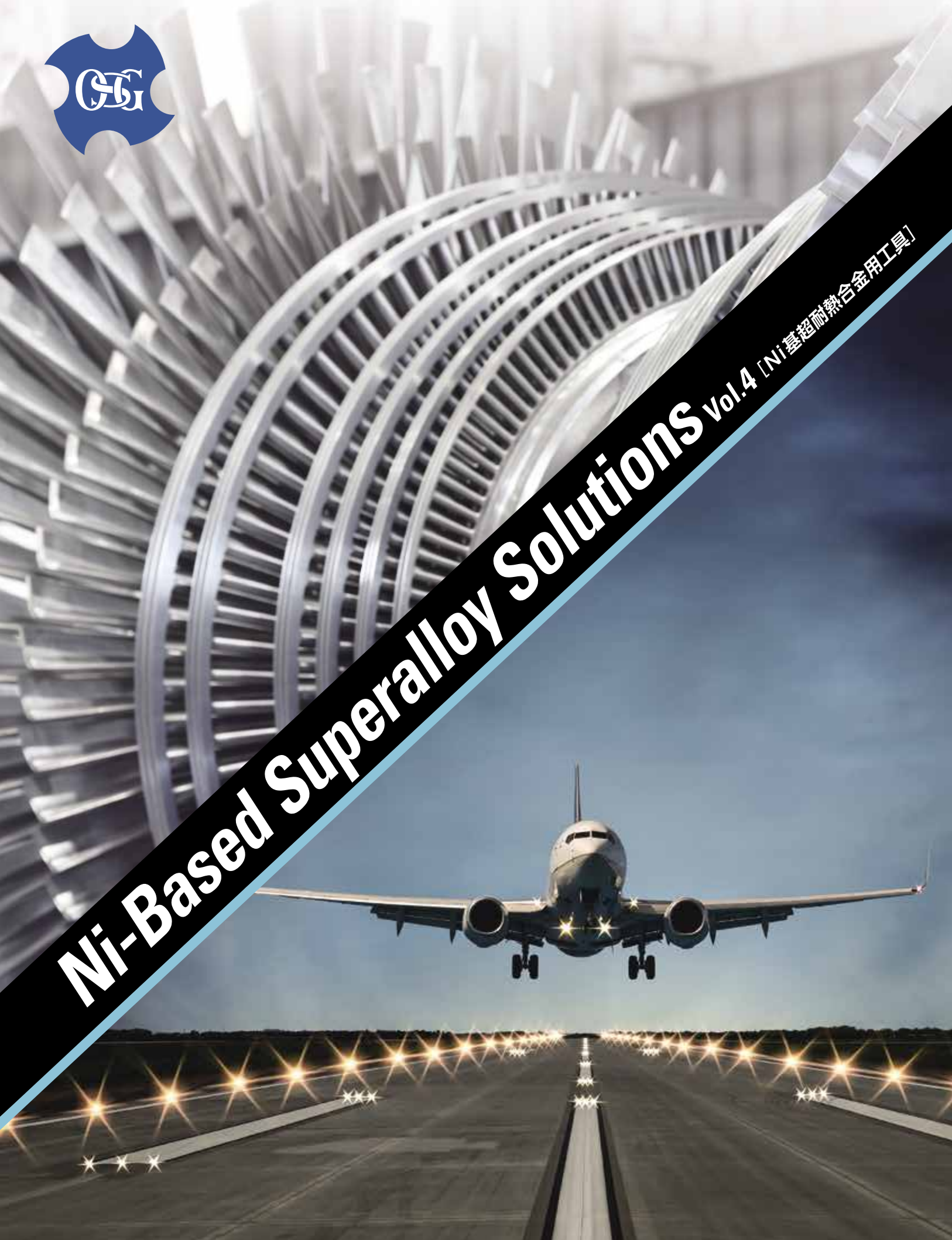




Ni-Based Superalloy Solutions Vol.4 [Ni基超耐热合金用工具]



镍基超耐热合金是十分难加工的材料。与快削钢相比，切削加工难度大了10倍。
Machinability of Ni-based superalloy is approximately 10 times more difficult to machine than free-cutting steel.

■ 切削加工性能指数

Machinability Index

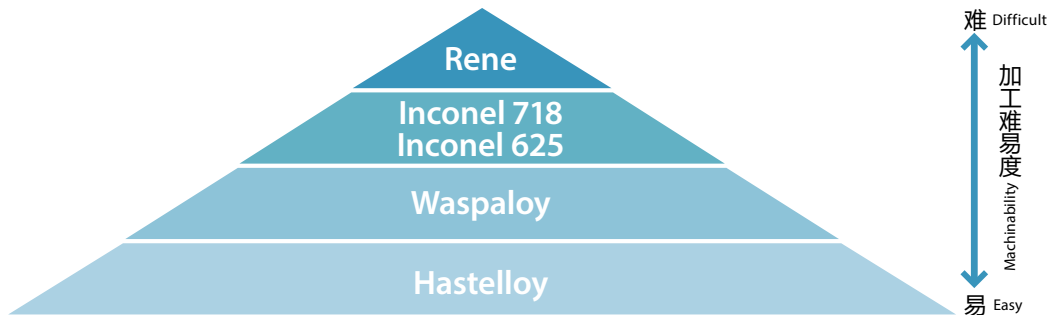
加工材料 Work Material	加工材料性能指数 Machinability Index	加工材料 Work Material	加工材料性能指数 Machinability Index	
快削钢 (AISI B1112) Free Cutting Steel	100%	铁素体不锈钢 Ferritic Stainless Steels	65~50%	
		马氏体不锈钢 Martensitic Stainless Steels	55~40%	
铜合金 Copper Alloy	100~70%	奥氏体不锈钢 Austenitic Stainless Steels	50~40%	
低碳素钢 Low Carbon Steel	85~70%	钛合金 Titanium Alloy	30~27%	
中碳素钢 Medium Carbon Steel	65~50%	超耐热合金 Superalloy	铁基合金 Fe-Based	27~20%
高碳素钢 High Carbon Steel	60~50%		镍基合金 Ni-Based	15~6%
铸铁 Cast Iron	50%		钴基合金 Co-Based	10~6%

■ 加工镍基合金的加工问题与加工工具的必要条件

Problems and tool requirements for machining Ni-based superalloy

问题 Issue	加工工具的必要条件 Tool Requirement	
加工时产生过高的切削热 High cutting temperatures	减少切削阻力 Reduced cutting force	
切削阻力大 High cutting force		
加工工具寿命短 Short tool life	工具磨损严重 Tool wear	提高耐磨损性 Improved wear resistance
	溶着引起的崩损 Chipping caused by welding	提高刃尖强度 Improved cutting edge strength
		高韧性工具材料 Tough tool material
	防止溶着 Welding prevention	
因加工材料价格昂贵，所以加工时更加追求高成品率 Materials are expensive, and no machining failure is allowed		稳定性 Stability

具代表性的镍基超耐热合金 Common Ni-based Superalloy



■ 标识种类 Guide for Icons

1 材质 Tool Material

- CARBIDE** 硬质合金 Tungsten Carbide
- XPM** 高级粉末高速钢 High Grade Powder Metallurgy HSS (XPM)
- CPM** 粉末高速钢 Powder Metallurgy HSS (CPM)
- CERAMIC** 陶瓷 Ceramic

2 加工螺旋种类 Thread Type

- 内螺纹** for Internal Thread
- 外螺纹** for External Thread

3 外径·直径的容许差 Tolerance for diameter

- h8** 表示钻头直径的容许差 Tolerance for drill diameter.
- 表示铣刀外径的容许差。 Tolerance for end mill diameter.
- 30°** 表示槽的螺旋角度。 Helix angle of flute.
- R ± 0.02** 表示圆弧角铣刀的 R 容许差。 Identifies the tolerance of the radius for end mills

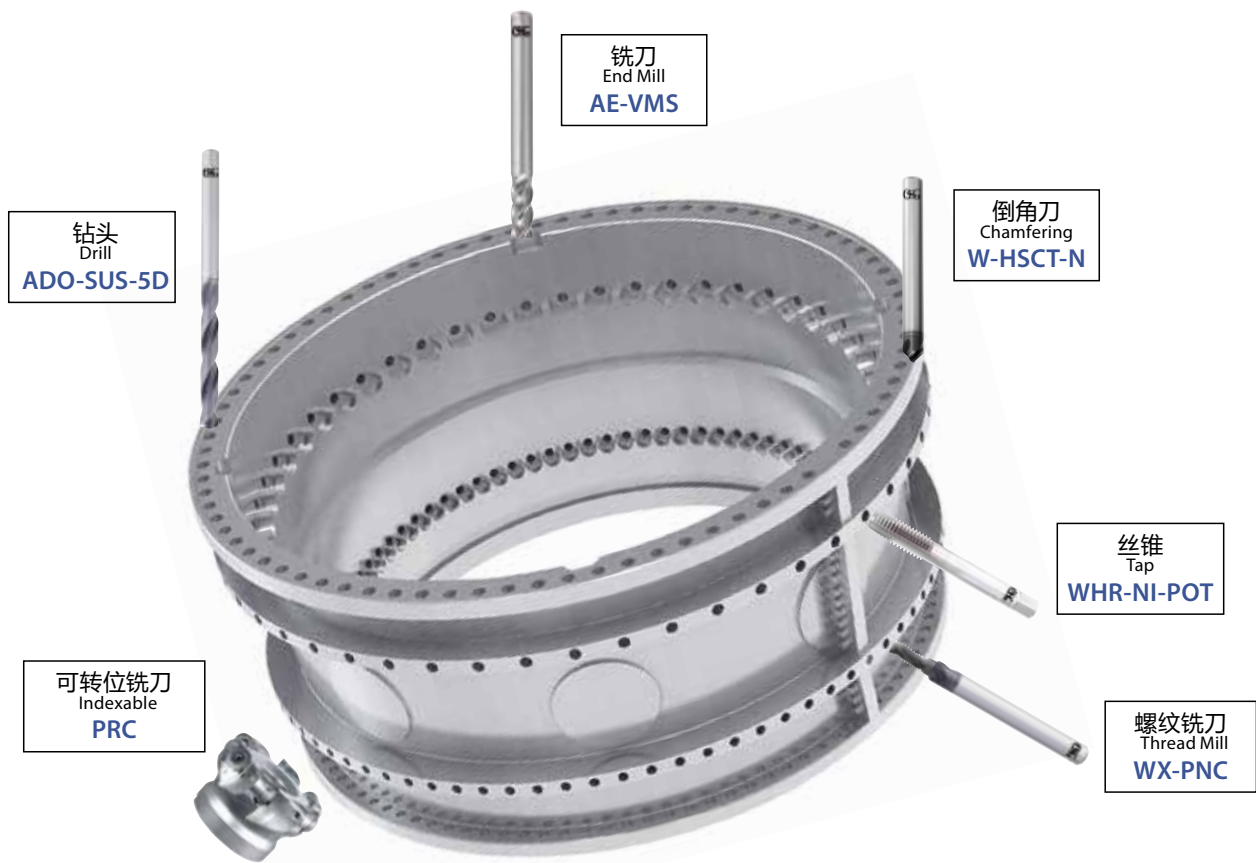
4 刀柄 Shank

- SHANK h7** 表示刀柄精度。 Tolerance for shank diameter.
- SHRINK FIT** 推荐使用热胀刀柄。 Suitable for shrink holder system.

5 表面处理 Surface Treatment

- WXL** WXL 涂层 WXL coating
- WXS** WXS 涂层 WX Super coating
- HR** HR 涂层 HR coating
- WX** WX 涂层 WX (TiAlN) coating
- V** V 涂层 (复合多层涂层) V (composite multi-layered) coating
- WDI** WDI 涂层 WDI coating
- FX** FX 涂层 FX (TiAlN) coating
- DUARISE** Duarise 涂层 Duarise coating

WXL、WXS、WDI、DUARISE以及Smooth涂层为OSG公司的注册商标。
WXL, WXS and WDI, DUARISE are registered trademarks of OSG Corporation.



推荐工具一览表及适用的加工材料 Recommended tools and applicable work material list

本样本介绍了只适用于下列加工材料的产品及尺寸。
Please note that only products and dimensions suitable for the below work materials are published in this catalog.

产品种类 Product Category	推荐工具 Recommended Tools	所在页 Pages	镍基合金 Ni-Based Alloy	钛合金 Titanium Alloy Ti-6Al-4V	析出硬化不锈钢 Precipitation Stainless Steel SUS630
硬质合金钻头 Carbide Drills	WHO55-5D	p. 3 ~ 6	◎	—	—
	ADO-SUS	p. 7 ~ 18	◎	◎	◎
高速钢钻头 HSS Drills	VPH-GDS	p.19 ~ 30	◎	○	○
丝锥 Taps	WHR-NI-SFT※	p.31 ~ 34	◎	—	—
	WHR-NI-POT※			○	—
螺纹铣刀 Thread Mills	WX-PNC	p.37 ~ 42	◎	◎	◎
	WH-VM-PNC		◎	◎	◎
硬质合金铣刀 End Mills	AE-VMSS	p.43 ~ 48	○	○	◎
	AE-VMS		○	○	◎
	NEO-PHS	p.49 ~ 54	◎	◎	◎
	NEO-EMS				
	NEO-CR-PHS				
	NEO-CR-EMS				
	W-HSCT-P	p.55	◎	◎	◎
	W-HSCT-N		◎	○	○
	CM-RMS※	p.56 ~ 60	◎	—	—
	CM-CRE※		◎	—	—
可转位铣刀 Indexable	XC5035	p.61 ~ 62	◎	◎	○
	XC5040※				

※标记※的产品仅适用于本图表所列材料。详情请参阅OSG综合样本。
Suitable for materials listed in this chart only. Please see OSG general catalog for details.

◎ :最适用 Best ○ :适用 Good

上述产品可根据客户要求订制非标品。具体请咨询本社营业人员。
Custom order with specific requests are accepted. Please contact our sales staff for information.

WHO55-5D 的特点 Features

1 锋利的切削刃 Sharp cutting edge

为了加工时效处理后的镍基耐热合金，需要锋利的切削刃来确保加工。锋利的切削刃还可以抑制发热，从而实现切屑的稳定生成。

WHO55-5D is designed to machine aged Ni-based superalloy. With its sharp cutting edges, stable chip shape is produced by reducing cutting heat generation.

2 工具的高刚性 High tool rigidity

沟槽采用小螺旋角设计，实现工具的高刚性。

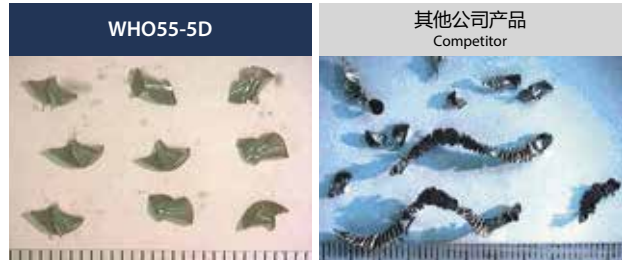
High tool rigidity is achieved with low helix angle.

3 耐磨损性优异 Excellent wear resistance

对应水溶性切削油剂（内部给油）的高速加工，采用WXS涂层，实现更长的寿命。

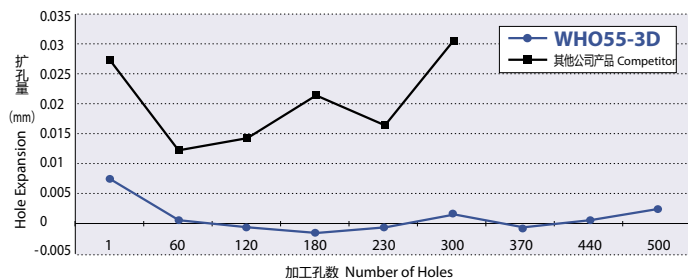
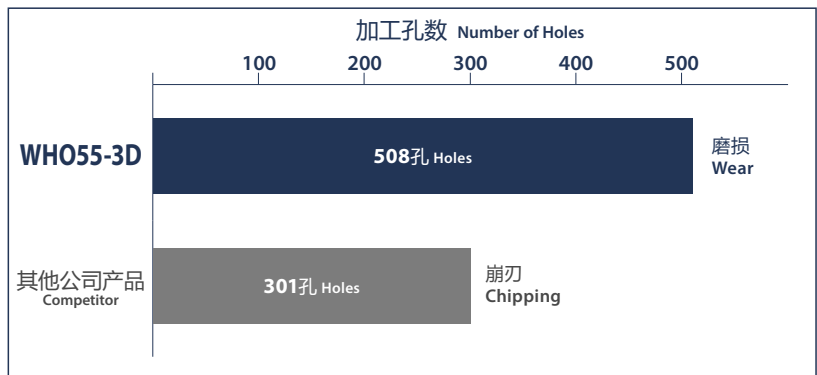
With WXS coating and internal coolant-through capability, long tool life is achieved.

4 切屑生成稳定 Stable chip shapes



■ 长寿命且稳定的扩孔量 Long tool life with stable drilled hole size

使用工具 Tool	WHO55-3D φ7(非标品) Special
加工材料 Work Material	Inconel 718(45HRC)
切削速度 Cutting Speed	30m/min(1,364min ⁻¹)
进给速度 Feed	143mm/min(0.105mm/rev)
孔深 Depth of Hole	18mm(通孔)无停顿式 (Through) No Pecking
切削油剂 Coolant	水溶性切削油剂(内部给油) Water-Soluble (Internal)
使用机械 Machine	卧式加工中心(BT40) Horizontal Machining Center



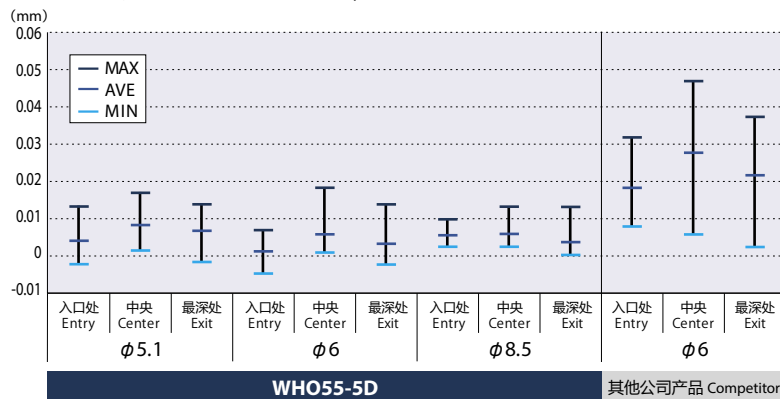
■ 使用 WHO55-5D 加工 508 个孔后的照片
After drilling 508 holes with WHO55-5D.



■ 各尺寸的稳定扩孔量 Stable drilled hole sizes with different drill dia.

使用工具 Tool	WHO55-5D
加工材料 Work Material	Inconel 718(43HRC)
切削速度 Cutting Speed	30m/min
进给速度 Feed	1.5% × D mm/rev
孔深 Depth of Hole	3D(盲孔) Blind
切削油剂 Coolant	水溶性切削油剂(内部给油) Water-Soluble (Internal)
使用机械 Machine	立式加工中心 (BT40) Vertical Machining Center

■ 0~200孔加工的孔扩大量 Hole expansion with 1st to 200th holes



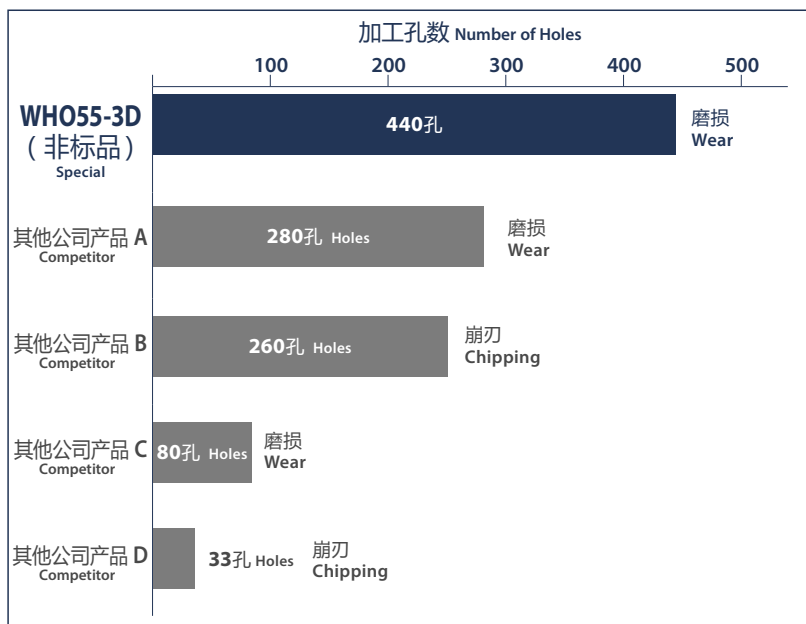
通过高刚性刀体形状的设置，能够成功抑制各个尺寸的扩孔量。同时也可以适用于精加工前加工余量的稳定加工以及对精度有苛刻要求的钻孔加工。
With high tool rigidity of WHO55-5D, hole expansion is minimized for each drill size. By keeping tight hole tolerance, WHO55-5D can be applied to precision drilling required before reaming.

■ 其他公司产品1.5倍的耐久性 1.5 times longer tool life against competitors

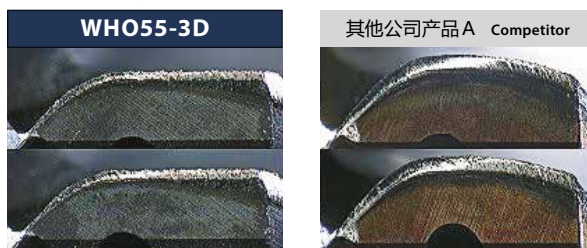
使用工具 Tool	WHO55-3D φ6(非标品) Special
加工材料 Work Material	Inconel 718(43HRC)
切削速度 Cutting Speed	30m/min(1,592min ⁻¹)
进给速度 Feed	143mm/min(0.09mm/rev)
孔深 Depth of Hole	18mm(3D 盲孔)无停顿式 Blind No Pecking
切削油剂 Coolant	水溶性切削油剂(内部给油) Water-Soluble (Internal)
使用机械 Machine	立式加工中心 (BT40) Vertical Machining Center

在兼顾锋利的刃尖以及高刚性刀体上采用WXS涂层，可以在水溶性油剂(内冷)的高速环境下实现稳定长寿命加工。

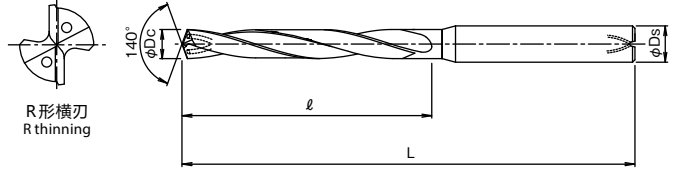
Sharp cutting edges and high tool rigidity with WXS coating and internal coolant-through capability lead to stable and long tool life in high speed drilling.



■ 加工240孔后的照片 After drilling 240 holes



WHO55-5D



单位:mm Unit:mm

商品号 EDP No.	直径 Dc	槽长 l	全长 L	柄径 Ds	库存 Stock	
3316330	3.3	32	78	6	○	
3316340	3.4					
3316349	3.49					
3316350	3.5					
3316360	3.6	34				
3316370	3.7					
3316380	3.8	36				
3316390	3.9					
3316400	4					
3316410	4.1	38	88			
3316415	4.15					
3316420	4.2	41				
3316430	4.3					
3316440	4.4					
3316450	4.5	43				
3316460	4.6					
3316470	4.7	45				
3316480	4.8					
3316490	4.9					
3316500	5	42				92
3316510	5.1					
3316520	5.2	44				
3316530	5.3					
3316540	5.4	46				
3316550	5.5					
3316556	5.56					
3316560	5.6					

商品号 EDP No.	直径 Dc	槽长 l	全长 L	柄径 Ds	库存 Stock	
3316570	5.7	46	92	6	○	
3316580	5.8					
3316590	5.9					
3316600	6	48	102	8		
3316650	6.5	52				
3316680	6.8	56				
3316700	7					
3316750	7.5	60	118			
3316780	7.8	64				
3316800	8	68	128	10		
3316850	8.5	70				
3316870	8.7	72				
3316880	8.8	72				
3316900	9	76	136			
3316950	9.5	80				
3316980	9.8	80				
3316997	9.97	84	146			12
3317000	10	88				
3317030	10.3	92				
3317050	10.5	94				
3317080	10.8	96	156			
3317100	11	96				
3317150	11.5	96				
3317156	11.56	96				
3317180	11.8	96				
3317200	12	96				

· 标识说明请参阅 P.1。

· See p.1 for explanation of icons.

非标品制作的介绍

考虑到通用性,我们的标准库存主要有5D型产品。追求刀具更长寿命、稳定性加工用的话,可对应制作3D型等非标品。详情请与本公司销售联系。

Standard stock is available for 5D style but special 3D type is also available in order to improve tool life and achieve stable drilling. Please contact OSG sales for details.

例)



WHO55-3D

水溶性切削油剂(内部给油)型
for Water-Soluble, Internal

对于时效处理后的镍基耐热合金(40~45HRC)而言,WHO55-3D兼具最适合的涂层、刀具刚性和锋利的刃尖,可实现稳定、高寿命的加工。

For aged Ni-based superalloy (40 to 45HRC), sharp cutting edges and high tool rigidity of WHO55-5D with WXS coating and internal coolant-through capability lead to stable and long tool life in high speed drilling.

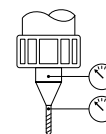


■ 切削条件基准表 Cutting Conditions

WHO55-5D

加工材料 Work Material	镍基合金 Ni-Based Alloy (Inconel 718)	
切削速度 Cutting Speed	10~30m/min	
直径 Drill Dia. (mm)	转速 Speed (min ⁻¹)	进给量 Feed Rate (mm/rev)
3.3	1,900	0.03 ~ 0.07
4	1,600	0.04 ~ 0.08
5	1,300	0.05 ~ 0.1
6	1,100	0.06 ~ 0.12
7	900	0.07 ~ 0.14
8	800	0.08 ~ 0.16
9	700	0.09 ~ 0.18
10	600	0.1 ~ 0.2
11	600	0.11 ~ 0.22
12	500	0.12 ~ 0.24

1. 此切削条件基准表适用于水溶性切削油剂的内部给油加工时。
 2. 请使用稀释倍率为20倍以下的优质水溶性切削油剂。
 3. 使用油性切削油剂或者稀释倍率超过20倍的水溶性切削油剂时，切削速度请下调30%。
 4. 装夹钻头时，请使用无损伤，无油污的弹簧夹头，并将径向跳动控制在0.02mm以下。
 5. 请牢牢固定加工材料，确保在没有变形，弯曲，震动的情况下加工。
 6. 油污堵塞会造成折损，因此供油装置请务必安装过滤网。
- * 本条件表是以镍基合金718为首的耐热合金在孔深低于3D的情况下适用，如果超过3D的情况下请采用对应的阶梯式加工。



1. The indicated speeds and feeds are for water-soluble coolant.
 2. Suitable cutting fluid is water-soluble in high density (less than 20 times dilution).
 3. When using non-water-soluble coolant or water-soluble coolant (over 20 times dilution), reduce cutting speed by 30%.
 4. When inserting a drill into the machine, use a collet that does not have any scratches or dust located within internal bore. Also, reduce deflection of drill to less than 0.02mm.
 5. Fasten the work material to reduce the possibility of work deformation, deflection of machined surface, or vibration.
 6. A clogged oil hole can lead to a breakage. Make sure that a filter is attached to the oil feeder.
- ※ The above cutting conditions are applicable to hole depth under 3D for Superalloys such as Inconel 718. When hole depth is over 3D, please consider pecking.

■ 油性切削油剂的加工案例 Drilling under non-water-soluble flood coolant environment

使用工具 Tool	WHO55-3D φ6(非标品) Special
加工材料 Work Material	Inconel 718(43HRC)
切削速度 Cutting Speed	10m/min(531min ⁻¹)
进给速度 Feed	48mm/min(0.09mm/rev)
孔深 Depth of Hole	18mm(3D盲孔)无阶梯式 Blind No Pecking
切削油剂 Coolant	油性切削油剂(外部给油) Non-Water-Soluble(External)
使用机械 Machine	立式加工中心(BT30) Vertical Machining Center

即使在油性切削油剂外部给油环境下，通过调整切削速度后可实现稳定寿命。

By making cutting speed adjustment, stable and long tool life is achieved under non-water-soluble flood coolant environment.

■ 刀具寿命比较 Comparison of tool life



■ 加工90孔后的照片 After drilling 90 holes



Drill
WHO55-5D

ADO-SUS
series

VPH-GDS

Tap
WHR-NI-POT
WHR-NI-SFT

Thread Mill
WH-VM-PNC
WX-PNC

AE-VMSS

AE-VMS

End Mill
NEO
series

W-HSCT
series

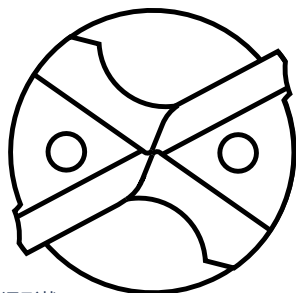
Ceramic End Mill
series

Indexable
XC5035
XC5040

ADO-SUS的特点 Features

ADO-SUS采用新型“MEGA COOLER”油孔形状。

By adopting the new oil hole shape “MEGA COOLER,” coolant flow velocity can be increased by 120%



普通形状 Oil Hole

切削油剂供给量 Feed Rate of Coolant

120%



MEGA COOLER是OSG公司注册商标。 MEGA COOLER is a registered trademark of OSG Corporation.

新型“MEGA COOLER”油孔形状 New Coolant Hole Shape

PAT. in Japan

迅速去除切削热。增大冷却剂喷出量，提高切屑的排出性。

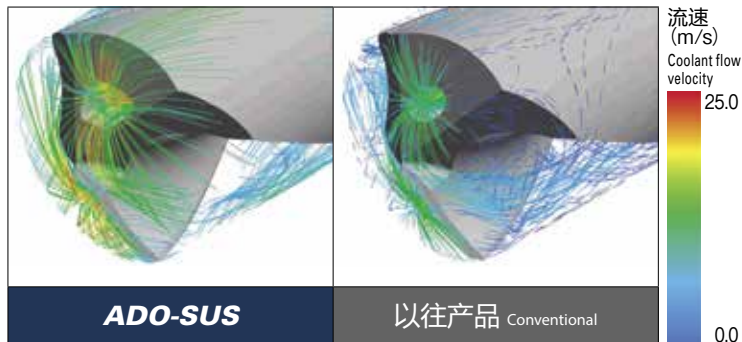
Improves coolant flow, chip evacuation and cutting heat generation.

*适用于超过φ6的尺寸

* New coolant hole shape applies only to diameter sizes over 6mm

实现最大级的喷油量！

Maximum amount of coolant flow to suppress heat generation!



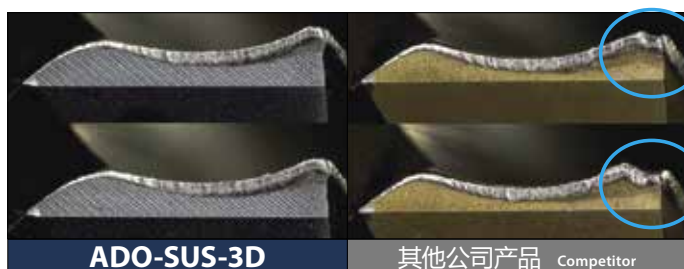
刀具转速2200min⁻¹时的分析 Analysis of coolant flow with spindle speed of 2,200min⁻¹

镍基超耐热合金加工 Machining Ni-based Superalloy

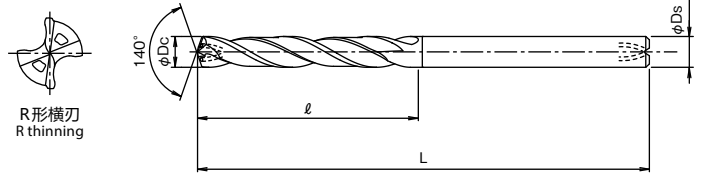
使用工具 Tool	ADO-SUS-3D	其他公司产品 Competitor
尺寸 Size	φ6	
加工材料 Work Material	Inconel 718(43HRC)	
切削速度 Cutting Speed	30m/min(1,592min ⁻¹)	
进给速度 Feed	143mm/min(0.09mm/rev)	
孔深 Depth of Hole	18mm(通孔)无停顿式 (Through) No Pecking	
切削油剂 Coolant	水溶性切削油剂(内部给油) Water-Soluble(Internal)	
使用机械 Machine	卧式加工中心(BT40) Horizontal Machining Center	



加工160孔后的磨损情况 Wear after drilling 160 holes



ADO-SUS-3D NEW SIZE



R形横刃
R thinning

* 新型油孔形状适用于超过 $\phi 6$ 的尺寸
* New coolant hole shape applies only to diameter sizes over 6mm



单位:mm Unit:mm

商品号 EDP No.	直径 - 柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
* 8665200	2 - 3	12	66	3	
* 8665210	2.1 - 3	12	66	3	
* 8665220	2.2 - 3	14	66	3	
* 8665230	2.3 - 3	14	66	3	
* 8665240	2.4 - 3	15	66	3	
* 8665250	2.5 - 3	15	66	3	
* 8665260	2.6 - 3	16	66	3	
* 8665270	2.7 - 3	17	66	3	
8665280	2.8 - 3	17	66	3	
* 8665283	2.83 - 3	17	66	3	
* 8665287	2.87 - 3	18	66	3	
8665290	2.9 - 3	18	66	3	
8665300	3 - 3	18	66	3	
8665310	3.1	19	74	4	
8665315	3.15	19	74	4	
8665320	3.2	20	74	4	
8665326	3.26	20	74	4	
8665330	3.3	20	74	4	
8665340	3.4	21	74	4	
8665350	3.5	21	74	4	
8665360	3.6	22	74	4	
8665370	3.7	23	74	4	
* 8665373	3.73	23	74	4	
8665375	3.75	23	74	4	
8665380	3.8	23	74	4	
8665390	3.9	24	74	4	
8665400	4	24	74	4	
8665410	4.1 - 5	25	80	5	

商品号 EDP No.	直径 - 柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
* 8680410	4.1	25	80	6	
8665420	4.2 - 5	26	80	5	
* 8680420	4.2	26	80	6	
8665430	4.3 - 5	26	80	5	
* 8680430	4.3	26	80	6	
8665440	4.4 - 5	27	80	5	
* 8680440	4.4	27	80	6	
* 8680445	4.45	27	80	6	
8665450	4.5 - 5	27	80	5	
* 8680450	4.5	27	80	6	
8665460	4.6 - 5	28	80	5	
* 8680460	4.6	28	80	6	
* 8680465	4.65	28	80	6	
8665470	4.7 - 5	29	80	5	
* 8680470	4.7	29	80	6	
8665480	4.8 - 5	29	80	5	
* 8680480	4.8	29	80	6	
8665485	4.85	29	80	6	
8665490	4.9 - 5	30	80	5	
* 8680490	4.9	30	80	6	
8665500	5 - 5	25	80	5	
* 8680500	5	25	80	6	
8665510	5.1	26	82	6	
8665520	5.2	26	82	6	
8665525	5.25	27	82	6	
8665530	5.3	27	82	6	
8665540	5.4	27	82	6	
8665550	5.5	28	82	6	

· 标识说明请参阅P.1.

· See p.1 for explanation of icons.

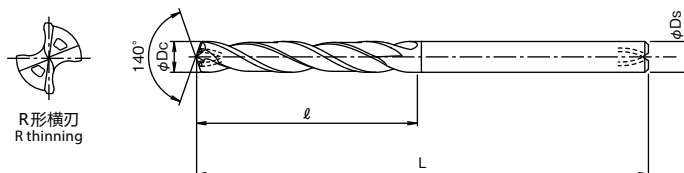
* =NEW SIZES

NEXT



Drill ADO-SUS series
 VPH-GDS
 WH055-5D
 Tap WHR-NI-POT
 WHR-NI-SFT
 Thread Mill WH-VM-PNC
 WX-PNC
 End Mill AE-VMSS
 AE-VMSS
 AE-VMSS
 NEO series
 W-HSCT series
 Ceramic End Mill series
 Indexable XC5035
 XC5040

ADO-SUS-3D NEW SIZE



*新型油孔形状适用于超过φ6的尺寸
* New coolant hole shape applies only to diameter sizes over 6mm

FROM

单位:mm Unit:mm

商品号 EDP No.	直径 - 柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
* 8680555	5.55	28	82	6	
8665560	5.6	28	82	6	
8665570	5.7	29	82	6	
8665580	5.8	29	82	6	
8665590	5.9	30	82	6	
8665600	6	30	82	6	
8665610	6.1 - 7	31	88	7	
* 8680610	6.1	31	88	8	
8665620	6.2 - 7	31	88	7	
* 8680620	6.2	31	88	8	
8665625	6.25 - 7	32	88	7	
8665630	6.3 - 7	32	88	7	
* 8680630	6.3	32	88	8	
8665635	6.35 - 6.35	32	88	6.35	
8665640	6.4 - 7	32	88	7	
* 8680640	6.4	32	88	8	
8665650	6.5 - 7	33	88	7	
* 8680650	6.5	33	88	8	
8665660	6.6 - 7	33	88	7	
* 8680660	6.6	33	88	8	
8665670	6.7 - 7	34	88	7	
* 8680670	6.7	34	88	8	
8665675	6.75 - 7	34	88	7	
8665680	6.8 - 7	34	88	7	
* 8680680	6.8	34	88	8	
8665690	6.9 - 7	35	88	7	
* 8680690	6.9	35	88	8	
8665700	7 - 7	35	88	7	

商品号 EDP No.	直径 - 柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
* 8680700	7	35	88	8	
8665710	7.1	36	94	8	
8665720	7.2	36	94	8	
8665725	7.25	37	94	8	
8665730	7.3	37	94	8	
8665740	7.4	37	94	8	
* 8680745	7.45	38	94	8	
8665750	7.5	38	94	8	
* 8680755	7.55	38	94	8	
8665760	7.6	38	94	8	
8665770	7.7	39	94	8	
8665775	7.75	39	94	8	
8665780	7.8	39	94	8	
8665790	7.9	40	94	8	
8665800	8	40	94	8	
8665810	8.1 - 9	41	101	9	
* 8680810	8.1	41	101	10	
8665820	8.2 - 9	41	101	9	
* 8680820	8.2	41	101	10	
8665825	8.25 - 9	42	101	9	
8665830	8.3 - 9	42	101	9	
* 8680830	8.3	42	101	10	
8665840	8.4 - 9	42	101	9	
* 8680840	8.4	42	101	10	
8665850	8.5 - 9	43	101	9	
* 8680850	8.5	43	101	10	
8665860	8.6 - 9	43	101	9	
* 8680860	8.6	43	101	10	

· 标识说明请参阅P.1.

· See p.1 for explanation of icons.

* =NEW SIZES

NEXT



FROM

商品号 EDP No.	直径 - 柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8665870	8.7 - 9	44	101	9	
* 8680870	8.7	44	101	10	
8665875	8.75 - 9	44	101	9	
8665880	8.8 - 9	44	101	9	
* 8680880	8.8	44	101	10	
8665890	8.9 - 9	45	101	9	
* 8680890	8.9	45	101	10	
8665900	9 - 9	45	101	9	
* 8680900	9	45	101	10	
8665910	9.1	46	106	10	
8665920	9.2	46	106	10	
8665925	9.25	47	106	10	
8665930	9.3	47	106	10	
8665940	9.4	47	106	10	
8665950	9.5	48	106	10	
* 8680955	9.55	48	106	10	
8665960	9.6	48	106	10	
8665970	9.7	49	106	10	
8665975	9.75	49	106	10	
8665980	9.8	49	106	10	
8665990	9.9	50	106	10	
8666000	10	50	106	10	
8666010	10.1 - 11	51	113	11	
* 8681010	10.1	51	113	12	
8666020	10.2 - 11	51	113	11	
* 8681020	10.2	51	113	12	
8666025	10.25 - 11	52	113	11	
8666030	10.3 - 11	52	113	11	

单位:mm Unit:mm

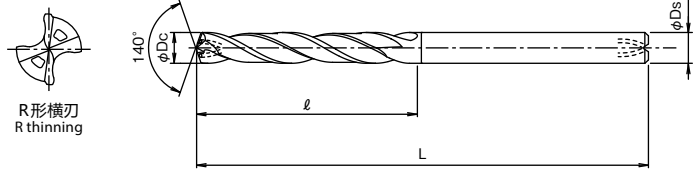
商品号 EDP No.	直径 - 柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
* 8681030	10.3	52	113	12	
8666040	10.4 - 11	52	113	11	
* 8681040	10.4	52	113	12	
8666050	10.5 - 11	53	113	11	
* 8681050	10.5	53	113	12	
8666060	10.6 - 11	53	113	11	
* 8681060	10.6	53	113	12	
8666070	10.7 - 11	54	113	11	
* 8681070	10.7	54	113	12	
8666075	10.75 - 11	54	113	11	
8666080	10.8 - 11	54	113	11	
* 8681080	10.8	54	113	12	
8666090	10.9 - 11	55	113	11	
* 8681090	10.9	55	113	12	
8666100	11 - 11	55	113	11	
* 8681100	11	55	113	12	
8666110	11.1	56	120	12	
8666120	11.2	56	120	12	
8666130	11.3	57	120	12	
8666140	11.4	57	120	12	
8666150	11.5	58	120	12	
8666160	11.6	58	120	12	
8666170	11.7	59	120	12	
8666180	11.8	59	120	12	
8666190	11.9	60	120	12	
8666200	12	60	120	12	
8666210	12.1 - 13	61	128	13	
* 8681210	12.1	61	128	14	

*=NEW SIZES

NEXT



ADO-SUS-3D NEW SIZE



CARBIDE WXL h8 30° SHRINK FIT SPEED FEED P18

* 新型油孔形状适用于超过φ6的尺寸
 * New coolant hole shape applies only to diameter sizes over 6mm

FROM

单位:mm Unit:mm

商品号 EDP No.	直径 - 柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8666220	12.2 - 13	61	128	13	
* 8681220	12.2	61	128	14	
8666230	12.3 - 13	62	128	13	
* 8681230	12.3	62	128	14	
8666240	12.4 - 13	62	128	13	
* 8681240	12.4	62	128	14	
8666250	12.5 - 13	63	128	13	
* 8681250	12.5	63	128	14	
8666260	12.6 - 13	63	128	13	
* 8681260	12.6	63	128	14	
8666270	12.7 - 13	64	128	13	
* 8681270	12.7	64	128	14	
8666275	12.75 - 13	64	128	13	
8666280	12.8 - 13	64	128	13	
* 8681280	12.8	64	128	14	
8666290	12.9 - 13	65	128	13	
* 8681290	12.9	65	128	14	
8666300	13 - 13	65	128	13	
* 8681300	13	65	128	14	
8666310	13.1	66	134	14	
8666320	13.2	66	134	14	
8666330	13.3	67	134	14	
8666340	13.4	67	134	14	
* 8681343	13.43	68	134	14	
8666350	13.5	68	134	14	
* 8681355	13.55	68	134	14	
8666360	13.6	68	134	14	
8666370	13.7	69	134	14	

商品号 EDP No.	直径 - 柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8666380	13.8	69	134	14	
8666390	13.9	70	134	14	
8666400	14	70	134	14	
8666410	14.1 - 15	71	140	15	
* 8681410	14.1	71	140	16	
8666420	14.2 - 15	71	140	15	
* 8681420	14.2	71	140	16	
8666430	14.3 - 15	72	140	15	
* 8681430	14.3	72	140	16	
8666440	14.4 - 15	72	140	15	
* 8681440	14.4	72	140	16	
8666450	14.5 - 15	73	140	15	
* 8681450	14.5	73	140	16	
8666460	14.6 - 15	73	140	15	
* 8681460	14.6	73	140	16	
8666470	14.7 - 15	74	140	15	
* 8681470	14.7	74	140	16	
8666480	14.8 - 15	74	140	15	
* 8681480	14.8	74	140	16	
8666490	14.9 - 15	75	140	15	
* 8681490	14.9	75	140	16	
8666500	15 - 15	75	140	15	
* 8681500	15	75	140	16	
8666510	15.1	76	145	16	
8666520	15.2	76	145	16	
8666530	15.3	77	145	16	
8666540	15.4	77	145	16	
8666550	15.5	78	145	16	

· 标识说明请参阅P.1.

· See p.1 for explanation of icons.

* =NEW SIZES

NEXT



FROM

商品号 EDP No.	直径 - 柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
※ 8681555	15.55	78	145	16	○
8666560	15.6	78	145	16	○
8666570	15.7	79	145	16	○
8666580	15.8	79	145	16	○
8666590	15.9	80	145	16	○
8666600	16	80	145	16	○
※	16.1	81	150	18	□
※	16.2	81	150	18	□
※	16.3	82	150	18	□
※	16.4	82	150	18	□
8666650	16.5 - 17	83	150	17	○
※ 8681650	16.5	83	150	18	○
※	16.6	83	150	18	□
※ 8681670	16.7	84	150	18	○
※	16.8	84	150	18	□
※	16.9	85	150	18	□
8666700	17 - 17	85	150	17	○
※ 8681700	17	85	150	18	○
※	17.1	86	155	18	□
※	17.2	86	155	18	□
※ 8681730	17.3	87	155	18	○
※	17.4	87	155	18	□
8666750	17.5	88	155	18	○
※ 8681755	17.55	88	155	18	○
※	17.6	88	155	18	□
※	17.7	89	155	18	□

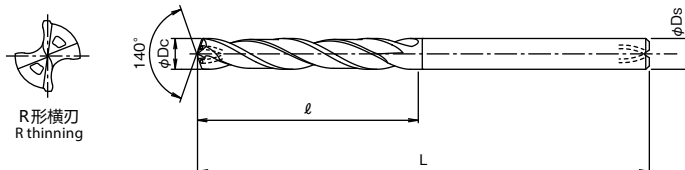
单位:mm Unit:mm

商品号 EDP No.	直径 - 柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
※	17.8	89	155	18	□
※	17.9	90	155	18	□
8666800	18	90	155	18	○
※	18.1	91	160	20	□
※	18.2	91	160	20	□
※	18.3	92	160	20	□
※	18.4	92	160	20	□
8666850	18.5 - 19	93	160	19	○
※ 8681850	18.5	93	160	20	○
※	18.6	93	160	20	□
※ 8681870	18.7	94	160	20	○
※	18.8	94	160	20	□
※	18.9	95	160	20	□
8666900	19 - 19	95	160	19	○
※ 8681900	19	95	160	20	○
※	19.1	96	165	20	□
※	19.2	96	165	20	□
※ 8681930	19.3	97	165	20	○
※	19.4	97	165	20	□
8666950	19.5	98	165	20	○
※ 8681955	19.55	98	165	20	○
※	19.6	98	165	20	□
※	19.7	99	165	20	□
※	19.8	99	165	20	□
※	19.9	100	165	20	□
8667000	20	100	165	20	○

※=NEW SIZES



ADO-SUS-5D NEW SIZE



*新型油孔形状适用于超过φ6的尺寸
* New coolant hole shape applies only to diameter sizes over 6mm



单位:mm Unit:mm

商品号 EDP No.	直径 - 柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
* 8667200	2 - 3	18	70	3	
* 8667210	2.1 - 3	19	70	3	
* 8667220	2.2 - 3	20	70	3	
* 8667230	2.3 - 3	21	70	3	
* 8667240	2.4 - 3	22	70	3	
* 8667250	2.5 - 3	23	70	3	
* 8667260	2.6 - 3	24	78	3	
* 8667270	2.7 - 3	25	78	3	
8667276	2.76 - 3	25	78	3	
8667278	2.78 - 3	26	78	3	
8667280	2.8 - 3	26	78	3	
* 8667283	2.83 - 3	26	78	3	
* 8667287	2.87 - 3	26	78	3	
8667290	2.9 - 3	27	78	3	
8667300	3 - 3	27	78	3	
8667310	3.1	28	86	4	
8667315	3.15	29	86	4	
8667320	3.2	29	86	4	
8667326	3.26	29	86	4	
8667330	3.3	30	86	4	
8667340	3.4	31	86	4	
8667350	3.5	32	86	4	
8667360	3.6	33	86	4	
8667366	3.66	33	86	4	
8667368	3.68	34	86	4	
8667370	3.7	34	86	4	
* 8667373	3.73	34	86	4	
8667375	3.75	34	86	4	
8667380	3.8	35	86	4	
8667390	3.9	36	86	4	

商品号 EDP No.	直径 - 柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8667400	4	36	86	4	
8667410	4.1 - 5	37	95	5	
* 8682410	4.1	37	95	6	
8667420	4.2 - 5	38	95	5	
* 8682420	4.2	38	95	6	
8667430	4.3 - 5	39	95	5	
* 8682430	4.3	39	95	6	
8667440	4.4 - 5	40	95	5	
* 8682440	4.4	40	95	6	
* 8682445	4.45	41	95	6	
8667450	4.5 - 5	41	95	5	
* 8682450	4.5	41	95	6	
8667460	4.6 - 5	42	95	5	
* 8682460	4.6	42	95	6	
8667462	4.62 - 5	42	95	5	
8667464	4.64 - 5	42	95	5	
* 8682464	4.64	42	95	6	
8667470	4.7 - 5	43	95	5	
* 8682470	4.7	43	95	6	
8667480	4.8 - 5	44	95	5	
* 8682480	4.8	44	95	6	
8667485	4.85	44	95	6	
8667490	4.9 - 5	45	95	5	
* 8682490	4.9	45	95	6	
8667500	5 - 5	45	95	5	
* 8682500	5	45	95	6	
8667510	5.1	41	100	6	
8667520	5.2	42	100	6	
8667525	5.25	42	100	6	
8667530	5.3	43	100	6	

· 标识说明请参阅P.1.

· See p.1 for explanation of icons.

* = NEW SIZES

NEXT



FROM

单位:mm Unit:mm

商品号 EDP No.	直径 - 柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8667540	5.4	44	100	6	
8667550	5.5	44	100	6	
8667552	5.52	45	100	6	
8667554	5.54	45	100	6	
8667560	5.6	45	100	6	
8667570	5.7	46	100	6	
8667580	5.8	47	100	6	
8667590	5.9	48	100	6	
8667600	6	48	100	6	
8667610	6.1 - 7	49	109	7	
* 8682610	6.1	49	109	8	
8667620	6.2 - 7	50	109	7	
* 8682620	6.2	50	109	8	
8667625	6.25 - 7	50	109	7	
8667630	6.3 - 7	51	109	7	
* 8682630	6.3	51	109	8	
8667635	6.35 - 6.35	52	109	6.35	
8667640	6.4 - 7	52	109	7	
* 8682640	6.4	52	109	8	
8667650	6.5 - 7	52	109	7	
* 8682650	6.5	52	109	8	
8667660	6.6 - 7	53	109	7	
* 8682660	6.6	53	109	8	
8667670	6.7 - 7	54	109	7	
* 8682670	6.7	54	109	8	
8667675	6.75 - 7	54	109	7	
8667680	6.8 - 7	55	109	7	
* 8682680	6.8	55	109	8	
8667690	6.9 - 7	56	109	7	
* 8682690	6.9	56	109	8	

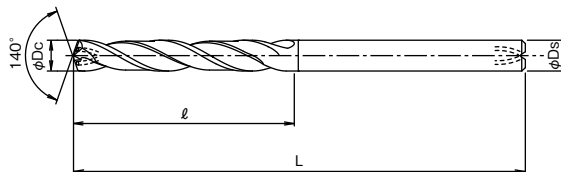
商品号 EDP No.	直径 - 柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8667700	7 - 7	56	109	7	
* 8682700	7	56	109	8	
8667710	7.1	57	118	8	
8667720	7.2	58	118	8	
8667725	7.25	58	118	8	
8667730	7.3	59	118	8	
8667736	7.36	59	118	8	
8667738	7.38	60	118	8	
8667740	7.4	60	118	8	
* 8682745	7.45	60	118	8	
8667750	7.5	60	118	8	
8667752	7.52	61	118	8	
8667754	7.54	61	118	8	
8667760	7.6	61	118	8	
8667770	7.7	62	118	8	
8667775	7.75	62	118	8	
8667780	7.8	63	118	8	
8667790	7.9	64	118	8	
8667800	8	64	118	8	
8667810	8.1 - 9	65	128	9	
* 8682810	8.1	65	128	10	
8667820	8.2 - 9	66	128	9	
* 8682820	8.2	66	128	10	
8667825	8.25 - 9	66	128	9	
8667830	8.3 - 9	67	128	9	
* 8682830	8.3	67	128	10	
8667840	8.4 - 9	68	128	9	
* 8682840	8.4	68	128	10	
8667850	8.5 - 9	68	128	9	
* 8682850	8.5	68	128	10	

*=NEW SIZES

NEXT



ADO-SUS-5D



*新型油孔形状适用于超过 $\phi 6$ 的尺寸
* New coolant hole shape applies only to diameter sizes over 6mm

FROM

单位:mm Unit:mm

商品号 EDP No.	直径 - 柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8667860	8.6 - 9	69	128	9	
* 8682860	8.6	69	128	10	
8667870	8.7 - 9	70	128	9	
* 8682870	8.7	70	128	10	
8667875	8.75 - 9	70	128	9	
8667880	8.8 - 9	71	128	9	
* 8682880	8.8	71	128	10	
8667890	8.9 - 9	72	128	9	
* 8682890	8.9	72	128	10	
8667900	9 - 9	72	128	9	
* 8682900	9	72	128	10	
8667910	9.1	73	136	10	
8667920	9.2	74	136	10	
8667924	9.24	74	136	10	
8667925	9.25	74	136	10	
8667926	9.26	75	136	10	
8667930	9.3	75	136	10	
8667936	9.36	75	136	10	
8667938	9.38	76	136	10	
8667940	9.4	76	136	10	
8667950	9.5	76	136	10	
8667952	9.52	77	136	10	
8667954	9.54	77	136	10	
8667960	9.6	77	136	10	
8667970	9.7	78	136	10	
8667975	9.75	78	136	10	
8667980	9.8	79	136	10	
8667990	9.9	80	136	10	
8668000	10	80	136	10	
8668010	10.1 - 11	81	146	11	

商品号 EDP No.	直径 - 柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
* 8683010	10.1	81	146	12	
8668020	10.2 - 11	82	146	11	
* 8683020	10.2	82	146	12	
8668025	10.25 - 11	82	146	11	
8668030	10.3 - 11	83	146	11	
* 8683030	10.3	83	146	12	
8668040	10.4 - 11	84	146	11	
* 8683040	10.4	84	146	12	
8668050	10.5 - 11	84	146	11	
* 8683050	10.5	84	146	12	
8668060	10.6 - 11	85	146	11	
* 8683060	10.6	85	146	12	
8668070	10.7 - 11	86	146	11	
* 8683070	10.7	86	146	12	
8668075	10.75 - 11	86	146	11	
8668080	10.8 - 11	87	146	11	
* 8683080	10.8	87	146	12	
8668090	10.9 - 11	88	146	11	
* 8683090	10.9	88	146	12	
8668100	11 - 11	88	146	11	
* 8683100	11	88	146	12	
8668110	11.1	89	156	12	
8668120	11.2	90	156	12	
8668122	11.22	90	156	12	
8668124	11.24	90	156	12	
8668130	11.3	91	156	12	
8668136	11.36	91	156	12	
8668138	11.38	92	156	12	
8668140	11.4	92	156	12	
8668150	11.5	92	156	12	

· 标识说明请参阅P.1.

· See p.1 for explanation of icons.

* = NEW SIZES

NEXT



FROM

商品号 EDP No.	直径 - 柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8668160	11.6	93	156	12	
8668170	11.7	94	156	12	
8668180	11.8	95	156	12	
8668190	11.9	96	156	12	
8668200	12	96	156	12	
8668210	12.1 - 13	97	167	13	
* 8683210	12.1	97	167	14	
8668220	12.2 - 13	98	167	13	
* 8683220	12.2	98	167	14	
8668230	12.3 - 13	99	167	13	
* 8683230	12.3	99	167	14	
8668240	12.4 - 13	100	167	13	
* 8683240	12.4	100	167	14	
8668250	12.5 - 13	100	167	13	
* 8683250	12.5	100	167	14	
8668260	12.6 - 13	101	167	13	
* 8683260	12.6	101	167	14	
8668270	12.7 - 13	102	167	13	
* 8683270	12.7	102	167	14	
8668275	12.75 - 13	102	167	13	
8668280	12.8 - 13	103	167	13	
* 8683280	12.8	103	167	14	
8668290	12.9 - 13	104	167	13	
* 8683290	12.9	104	167	14	
8668300	13 - 13	104	167	13	
* 8683300	13	104	167	14	
8668310	13.1	105	176	14	
8668320	13.2	106	176	14	
8668325	13.25	106	176	14	
8668330	13.3	107	176	14	

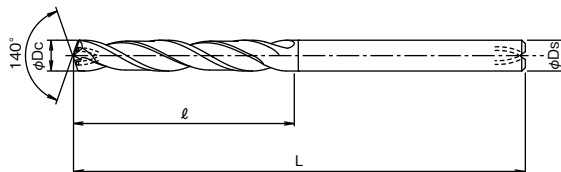
商品号 EDP No.	直径 - 柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8668340	13.4	108	176	14	
* 8683343	13.43	108	176	14	
8668350	13.5	108	176	14	
* 8683355	13.55	109	176	14	
8668360	13.6	109	176	14	
8668370	13.7	110	176	14	
8668380	13.8	111	176	14	
8668390	13.9	112	176	14	
8668400	14	112	176	14	
8668410	14.1 - 15	113	185	15	
* 8683410	14.1	113	185	16	
8668420	14.2 - 15	114	185	15	
* 8683420	14.2	114	185	16	
8668430	14.3 - 15	115	185	15	
* 8683430	14.3	115	185	16	
8668440	14.4 - 15	116	185	15	
* 8683440	14.4	116	185	16	
8668450	14.5 - 15	116	185	15	
* 8683450	14.5	116	185	16	
8668460	14.6 - 15	117	185	15	
* 8683460	14.6	117	185	16	
8668470	14.7 - 15	118	185	15	
* 8683470	14.7	118	185	16	
8668480	14.8 - 15	119	185	15	
* 8683480	14.8	119	185	16	
8668490	14.9 - 15	120	185	15	
* 8683490	14.9	120	185	16	
8668500	15 - 15	120	185	15	
* 8683500	15	120	185	16	
8668510	15.1	121	193	16	

* =NEW SIZES

NEXT



ADO-SUS-5D



*新型油孔形状适用于超过φ6的尺寸
* New coolant hole shape applies only to diameter sizes over 6mm

FROM

商品号 EDP No.	直径 - 柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8668520	15.2	122	193	16	○
8668525	15.25	122	193	16	○
8668530	15.3	123	193	16	○
8668540	15.4	124	193	16	○
8668550	15.5	124	193	16	○
* 8683555	15.55	125	193	16	○
8668560	15.6	125	193	16	○
8668570	15.7	126	193	16	○
8668580	15.8	127	193	16	○
8668590	15.9	128	193	16	○
8668600	16	128	193	16	○
* 16.1	16.1	113	184	18	□
* 16.2	16.2	114	184	18	□
* 16.3	16.3	115	184	18	□
* 16.4	16.4	115	184	18	□
8668650	16.5 - 17	116	184	17	○
* 8683650	16.5	116	184	18	○
8668650	16.5 - 17	116	184	17	○
* 16.6	16.6	117	184	18	□
* 8683670	16.7	117	184	18	○
* 16.8	16.8	118	184	18	□
* 16.9	16.9	119	184	18	□
8668700	17 - 17	119	184	17	○
* 8683700	17	119	184	18	○
* 17.1	17.1	120	191	18	□
* 17.2	17.2	121	191	18	□
* 8683730	17.3	122	191	18	○
* 17.4	17.4	122	191	18	□
8668750	17.5	123	191	18	○

单位:mm Unit:mm

商品号 EDP No.	直径 - 柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
* 8683755	17.55	123	191	18	B
* 17.6	17.6	124	191	18	□
* 17.7	17.7	124	191	18	□
* 17.8	17.8	125	191	18	□
* 17.9	17.9	126	191	18	□
8668800	18	126	191	18	○
* 18.1	18.1	127	198	20	□
* 18.2	18.2	128	198	20	□
* 18.3	18.3	129	198	20	□
* 18.4	18.4	129	198	20	□
8668850	18.5 - 19	130	198	19	○
* 8683850	18.5	130	198	20	○
* 18.6	18.6	131	198	20	□
* 8683870	18.7	131	198	20	○
* 18.8	18.8	132	198	20	□
* 18.9	18.9	133	198	20	□
8668900	19 - 19	133	198	19	○
* 8683900	19	133	198	20	○
* 19.1	19.1	134	205	20	□
* 19.2	19.2	135	205	20	□
* 8683930	19.3	136	205	20	○
* 19.4	19.4	136	205	20	□
8668950	19.5	137	205	20	○
* 8683955	19.55	137	205	20	○
* 19.6	19.6	138	205	20	□
* 19.7	19.7	138	205	20	□
* 19.8	19.8	139	205	20	□
* 19.9	19.9	140	205	20	□
8669000	20	140	205	20	○

· 标识说明请参阅P.1.

· See p.1 for explanation of icons.

* = NEW SIZES



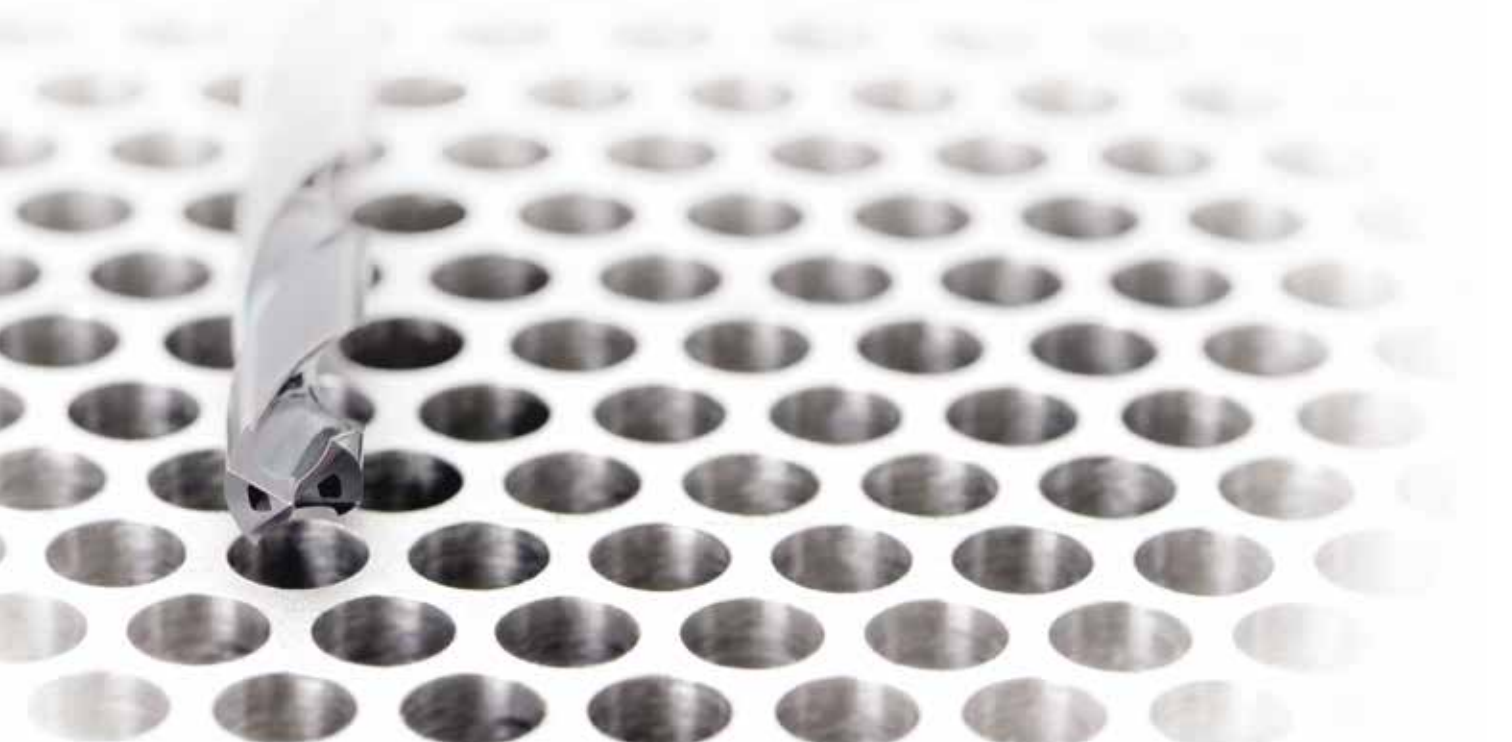
■ 切削条件基准表 Cutting Conditions

ADO-SUS-3D · ADO-SUS-5D

加工材料 Work Material	镍基合金※ Ni-Based Alloy (Inconel 718)		钛合金 Titanium Alloy (Ti-6Al-4V)		析出硬化体不锈钢 Precipitation Stainless Steel (SUS630)	
切削速度 Cutting Speed	10~30 m/min		30~50 m/min		40~60 m/min	
直径 Drill Dia. (mm)	转速 Speed (min ⁻¹)	进给量 Feed Rate (mm/rev)	转速 Speed (min ⁻¹)	进给量 Feed Rate (mm/rev)	转速 Speed (min ⁻¹)	进给量 Feed Rate (mm/rev)
2	3,200	0.03 ~ 0.05	6,400	0.04 ~ 0.08	8,000	0.04 ~ 0.08
3	2,100	0.05 ~ 0.08	4,200	0.06 ~ 0.12	5,300	0.06 ~ 0.12
4	1,600	0.06 ~ 0.1	3,200	0.08 ~ 0.16	4,000	0.08 ~ 0.16
6	1,100	0.09 ~ 0.15	2,100	0.12 ~ 0.21	2,700	0.12 ~ 0.21
8	800	0.12 ~ 0.2	1,600	0.16 ~ 0.24	2,000	0.16 ~ 0.24
10	640	0.15 ~ 0.2	1,300	0.17 ~ 0.27	1,600	0.2 ~ 0.3
12	530	0.15 ~ 0.2	1,100	0.19 ~ 0.3	1,300	0.21 ~ 0.31
16	400	0.15 ~ 0.24	800	0.22 ~ 0.32	1,000	0.22 ~ 0.32
20	320	0.15 ~ 0.3	600	0.28 ~ 0.4	800	0.28 ~ 0.4

1. 此切削条件基准表适用于水溶性切削油剂的内部给油加工时。
 2. 请使用稀释倍率为20倍以下的优质水溶性切削油剂。
 3. 使用油性切削油剂或者稀释倍率超过20倍时，切削速度请下调30%。
 4. 装夹钻头时，请使用无损伤，无油污的弹簧夹头，并将径向跳动控制在0.02mm以下。
 5. 请牢牢固定加工材料，确保在没有变形，弯曲，振动的情况下加工。
 6. 油污堵塞会造成折损，因此供油装置请务必安装过滤网。
- * 本条件表是以镍基合金718为首的耐热合金在孔深低于3D的情况下适用，如果超过3D的情况下请采用对应的阶梯式加工。

1. The above speeds and feeds are for drilling with water-soluble coolant and internal coolant supply.
 2. Suitable cutting fluid is water-soluble high density coolant (20 - 30 times dilution).
 3. When using non-water-soluble or water-soluble coolant (over 20times dilution), reduce cutting speed by 30%.
 4. Equip the drill with a scratch-and dust-free collet and minimize drill deflection to less than 0.02mm.
 5. Fasten the work material to reduce the possibility of work deformation, deflection of machined surface, or vibration.
 6. A clogged oil hole can lead to a breakage. Make sure that a filter is attached to the oil feeder.
- ※The above cutting conditions are applicable to hole depth under 3D for heat-resistant alloys such as Inconel 718. When necessary please consider step drilling.



Drill WH055-5D
 ADO-SUS series
 VPH-GDS
 Tap WHR-NI-POT WHR-NI-SFT
 Thread Mill WX-PNC
 WH-VM-PNC
 End Mill AE-VMSS
 AE-VMS
 NEO series
 W-HSCT series
 Ceramic End Mill series
 Indexable XC5035
 XC5040

VPH-GDS 系列的特点 Features

最适于耐热合金加工用高速钢钻头 VPH-GDS

VPH-GDS is ideal for Heat Resistant Super Alloys (HRSA)



1 采用高级粉末高速钢 High grade powder metallurgy HSS

耐磨损性优异 Excellent wear resistance

2 锋利的切削刃 Sharp cutting edge

抑制切削热的发生, 稳定生成切屑 Reduced cutting heat generation and stable chip shape

3 短刃型, 提高工具刚性 High tool rigidity

抑制崩刃、折损 Prevention of chipping and tool breakage

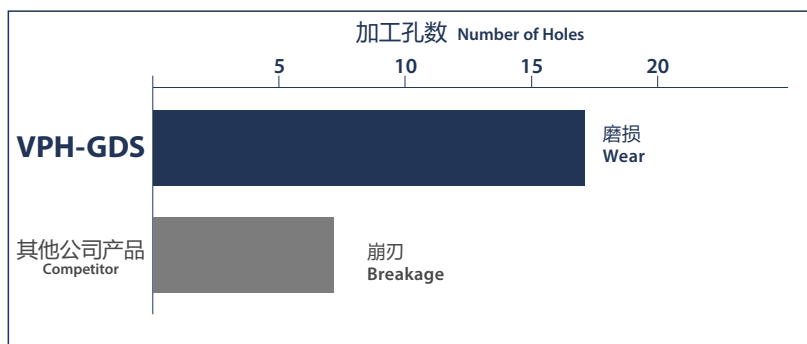


不仅适用于调质钢、铸铁, 也适用于耐热合金的粉末高速钢钻头。
VPH-GDS 在拥有巨大耐热合金加工的北美市场中被广泛应用。

VPH-GDS is ideal for not only hardened steel and cast iron but also Ni-based superalloy and titanium alloy. North America is the biggest HRSA market, and many of our customers use VPH-GDS for their applications.

■ VPH-GDS 的性能评价 Test cut results of VPH-GDS

使用工具 Tool	VPH-GDS φ5.9
加工材料 Work Material	Inconel 718 (43HRC)
切削速度 Cutting Speed	6m/min (324min ⁻¹)
进给速度 Feed	19mm/min (0.06mm/rev)
孔深 Depth of Hole	12mm (盲孔) 3mm 停顿 Blind Pecking
切削油剂 Coolant	油性切削油剂 Non-Water-Soluble (External)
使用机械 Machine	立式加工中心 (BT40) Vertical Machining Center



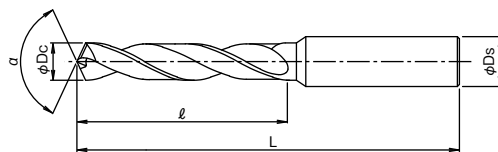
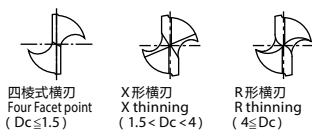
采用高级粉末高速钢的高刚性刀体及锋利的切削刃, 加工时效处理后的 Inconel718 材料, 拥有比其他公司产品更持久的耐久性。即使是使用普通的非水溶性切削油剂也可实现稳定加工。

Sharp cutting edges with high tool rigidity of VPH-GDS lead to long tool life in aged Ni-based superalloy, such as Inconel 718. It achieves longer tool life than a competitor under non-water-soluble flood coolant environment.

■ 加工6孔后的照片 After drilling 6 holes



VPH-GDS



$Dc \leq 13 : \alpha = 130^\circ$



or
 $Dc < 2$
 $2 \leq Dc < 6$ *1
 $2 \leq Dc < 6$ *2
 $6 \leq Dc$

*1 适用于每0.01mm递增的尺寸
 Applies to sizes in 0.01mm increment

*2 适用于每0.1mm递增的尺寸
 Applies to sizes in 0.1mm increment

单位:mm Unit:mm

商品号 EDP No.	直径-柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8599005	0.5	3	38	3	○
8608051	0.51				
8608052	0.52				
8608053	0.53				
8608054	0.54	3.5			
8608055	0.55				
8608056	0.56				
8608057	0.57				
8608058	0.58				
8608059	0.59				
8599006	0.6				
8608061	0.61	4			
8608062	0.62				
8608063	0.63				
8608064	0.64				
8608065	0.65	4.5			
8608066	0.66				
8608067	0.67				
8608068	0.68				
8608069	0.69	5			
8599007	0.7				
8608071	0.71				
8608072	0.72				
8608073	0.73				
8608074	0.74				
8608075	0.75				
8608076	0.76				
8608077	0.77				
8608078	0.78				
8608079	0.79				
8599008	0.8				

商品号 EDP No.	直径-柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8608081	0.81	5	38	3	○
8608082	0.82				
8608083	0.83				
8608084	0.84				
8608085	0.85	5.5			
8608086	0.86				
8608087	0.87				
8608088	0.88				
8608089	0.89				
8599009	0.9				
8608091	0.91	6			
8608092	0.92				
8608093	0.93				
8608094	0.94				
8608095	0.95	7			
8608096	0.96				
8608097	0.97				
8608098	0.98				
8608099	0.99				
8599010	1				
8608101	1.01				
8608102	1.02				
8608103	1.03				
8608104	1.04				
8608105	1.05				
8608106	1.06				
8608107	1.07				
8608108	1.08				
8608109	1.09				
8599011	1.1				
8608111	1.11				

· 标识说明请参阅P.1.

· See p.1 for explanation of icons.

Drill
 ADO-SUS
 series
 VPH-GDS

Tap
 WHR-NI-POT
 WHR-NI-SFT

Thread Mill
 WH-VM-PNC
 WX-PNC

End Mill
 AE-VMSS
 AE-VMS

NEO
 series
 W-HSCT
 series

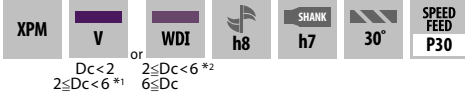
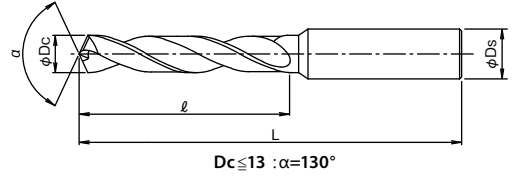
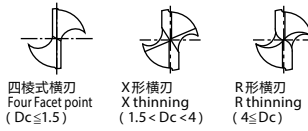
Ceramic End Mill
 series

Indexable
 XC5035
 XC5040

NEXT



VPH-GDS



*1 适用于每0.01mm递增的尺寸
Applies to sizes in 0.01mm increment

*2 适用于每0.1mm递增的尺寸
Applies to sizes in 0.1mm increment

FROM

单位:mm Unit:mm

商品号 EDP No.	直径-柄径 Dc - Ds	槽长 l	全长 L	柄径 Ds	库存 Stock
8608112	1.12	7	39	3	○
8608113	1.13				
8608114	1.14				
8608115	1.15				
8608116	1.16				
8608117	1.17				
8608118	1.18				
8608119	1.19	8	40		
8599012	1.2				
8608121	1.21				
8608122	1.22				
8608123	1.23				
8608124	1.24				
8608125	1.25				
8608126	1.26				
8608127	1.27				
8608128	1.28				
8608129	1.29	9	41		
8599013	1.3				
8608131	1.31				
8608132	1.32				
8608133	1.33				
8608134	1.34				
8608135	1.35				
8608136	1.36				
8608137	1.37				
8608138	1.38				
8608139	1.39				
8599014	1.4				
8608141	1.41				
8608142	1.42				

商品号 EDP No.	直径-柄径 Dc - Ds	槽长 l	全长 L	柄径 Ds	库存 Stock
8608143	1.43	9	41	3	○
8608144	1.44				
8608145	1.45				
8608146	1.46				
8608147	1.47				
8608148	1.48				
8608149	1.49				
8599015	1.5	10	42		
8608151	1.51				
8608152	1.52				
8608153	1.53				
8608154	1.54				
8608155	1.55				
8608156	1.56				
8608157	1.57				
8608158	1.58				
8608159	1.59				
8599016	1.6				
8608161	1.61				
8608162	1.62				
8608163	1.63				
8608164	1.64				
8608165	1.65				
8608166	1.66				
8608167	1.67				
8608168	1.68				
8608169	1.69				
8599017	1.7	11	43		
8608171	1.71				
8608172	1.72				
8608173	1.73				

· 标识说明请参阅P.1。

· See p.1 for explanation of icons.

NEXT



FROM

单位:mm Unit:mm

商品号 EDP No.	直径-柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8608174	1.74	11	43		
8608175	1.75				
8608176	1.76				
8608177	1.77				
8608178	1.78				
8608179	1.79				
8599018	1.8				
8608181	1.81				
8608182	1.82				
8608183	1.83				
8608184	1.84				
8608185	1.85				
8608186	1.86				
8608187	1.87				
8608188	1.88				
8608189	1.89				
8599019	1.9				
8608191	1.91	12	44	3	○
8608192	1.92				
8608193	1.93				
8608194	1.94				
8608195	1.95				
8608196	1.96				
8608197	1.97				
8608198	1.98				
8608199	1.99				
8599020	2				
8608201	2.01				
8608202	2.02				
8608203	2.03				
8608204	2.04				
8608205	2.05				
8608206	2.06				
8608207	2.07				
8608208	2.08				
8608209	2.09				
8599021	2.1				
8608211	2.11				
8608212	2.12				
8608213	2.13	13	45		

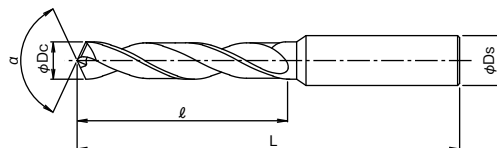
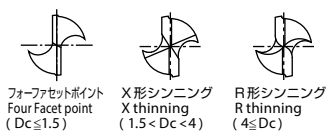
商品号 EDP No.	直径-柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8608214	2.14	13	45		
8608215	2.15				
8608216	2.16				
8608217	2.17				
8608218	2.18				
8608219	2.19				
8599022	2.2				
8608221	2.21				
8608222	2.22				
8608223	2.23				
8608224	2.24				
8608225	2.25				
8608226	2.26				
8608227	2.27				
8608228	2.28				
8608229	2.29				
8599023	2.3				
8608231	2.31	14	46	3	○
8608232	2.32				
8608233	2.33				
8608234	2.34				
8608235	2.35				
8608236	2.36				
8608237	2.37				
8608238	2.38				
8608239	2.39				
8599024	2.4				
8608241	2.41				
8608242	2.42				
8608243	2.43				
8608244	2.44				
8608245	2.45				
8608246	2.46				
8608247	2.47				
8608248	2.48				
8608249	2.49				
8599025	2.5				
8608251	2.51				
8608252	2.52				
8608253	2.53				

Indexable XC5040 XC5035
Ceramic End Mill serie se
W-HSCT serie se
End Mill NEO serie se
AE-VMS AE-VMS5
Thread Mill WH-VM-PNC WX-PNC
Tap WHR-NI-POT WHR-NI-SFT
VPH-GDS
Drill ADO-SUS serie se
WH055-5D

NEXT



VPH-GDS



$D_c \leq 13$: $\alpha = 130^\circ$



$D_c < 2$ or $2 \leq D_c < 6$ *2
 $2 \leq D_c < 6$ *1 $6 \leq D_c$

*1 适用于每0.01mm递增的尺寸
Applies to sizes in 0.01mm increment

*2 适用于每0.1mm递增的尺寸
Applies to sizes in 0.1mm increment

FROM

单位:mm Unit:mm

商品号 EDP No.	直径-柄径 Dc - Ds	槽长 l	全长 L	柄径 Ds	库存 Stock
8608254	2.54	14	46	3	○
8608255	2.55				
8608256	2.56				
8608257	2.57				
8608258	2.58				
8608259	2.59				
8599026	2.6				
8608261	2.61				
8608262	2.62				
8608263	2.63				
8608264	2.64				
8608265	2.65				
8608266	2.66				
8608267	2.67				
8608268	2.68				
8608269	2.69				
8599027	2.7				
8608271	2.71				
8608272	2.72				
8608273	2.73				
8608274	2.74				
8608275	2.75				
8608276	2.76				
8608277	2.77				
8608278	2.78				
8608279	2.79				
8599028	2.8				
8608281	2.81				
8608282	2.82				
8608283	2.83				
8608284	2.84				

商品号 EDP No.	直径-柄径 Dc - Ds	槽长 l	全长 L	柄径 Ds	库存 Stock
8608285	2.85	16	48	3	○
8608286	2.86				
8608287	2.87				
8608288	2.88				
8608289	2.89				
8599029	2.9				
8608291	2.91				
8608292	2.92				
8608293	2.93				
8608294	2.94				
8608295	2.95				
8608296	2.96				
8608297	2.97				
8608298	2.98				
8608299	2.99				
8599030	3				
8608301	3.01	18	50	4	○
8608302	3.02				
8608303	3.03				
8608304	3.04				
8608305	3.05				
8608306	3.06				
8608307	3.07				
8608308	3.08				
8608309	3.09				
8599031	3.1				
8608311	3.11				
8608312	3.12				
8608313	3.13				
8608314	3.14				
8608315	3.15				

· 标识说明请参阅 P.1.

· See p.1 for explanation of icons.

NEXT



FROM

单位:mm Unit:mm

商品号 EDP No.	直径-柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8608316	3.16	18	50	4	○
8608317	3.17				
8608318	3.18				
8608319	3.19				
8599032	3.2				
8608321	3.21				
8608322	3.22				
8608323	3.23				
8608324	3.24				
8608325	3.25				
8608326	3.26				
8608327	3.27				
8608328	3.28				
8608329	3.29				
8599033	3.3				
8608331	3.31				
8608332	3.32				
8608333	3.33				
8608334	3.34				
8608335	3.35				
8608336	3.36	20	52	4	○
8608337	3.37				
8608338	3.38				
8608339	3.39				
8599034	3.4				
8608341	3.41				
8608342	3.42				
8608343	3.43				
8608344	3.44				
8608345	3.45				
8608346	3.46				
8608347	3.47				
8608348	3.48				
8608349	3.49				
8599035	3.5				
8608351	3.51				
8608352	3.52				
8608353	3.53				
8608354	3.54				
8608355	3.55				

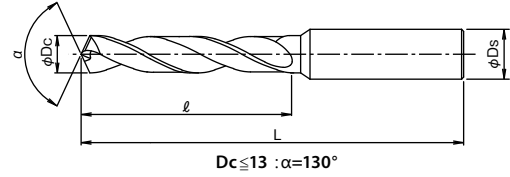
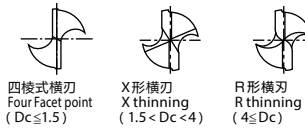
商品号 EDP No.	直径-柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8608356	3.56	20	52	4	○
8608357	3.57				
8608358	3.58				
8608359	3.59				
8599036	3.6				
8608361	3.61				
8608362	3.62				
8608363	3.63				
8608364	3.64				
8608365	3.65				
8608366	3.66				
8608367	3.67				
8608368	3.68				
8608369	3.69				
8599037	3.7				
8608371	3.71				
8608372	3.72				
8608373	3.73				
8608374	3.74				
8608375	3.75				
8608376	3.76	22	54	4	○
8608377	3.77				
8608378	3.78				
8608379	3.79				
8599038	3.8				
8608381	3.81				
8608382	3.82				
8608383	3.83				
8608384	3.84				
8608385	3.85				
8608386	3.86				
8608387	3.87				
8608388	3.88				
8608389	3.89				
8599039	3.9				
8608391	3.91				
8608392	3.92				
8608393	3.93				
8608394	3.94				
8608395	3.95				

Indexable XC5040 XC5035
Ceramic End Mill serie se
W-HSCT serie se
End Mill NEO serie se
AE-VMS AE-VMS5
WH-VM-PNC WX-PNC
Thread Mill
WHR-NI-POT WHR-NI-SFT
Tap
VPH-GDS
Drill ADO-SUS serie se
WH055-5D

NEXT



VPH-GDS



XPM V or WDI h8 SHANK h7 30° SPEED FEED P30
 $Dc < 2$ or $2 \leq Dc < 6^{*2}$
 $2 \leq Dc < 6^{*1}$ or $6 \leq Dc$

*1 适用于每0.01mm递增的尺寸
Applies to sizes in 0.01mm increment
*2 适用于每0.1mm递增的尺寸
Applies to sizes in 0.1mm increment

FROM

单位:mm Unit:mm

商品号 EDP No.	直径-柄径 Dc - Ds	槽长 l	全长 L	柄径 Ds	库存 Stock
8608396	3.96	22	54	4	○
8608397	3.97				
8608398	3.98				
8608399	3.99				
8599040	4				
8608401	4.01				
8608402	4.02				
8608403	4.03				
8608404	4.04				
8608405	4.05				
8608406	4.06				
8608407	4.07				
8608408	4.08				
8608409	4.09				
8599041	4.1				
8608411	4.11				
8608412	4.12				
8608413	4.13				
8608414	4.14				
8608415	4.15				
8608416	4.16				
8608417	4.17				
8608418	4.18				
8608419	4.19				
8599042	4.2				
8608421	4.21				
8608422	4.22				
8608423	4.23				
8608424	4.24				
8608425	4.25				
8608426	4.26				
		24	68		

商品号 EDP No.	直径-柄径 Dc - Ds	槽长 l	全长 L	柄径 Ds	库存 Stock
8608427	4.27	24	68	6	○
8608428	4.28				
8608429	4.29				
8599043	4.3				
8608431	4.31				
8608432	4.32				
8608433	4.33				
8608434	4.34				
8608435	4.35				
8608436	4.36				
8608437	4.37				
8608438	4.38				
8608439	4.39				
8599044	4.4				
8608441	4.41				
8608442	4.42				
8608443	4.43				
8608444	4.44				
8608445	4.45				
8608446	4.46				
8608447	4.47				
8608448	4.48				
8608449	4.49				
8599045	4.5				
8608451	4.51				
8608452	4.52				
8608453	4.53				
8608454	4.54				
8608455	4.55				
8608456	4.56				
8608457	4.57				

· 标识说明请参阅 P.1.

· See p.1 for explanation of icons.

NEXT



FROM

单位:mm Unit:mm

商品号 EDP No.	直径-柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8608458	4.58	24	68	6	○
8608459	4.59				
8599046	4.6				
8608461	4.61				
8608462	4.62				
8608463	4.63				
8608464	4.64				
8608465	4.65				
8608466	4.66				
8608467	4.67				
8608468	4.68				
8608469	4.69				
8599047	4.7				
8608471	4.71				
8608472	4.72				
8608473	4.73				
8608474	4.74				
8608475	4.75				
8608476	4.76	26	70	6	○
8608477	4.77				
8608478	4.78				
8608479	4.79				
8599048	4.8				
8608481	4.81				
8608482	4.82				
8608483	4.83				
8608484	4.84				
8608485	4.85				
8608486	4.86				
8608487	4.87				
8608488	4.88				
8608489	4.89				
8599049	4.9				
8608491	4.91				
8608492	4.92				
8608493	4.93				
8608494	4.94				
8608495	4.95				
8608496	4.96				
8608497	4.97				

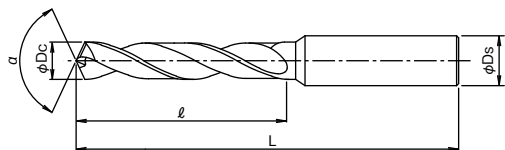
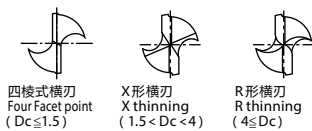
商品号 EDP No.	直径-柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8608498	4.98	26	70	6	○
8608499	4.99				
8599050	5				
8608501	5.01				
8608502	5.02				
8608503	5.03				
8608504	5.04				
8608505	5.05				
8608506	5.06				
8608507	5.07				
8608508	5.08				
8608509	5.09				
8599051	5.1				
8608511	5.11				
8608512	5.12				
8608513	5.13				
8608514	5.14				
8608515	5.15				
8608516	5.16				
8608517	5.17				
8608518	5.18				
8608519	5.19				
8599052	5.2				
8608521	5.21				
8608522	5.22				
8608523	5.23				
8608524	5.24				
8608525	5.25				
8608526	5.26				
8608527	5.27				
8608528	5.28				
8608529	5.29				
8599053	5.3	28	72	6	○
8608531	5.31				
8608532	5.32				
8608533	5.33				
8608534	5.34				
8608535	5.35				
8608536	5.36				
8608537	5.37				

Indexable XC5040 XC5035 Ceramic End Mill serie se W-HSCT serie se NEO serie se End Mill AE-VMS AE-VMS5 WH-VM-PNC WH-VM-PNC Thread Mill WX-PNC WHR-NI-SFT WHR-NI-SFT VPH-GDS ADO-SUS serie se Drill WH055-5D

NEXT



VPH-GDS



*1 适用于每0.01mm递增的尺寸
Applies to sizes in 0.01mm increment

*2 适用于每0.1mm递增的尺寸
Applies to sizes in 0.1mm increment

FROM

单位:mm Unit:mm

商品号 EDP No.	直径-柄径 Dc - Ds	槽长 l	全长 L	柄径 Ds	库存 Stock
8608538	5.38	28	72	6	○
8608539	5.39				
8599054	5.4				
8608541	5.41				
8608542	5.42				
8608543	5.43				
8608544	5.44				
8608545	5.45				
8608546	5.46				
8608547	5.47				
8608548	5.48				
8608549	5.49				
8599055	5.5				
8608551	5.51				
8608552	5.52				
8608553	5.53				
8608554	5.54				
8608555	5.55				
8608556	5.56				
8608557	5.57				
8608558	5.58				
8608559	5.59				
8599056	5.6				
8608561	5.61				
8608562	5.62				
8608563	5.63				
8608564	5.64				
8608565	5.65				
8608566	5.66				
8608567	5.67				
8608568	5.68				

商品号 EDP No.	直径-柄径 Dc - Ds	槽长 l	全长 L	柄径 Ds	库存 Stock
8608569	5.69	28	72	6	○
8599057	5.7				
8608571	5.71				
8608572	5.72				
8608573	5.73				
8608574	5.74				
8608575	5.75				
8608576	5.76				
8608577	5.77				
8608578	5.78				
8608579	5.79				
8599058	5.8				
8608581	5.81				
8608582	5.82				
8608583	5.83				
8608584	5.84				
8608585	5.85				
8608586	5.86				
8608587	5.87				
8608588	5.88				
8608589	5.89				
8599059	5.9				
8608591	5.91				
8608592	5.92				
8608593	5.93				
8608594	5.94				
8608595	5.95				
8608596	5.96				
8608597	5.97				
8608598	5.98				
8608599	5.99				

· 标识说明请参阅 P.1.

· See p.1 for explanation of icons.

NEXT



FROM

单位:mm Unit:mm

商品号 EDP No.	直径-柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8599060	6	28	72	6	○
	6.05	31	75	6	□
8599061	6.1				○
	6.15				□
8599062	6.2				○
	6.25				□
8599063	6.3				○
	6.35				□
8599064	6.4				○
	6.45				□
8599065	6.5				○
	6.55	□			
8599066	6.6	34	78	8	○
	6.65				□
8599067	6.7				○
	6.75				□
8599068	6.8				○
	6.85				□
8599069	6.9				○
	6.95				□
8599070	7				○
	7.05				□
8599071	7.1	○			
	7.15	□			
8599072	7.2	○			
	7.25	□			
8599073	7.3	○			
	7.35	□			
8599074	7.4	○			
	7.45	□			
8599075	7.5	○			
	7.55	□			
8599076	7.6	37	81	8	○
	7.65				□
8599077	7.7				○
	7.75				□
8599078	7.8				○
	7.85	□			
8599079	7.9	○			
	7.95	□			

商品号 EDP No.	直径-柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8599080	8	37	87	8	○
	8.05				□
8599081	8.1				○
	8.15				□
8599082	8.2				○
	8.25				□
8599083	8.3				○
	8.35				□
8599084	8.4				○
	8.45				□
8599085	8.5	40	90	10	○
	8.55				□
8599086	8.6				○
	8.65				□
8599087	8.7				○
	8.75				□
8599088	8.8				○
	8.85				□
8599089	8.9				○
	8.95				□
8599090	9	43	93	8	○
	9.05				□
8599091	9.1				○
	9.15				□
8599092	9.2				○
	9.25				□
8599093	9.3				○
	9.35				□
8599094	9.4				○
	9.45				□
8599095	9.5	○			
	9.55	□			
8599096	9.6	43	93	8	○
	9.65				□
8599097	9.7				○
	9.75				□
8599098	9.8				○
	9.85	□			
8599099	9.9	○			
	9.95	□			

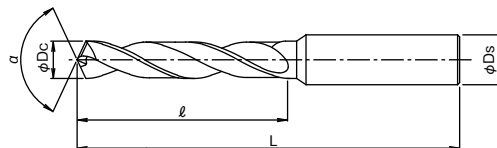
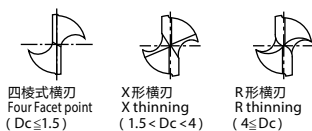
□ = 特定代理店库存品 □ = Stocked by specific distributors. Contact us for price & availability.

NEXT



Indexable XC5040 XC5035
Ceramic End Mill serie se
W-HSCT serie se
End Mill NEO serie se
AE-VMS AE-VMS5
Thread Mill WH-VM-PNC WX-PNC
Tap WHR-NI-POT WHR-NI-SFT
VPH-GDS
Drill ADO-SUS serie se
WH055-5D

VPH-GDS



$D_c \leq 13 : \alpha = 130^\circ$



$D_c < 2$ or $2 \leq D_c < 6$ *1
 $2 \leq D_c < 6$ *2
 $6 \leq D_c$

*1 适用于每0.01mm递增的尺寸
Applies to sizes in 0.01mm increment

*2 适用于每0.01mm递增的尺寸
Applies to sizes in 0.1mm increment

FROM

单位:mm Unit:mm

商品号 EDP No.	直径-柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8599100	10	43	93	10	○
	10.05		□		
8599101	10.1		○		
	10.15		□		
8599102	10.2		○		
	10.25		□		
8599103	10.3		○		
	10.35		□		
8599104	10.4		○		
	10.45		□		
8599105	10.5	○			
	10.55	□			
8599106	10.6	47	104	12	○
	10.65				□
8599107	10.7				○
	10.75				□
8599108	10.8				○
	10.85				□
8599109	10.9				○
	10.95				□
8599110	11				○
	11.05				□
8599111	11.1	○			
	11.15	□			
8599112	11.2	○			
	11.25	□			

商品号 EDP No.	直径-柄径 Dc - Ds	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8599113	11.3	47	104	12	○
	11.35				□
8599114	11.4				○
	11.45				□
8599115	11.5				○
	11.55				□
8599116	11.6				○
	11.65				□
8599117	11.7				○
	11.75				□
8599118	11.8	51	108	12	○
	11.85				□
8599119	11.9				○
	11.95				□
8599120	12				○
8599121	12.1				○
8599122	12.2				○
8599123	12.3				○
8599124	12.4				○
8599125	12.5				○
8599126	12.6	○			
8599127	12.7	○			
8599128	12.8	○			
8599129	12.9	○			
8599130	13	○			

· 标识说明请参阅 P.1。

· See p.1 for explanation of icons.

□ = 特定代理店库存品 □ = Stocked by specific distributors. Contact us for price & availability.



■ 切削条件基准表 Cutting Conditions

VPH-GDS

加工材料 Work Material	镍基合金 Ni-Based Alloy (Inconel 718)		钛合金 Titanium Alloy (Ti-6Al-4V)	
切削速度 Cutting Speed	6~8m/min		6~10m/min	
直径 Drill Dia. (mm)	转速 Speed (min ⁻¹)	进给量 Feed Rate (mm/rev)	转速 Speed (min ⁻¹)	进给量 Feed Rate (mm/rev)
0.5	3,800	0.005 ~ 0.01	5,000	0.005 ~ 0.01
1	2,000	0.01 ~ 0.02	2,400	0.01 ~ 0.02
2	1,100	0.02 ~ 0.04	1,200	0.02 ~ 0.04
3	740	0.03 ~ 0.06	800	0.03 ~ 0.06
4	550	0.04 ~ 0.08	699	0.04 ~ 0.08
5	445	0.05 ~ 0.1	500	0.05 ~ 0.1
6	370	0.06 ~ 0.12	440	0.06 ~ 0.12
7	320	0.07 ~ 0.14	350	0.07 ~ 0.14
8	280	0.08 ~ 0.16	320	0.08 ~ 0.16
9	250	0.09 ~ 0.18	280	0.09 ~ 0.18
10	220	0.1 ~ 0.2	260	0.1 ~ 0.2
11	200	0.11 ~ 0.22	230	0.11 ~ 0.22
12	190	0.12 ~ 0.24	210	0.12 ~ 0.24
13	170	0.13 ~ 0.26	200	0.13 ~ 0.26

1. 此切削条件基准表适用于使用水溶性切削油剂的情况。
2. 请使用稀释倍率20倍以下的优质水溶性切削油。
3. 使用油性切削液或大于10倍的水溶性切削油剂时，请把切削速度降低20%。
4. 孔深超过4倍直径时，请进行阶梯式进给，并按照下表设定切削速度。
5. 车床、卧式设备上加工3D以上的孔时，请使用阶梯式进给。
6. 在机械转速不能达到以上参数时，请在高转速下使用，但刀具的寿命可能受到一定的影响。

1. The indicated speeds and feeds are for drilling with water-soluble coolant.
2. The most suitable cutting fluid is water-soluble, high density coolant (less than 20 times dilution).
3. When using non-water-soluble or water-soluble coolant (over 10 times dilution), reduce the drilling speed by 20%.
4. The step process should be used when the drilling depth exceeds 4 times the drill diameter. (Using the table below)
5. Step process should be used when drilling depth of the hole exceeds 3 times drill diameter for lathe / horizontal machine.
6. For machines that cannot achieve the speeds indicated in the table please set rotation as high as possible. Tool life may be decreased.

孔深(D为直径) Depth of Hole (D : drill dia)	4D以下 ≤4D	5D以下 ≤5D	6D以下 ≤6D
切削速度抑制系数 Coefficient for reducing speed	×1	×0.9	×0.7



Drill WH055-5D
 ADO-SUS series
 VPH-GDS
 Tap WHR-NI-POT /WHR-NI-SFT
 Thread Mill WH-VM-PNC /WX-PNC
 End Mill AE-VMSS
 AE-VMS
 NEO series
 W-HSCT series
 Ceramic End Mill series
 Indexable XC5035
 XC5040

WHR-NI系列的特点 Features

针对难加工材镍基耐热合金的螺纹加工

Issues with Ni-based superalloy

工具寿命短，加工时容易在工件内部折断

Short tool life, tap breaks off inside of workpiece

刃尖磨损严重，切削刃容易崩损

Sudden tool wear, chipping of cutting edge

1/4-28 UNJF 加工 130 孔后的照片
Cutting edge after tapping 130 holes



缺损并磨损的切削锥部
Chipping and tool wear on chamfer

折损的可能性大
High possibility of breakage

新技术1

1 镍基超耐热合金用 HR 涂层

HR coating for Ni-based superalloy

(WHR-NI-SFT, WHR-NI-POT)

采用耐磨损性优异的 HR 涂层
HR coating with improved wear resistance

耐磨损性提高!
Improved wear resistance

M10×1.5 12穴加工後 Cutting edge after tapping 12 holes



V 涂层 V Coating



HR 涂层 HR Coating

新技术2

2 先端槽形螺旋槽丝锥

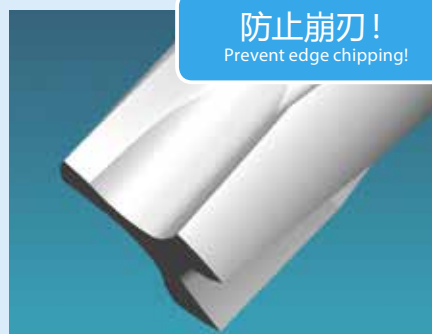
Spiral fluted tap with point flute

(WHR-NI-SFT)

盲孔也可使用的新型先端槽设计，提高刃尖刚性！

New point flute geometry with improved cutting edge rigidity to effectively machine blind holes

防止崩刃!
Prevent edge chipping!



■ 盲孔用 WHR-NI-SFT for Blind Holes

- 由于高刚性、不易崩刃、耐磨损性的先端槽形，可实现很稳定地加工。
- 采用了针对镍基耐热合金，抗溶着性高的 HR 涂层。
- 对时效处理后的镍基耐热合金(40-45HRC)，可实现长寿命加工。

- New point flute geometry with improved cutting edge rigidity and wear resistance for stable threading.
- HR coating for Ni-based superalloy effectively prevents build-up edge.
- Long tool life is achieved in aged Ni-based superalloy (40 to 45HRC).

■ 通孔用 WHR-NI-POT for Through Holes

- 采用了针对镍基耐热合金，抗溶着性高的 HR 涂层。
- 对时效处理后的镍基耐热合金(40-45HRC)，可实现长寿命加工。

- HR coating for Ni-based superalloy effectively prevents build-up edge.
- Long tool life is achieved in aged Ni-based superalloy (40 to 45HRC).



盲孔加工时是以往产品3倍的耐久性 3 times better tool life than conventional tool in blind holes

使用工具 Tool	WHR-NI-SFT 1/4-28UNJF
加工材料 Work Material	Inconel 718(43HRC)
底孔尺寸 Drill Hole Size	φ5.52×22mm (盲孔) Blind
攻丝长度 Tapping Length	12.7mm/min(2D)
切削速度 Cutting Speed	2m/min(100min ⁻¹)
切削油剂 Coolant	非水溶性切削油剂 Non-Water-Soluble
使用机械 Machine	立式加工中心 (BT30) Vertical Machining Center

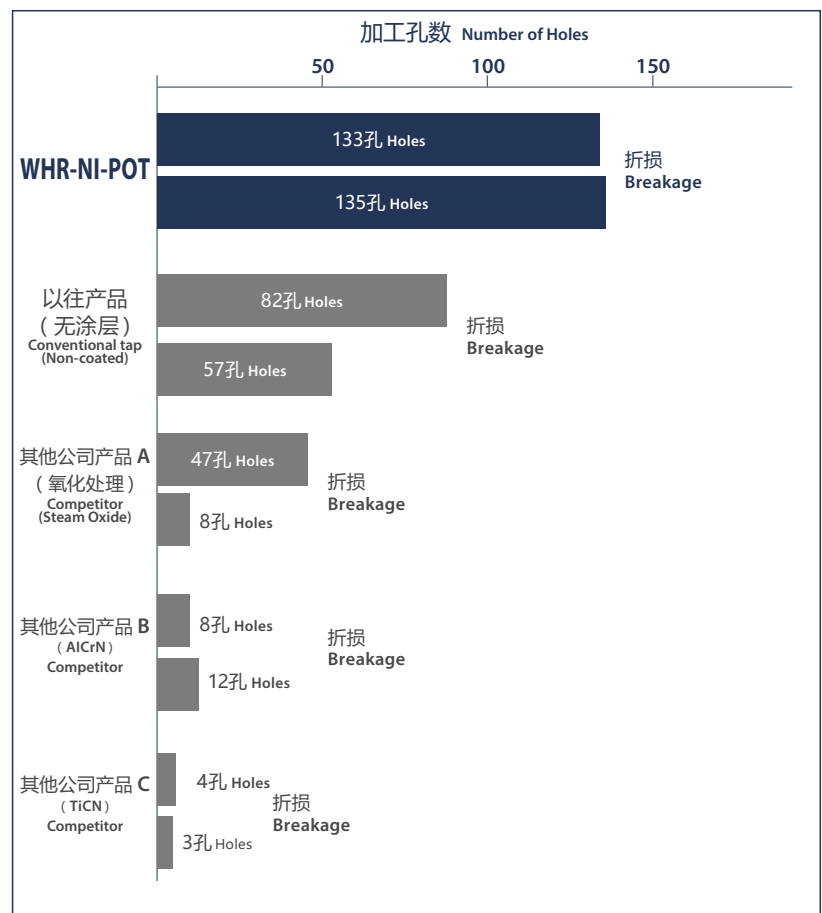
工具寿命比较 Comparison of tool life



通孔加工时稳定寿命长 Stable tool life in through holes

使用工具 Tool	WHR-NI-POT M4×0.7
加工材料 Work Material	Inconel 718(45HRC)
底孔尺寸 Drill Hole Size	φ3.3×9.5mm (通孔) Through
攻丝长度 Tapping Length	9.5mm(2.4D)
切削速度 Cutting Speed	3m/min(2,356min ⁻¹)
切削油剂 Coolant	非水溶性切削油剂 Non-Water-Soluble
使用机械 Machine	立式加工中心 (BT30) Vertical Machining Center

工具寿命比较 Tool life comparison

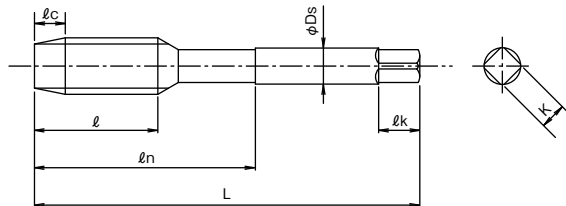


加工后的照片 Tool wear condition

		WHR-NI-POT	以往产品(无涂层) Conventional (Non-Coating)
第一支 No.1	60孔 Holes		
	120孔 Holes		82孔 折损 Breakage
第二支 No.2	60孔 Holes		57孔 折损 Breakage
	120孔 Holes		

Drill WH055-5D
ADO-SUS series
VPH-GDS
WHR-NI-POT WHR-NI-SFT
Thread Mill WH-VIM-PNC WX-PNC
AE-VMSS
AE-VMS
End Mill NEO series
W-HSCT series
Ceramic End Mill series
Indexable XC5035
XC5040

WHR-NI-SFT



螺纹种类 : M

单位:mm Unit:mm

商品号 EDP No.	螺纹尺寸 Thread Size	切削锥长 ℓ	精度标记 Grade	精度 TAP Limit	全长 L	螺纹部长度 ℓ	颈长 h	柄径 Ds	槽数 Flutes	突顶尖 ExternalCenter	推荐底孔径 Recommended drill hole dia.	库存 Stock
3901410	M 3 × 0.5	2.5P	STD	OH3	46	11	19	4	3	-	2.5	○
3901413	M 4 × 0.7				52	13	21	5		○	3.3	
3901416	M 5 × 0.8				60	16	29	5.5		○	4.2	
3901419	M 6 × 1				62	19	-	6		○	5	
3901422	M 8 × 1.25				70	22	36	7		-	6.8	
3901426	M 10 × 1.5				75	24	41	8.5		-	8.5	
3901432	M 12 × 1.75			82	29	43	10.5	-		10.3	OH4	

螺纹种类 : U·UNJ

单位:mm Unit:mm

商品号 EDP No.	螺纹尺寸 Thread Size	切削锥长 ℓ	精度 TAP Limit	全长 L	螺纹部长度 ℓ	颈长 h	柄径 Ds	槽数 Flutes	突顶尖 ExternalCenter	推荐底孔径 Recommended drill hole dia.	库存 Stock
3901446	No. 8 - 32UNJC	2.5P	GH3	52	13	21	5	3	○	3.5	○
3901455	No. 10 - 32UNJF			60	16	29	5.5		○	4.16	
3901467	¼ - 28UNJF		GH4	62	19	-	6		○	5.57	
3901473	⅝ - 24UNJF			70	22	36	7		-	7.01	
3901479	¾ - 24UNJF			75	24	41	8.5		-	8.59	
3901485	7/16 - 20UNJF		GH5	80	25	40	10.5		-	9.98	
3901491	½ - 20UNJF			85	29	45	10.5		-	11.57	

· 标识说明请参阅 P.1.

· See p.1 for explanation of icons.

1. 精度栏 为适合加工2级内螺纹的丝锥推荐精度。
2. 丝锥精度不能够保证内螺纹精度。
3. 柄部四方形尺寸、lk、k请参考「孔加工·螺纹加工刀具」综合样本。

1. The recommended tap limit corresponds to JIS class 2 internal thread standard.
2. Tap limit does not guarantee thread limit for the internal thread after tapping.
3. Refer to OSG's "Drilling and Threading Tools" general catalog for lengths of the l_k and K of the square shank.

GH 精度 GH Limit

为了对应高精度要求的航空零部件的螺纹加工，采用比OH精度公差带更窄的GH精度。

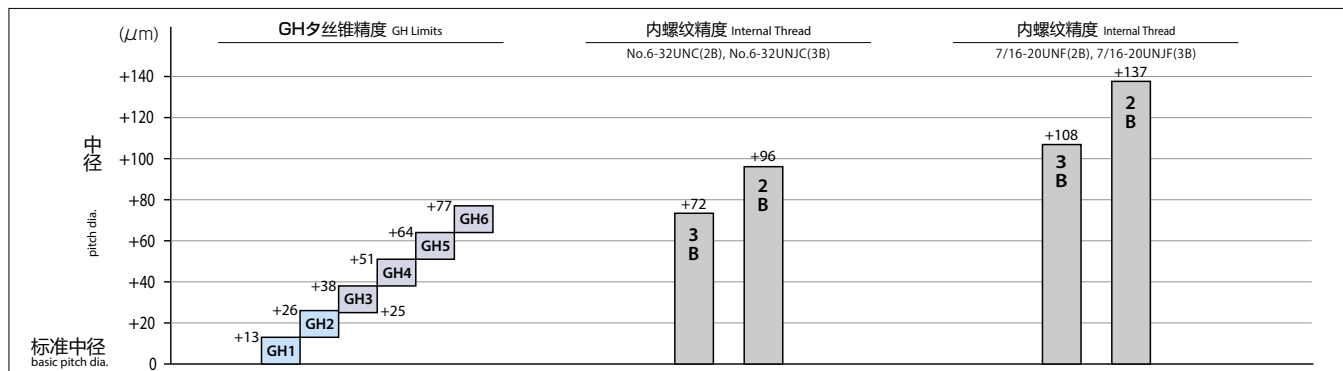
In order to meet with tighter hole tolerance of aerospace parts, tighter tap tolerance of GH limits is used for higher threaded hole precision.

GH1, 2

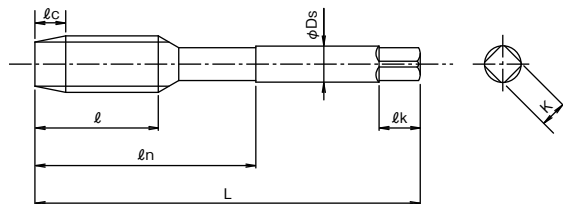
上公差 : $0.013 \times n$ upper limit : $0.013 \times n$
 下公差 : 上公差 - 0.013 lower limit : (upper limit) - 0.013
 单位 : mm Unit : mm (n=GH编号) (n=GH number)

GH3以上 GH3 and over

上公差 : $0.013 \times (n-2) + 0.025$ upper limit : $0.013 \times (n-2) + 0.025$
 下公差 : 上公差 - 0.013 lower limit : (upper limit) - 0.013
 单位 : mm Unit : mm (n=GH编号) (n=GH number)



WHR-NI-POT



螺纹种类 : M

单位:mm Unit:mm

商品号 EDP No.	螺纹尺寸 Thread Size	切削锥长 ℓ	精度标记 Grade	精度 TAP Limit	全长 L	螺纹部长度 ℓ	颈长 h	柄径 Ds	槽数 Flutes	突顶尖 External/Center	推荐底孔径 Recommended drill hole dia.	库存 Stock
3901210	M 3 × 0.5	5P	STD	OH3	46	18	19	4	3	○	2.5	○
3901213	M 4 × 0.7				52	20	21	5		○	3.3	
3901216	M 5 × 0.8				60	22	29	5.5		○	4.2	
3901219	M 6 × 1				62	24	-	6		○	5	
3901222	M 8 × 1.25				70	22	36	7		○	6.8	
3901226	M 10 × 1.5				75	24	41	8.5		-	8.5	
3901232	M 12 × 1.75			82	29	43	10.5	-		10.3		

螺纹种类 : U·UNJ

单位:mm Unit:mm

商品号 EDP No.	螺纹尺寸 Thread Size	切削锥长 ℓ	精度 TAP Limit	全长 L	螺纹部长度 ℓ	颈长 h	柄径 Ds	槽数 Flutes	突顶尖 External/Center	推荐底孔径 Recommended drill hole dia.	库存 Stock
3901246	No. 8 - 32UNJC	5P	GH3	52	20	21	5	3	○	3.5	○
3901255	No. 10 - 32UNJF			60	22	29	5.5		○	4.16	
3901267	¼ - 28UNJF		GH4	62	24	-	6		○	5.57	
3901273	5/16 - 24UNJF			70	22	36	7		○	7.01	
3901279	3/8 - 24UNJF			75	24	41	8.5		-	8.59	
3901285	7/16 - 20UNJF		GH5	80	25	40	10.5		-	9.98	
3901291	½ - 20UNJF			85	29	45	10.5		-	11.57	

· 标识说明请参阅 P.1.

· See p.1 for explanation of icons.

1. 精度栏 为适合加工2级内螺纹的丝锥推荐精度。
2. 丝锥精度不能保证内螺纹精度。
3. 柄部四方部尺寸、lk、k 请参考「孔加工·螺纹加工刀具」综合样本。

1. The recommended tap limit corresponds to JIS class 2 internal thread standard.
2. Tap limit does not guarantee thread limit for the internal thread after tapping.
3. Refer to OSG's "Drilling and Threading Tools" general catalog for lengths of the lk and K of the square shank.

■ 切削条件基准表 Cutting Conditions

WHR-NI-SFT · WHR-NI-POT

加工材料 Work Material		切削速度 (m/min) Cutting Speed		切削油剂 Coolant			
		WHR-NI-SFT	WHR-NI-POT	油性切削油剂 Non-Water-Soluble	水溶性切削油剂 Water-Soluble	半干式 Semi-Dry	干式 Dry
镍基合金 Ni-Based Alloy	Inconel Inconel 718	1~3	2~4	◎	—	—	—

1. 这个表中所示为通常情况下的选定基准, 但使用条件会根据实际情况变更。
2. 加工3B级内螺纹时, 请使用同步进给及铣刀夹头以防止内螺纹扩大的现象出现。

1. These cutting conditions should be only used as a reference. Depending on actual cutting environment, adjustments with the cutting condition should be considered.
2. To machine 3B class internal threads, use synchronized feeding and a milling chuck as measures against the problem of enlarged internal threads.



Drill WH055-5D
 ADO-SUS series
 VPH-GDS
 Tap WHR-NI-SFT
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 Thread Mill WX-PNC
 WH-VM-PNC
 AE-VMSS
 AE-VMS
 End Mill NEO series
 W-HSCT series
 Ceramic End Mill series
 Indexable XC5035
 XC5040

辅助螺纹铣刀加工的3种工具

3 Support Tools for Your Thread Milling Needs

使用3种工具来实现

缩减调试时间

缩减加工时间

稳定刀具寿命

Reduce setup, machining time, and achieve stable tool life with these 3 support tools.



1 使用 RPRG 提高工作效率

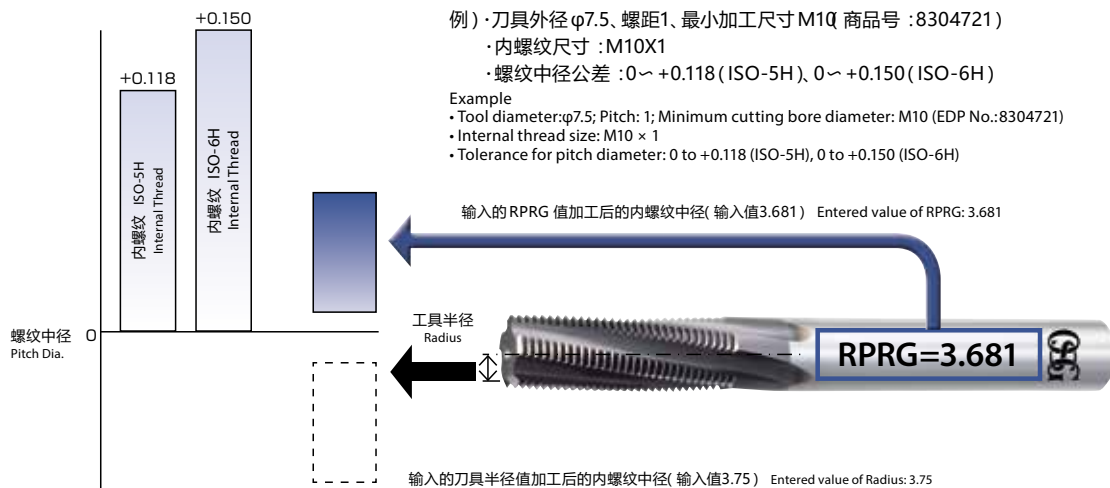
Use RPRG to reduce the workload

RPRG 值是指螺纹铣削加工时所必要的刀具半径补偿量的参考值

RPRG is the reference value of tool radius offset

通常情况下，设置时在数控系统的参数中输入刀具半径，通过用量规检查螺纹进行校正。现在只需要输入刀柄上的 RPRG 值，就可以减少检查和校正过程。

Conventionally, the tool radius was entered during setup as a parameter of the NC system, which was corrected by checking the thread with a gauge. However, it has become possible to reduce the checking and correction simply by entering the RPRG value indicated on the tool shank.



• 注意事项

1. RPRG 值为参考数值，在实际加工时，根据加工环境会有所变化，请在调试加工后再做调整。
2. RPRG 值的设定是以满足公制螺纹 ISO:5H(旧 JIS1级)，美制统一螺纹 ANSI :3B 内螺纹精度情况下，所推荐的最佳值。在加工锥管螺纹 (R-Rc) 时，RPRG 值的设定，以使用我司 NC 程序编程软件时，所推荐的实时有效的 RPRG 值为准。
3. 对于螺纹铣刀的直径而言，RPRG 值的设定是以满足当前刀具所允许加工的最小螺纹尺寸为基准进行计算的，当所需加工的螺纹尺寸大于最小螺纹尺寸时，所设定的半径补偿量应该小于当前的 RPRG 值。
4. 适用于 2014 年 11 月起生产的刀具。

• Notes

1. RPRG are reference values. Optimal values for actual cutting depend on the machining environment. Determine optimal values after trial cutting.
2. RPRG values are optimally established to achieve ISO:5H (formerly Grade 1) internal thread limits for metric threads and ANSI:3B internal thread limits for unified threads. RPRG values established for taper pipes (R/Rc) are effective when using the thread milling NC code generator software ThreadPro available on our website.
3. For diameters of thread mills, RPRG values are calculated based on the minimum cutting bore diameter (the minimum cutting internal thread size of the tool diameter). To cut other diameters, it is necessary to use a smaller value than RPRG.
4. RPRG values are indicated on tools manufactured from November 2014.



② 优化的NC 编程软件 ThreadPro

Revamped Thread Milling NC Code Generator Software "ThreadPro"

使用NC 螺纹铣刀编程软件(ThreadPro), 任何操作者都能简单容易的编制程序。即使是复杂的加工也可以简单的编制程序。

Generate codes for complex machining couldn't be easier. Create machining programs at ease with OSG's revamped NC code generator software ThreadPro.



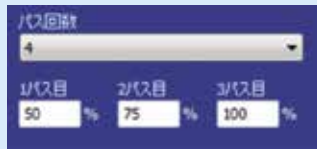
3大更新点

3 Key Revamped Features

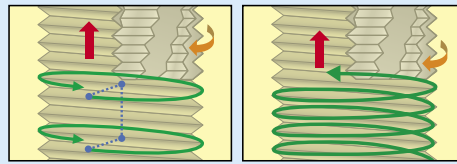
1. 12国语言对应 Available in 12 different languages
2. 支持8种NC 编程语言 Supports 8 NC programming languages
3. 计算最合适的RPRG 值 Calculates the most appropriate RPRG value

ThreadPro 具更全面的功能 ThreadPro with Comprehensive Features

- 1) 可轻松制作零切削程序
Generate programs for zero cut at ease



- 2) 高品质的同步进给加工
High quality machining by stair passes



阶梯进给 Pass type : continuous 连续进给 Pass type : stairs

- 3) 可以检查加工轨迹从而减少刀具的损伤
Capability to review machining trajectory to reduce tool damage

③ 使用DCT, 刀具半径的补偿更简单, 寿命更稳定

Achieve Stable Tool Life with the DCT for Accurate Diameter Measurement

螺纹铣刀用半径补偿工具(Diameter Correction Tool), 使至今颇为困难的内螺纹孔口部的中径测量也可以简单的数值化。

The internal thread effective diameter, which used to be difficult to determine, can now be measured with readable values.



详细请参考 OSG HP 和 DCT 样本。
Please refer OSG HP and DCT catalogue for details.

如何正确确定补正值? How can we properly determine the diameter correction value?

当极限量规的中径为负数时, 无法确定螺纹铣刀的半径补正值。然而, 使用螺纹铣刀用半径补正工具可以测量出中径负数值, 从而消除了孔扩大的风险, 可适当的补正, 大大减少了调整时间。

When the effective diameter of the limit gauge is minus, the radius correction value of the thread mill cannot be determined. However, with the use of the thread mill Diameter Correction Tool (DCT), the effective diameter can be measured, which can eliminate the risk of hole expansion, allow appropriate adjustment and significantly reduce setup time.

更换刀具后, 内螺纹的中径是否一直相同? Is the internal thread effective diameter always the same after changing tool?

根据内螺纹孔口部中径的数值化, 可以使刀具更换后的内螺纹中径基本保持一致。起始位置相同的话, 终点位置(刀具寿命) 也可一致, 使刀具寿命稳定化。

Knowing the internal thread effective diameter value can help maintain the same effective diameter after exchanging tool. As long as the starting position is the same, the GO position (tool life) can be aligned to help predict and stabilize tool life.

Drill WH055-5D
ADO-SUS series
VPH-GDS
Tap WHR-NI-POT WHR-NI-SFT
Thread Mill WH-VM-PNC WX-PNC
WH-VM-PNC
AE-VMSS
AE-VMS
End Mill NEO series
W-HSCT series
Ceramic End Mill series
Indexable XC5035
XC5040

WX-PNC的特点 Features

1 可加工镍基耐热合金等难加工材料! Excels in difficult-to-machine materials such as Ni-based alloy!

使用丝锥加工时排屑困难,而螺纹铣刀通过断续加工可以将切屑细小分割。因此几乎没有排屑问题,从而实现稳定加工。
Unlike cut taps, thread mills process materials by intermittent cutting, which creates short and compact chips. As there is no concern with chip management, stable threading can be achieved.

2 适用于水溶性切削油剂! Applicable with water-soluble coolant!

因为断续加工可分散切削热,即使使用水溶性切削油剂加工耐热合金也能充分发挥性能。
Stable machining with water-soluble coolant is possible even in heat-resistant alloys by intermittent cutting, which disperses cutting heat.

3 30°大螺旋槽,可降低振动 Suppresses vibration with 30° helical flute geometry!

WX-PNC大螺旋槽的特点,可以降低加工时的振动。特别是加工耐热合金时,可以高效率加工高品质的内螺纹。
Vibrations generated during cutting can be greatly reduced with the WX-PNC's notable high helix flute geometry. With minimal cutting vibrations, high efficiency and high quality threading can be achieved even in heat-resistant alloys.

4 采用WX涂层! Adoption of WX coating!

采用了在铣刀中使用并成功加工镍基合金的WX涂层。
Coated with the advanced WX coating, which is used in OSG end mills with a proven record of success for Ni-based alloy.

5 采用高硬度硬质合金材料,具有高耐磨损性! Manufactured with premium carbide substrate for superior wear resistance!

采用本公司硬质合金材料中最硬的材质,实现高耐久性。
Superior durability can be achieved with the utilization of OSG's toughest premium carbide substrate.

6 也可对应非铁合金(铝·铜)! Suitable even for non-ferrous alloys (aluminum and copper)!

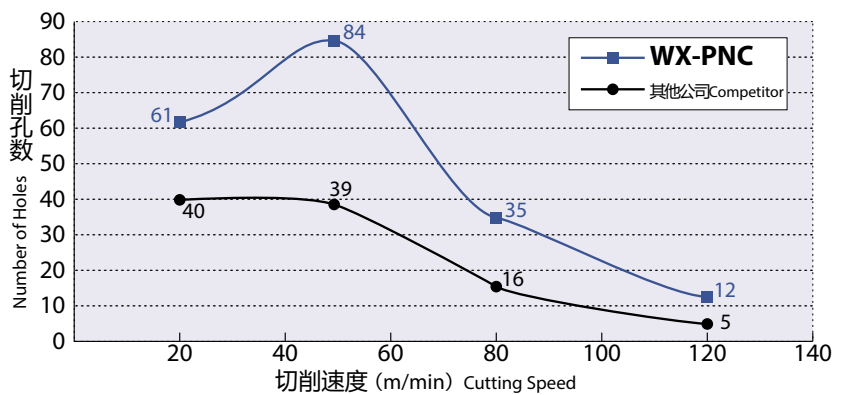
即使在需要锋利性的非铁合金中也可使用。
Excels even in non-ferrous alloys that require sharpness.

加工Inconel 718时,实现比其他公司2倍的耐久性

WX-PNC achieved twice the tool life of the competitor in Inconel 718

使用工具 Tool	WX-PNC 4.55×10.2 U20 3刃 FL
加工材料 Work Material	Inconel 718 (43HRC)
切削速度 Cutting Speed	参照右图 See graph on right
内螺纹尺寸 Internal Thread Size	1/4-20UNC
攻丝长度 Tapping Length	9mm
底孔尺寸 Drill Hole Size	φ5.1
每刃进给量 Feed per Tooth	0.03mm/t
切削油剂 Coolant	水溶性切削油剂 10倍 Water-Soluble (10%)
使用机械 Machine	卧式加工中心 (BT40) Horizontal Machining Center

■ 切削速度及耐久数 Cutting Speed and Durability Count



这是针对Inconel718 材料加工,使用不同切削速度的耐久性比较结果。以50m/min 以下的切削速度加工,工具耐久性佳,是比较好的加工领域范围。WX-PNC 不管切削速度如何,都是其它公司产品2倍的工具寿命。

These are the test results in Inconel 718 at various cutting speeds. At cutting speeds under 50m/min, durability is better and this seems to be an effective machining range. The WX-PNC achieves twice the tool life of the competitor, no matter the cutting speed.

WH-VM-PNC的特点 Features

① 3个牙的螺纹长度，可减少切削阻力！ Reduction of cutting resistance with 3-thread length geometry!

螺纹长为3个牙，可减轻对工具及机床的负担
Cutting load on both the machine and tool can be minimized with the optimized thread form.

② M1~皆可加工！！ Available from size M1~!

以往的产品系列中M6为最小，WH-VM-PNC上市后可加工最小M1x0.25。
M6 was the smallest offering in the previous lineup. With the introduction of WH-VM-PNC, sizes as small as M1x0.25 is now available.

③ 采用WXS涂层！ Adoption of WXS coating!

采用了在铣刀中使用并成功对应高硬度加工的WXS涂层。
Coated with the advanced WXS coating, which is used in OSG end mills with a proven record of success for hard hardness materials.

④ 采用高硬度硬质合金材料，具有高耐磨损性！ Manufactured with premium carbide substrate for superior wear resistance!

采用本公司硬质合金材料中最硬的材质，实现高耐久性。
Superior durability can be achieved with the utilization of OSG's toughest premium carbide substrate.

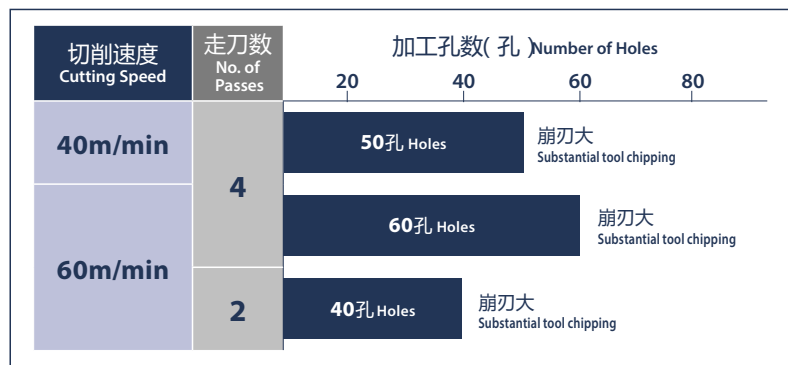
⑤ 可对应铝·铁·耐热合金等广泛的加工材料！ Suitable for a wide variety of materials, including aluminum, iron and heat-resistant alloys!

3个牙的螺纹长度，材料，涂层的特点，可对应广泛的加工材料。
也可对应HRC55高硬度材料的攻丝。
Capable to excel in a wide range of materials with the optimized thread form, premium carbide substrate and advanced coating. Applicable for internal threading of high hardness materials up to 55 HRC.

Inconel 718小径内螺纹加工

Machining small diameter internal threads with Inconel 718

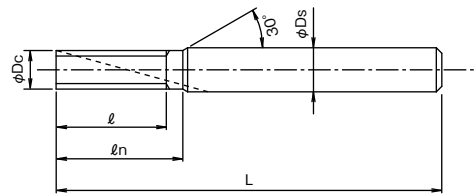
使用工具 Tool	WH-VM-PNC 3.2×2.4 U32 3刃 FL	
加工材料 Work Material	Inconel 718 (40HRC)	
切削速度 Cutting Speed	40m/min (3,980min ⁻¹)	60m/min (5,970min ⁻¹)
进给速度 Feed	120mm/min (0.03mm/t)	180mm/min (0.03mm/t)
内螺纹尺寸 Internal Thread Size	No.10-32 UNF	
底孔尺寸 Drill Hole Size	φ4.1×14mm(盲孔) Blind	
攻丝长度 Tapping Length	9mm(1.9D)(盲孔) Blind	
加工方法 Machining Method	顺铣 2·4次走刀 Down Cut 2·4 passes	
切削油剂 Coolant	水溶性切削油剂 Water-Soluble	
使用机械 Machine	立式加工中心(HSK-A40) Vertical Machining Center	



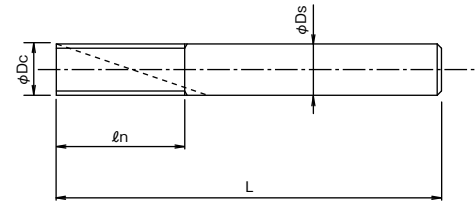
与丝锥相比，螺纹铣刀受切削条件制约小，无需担心切屑的处理或切削油剂的润滑性，可稳定地进行螺纹加工。此案例是追求提升高价格工件的小径内螺纹加工的成品率，是实现了加工稳定，高成品率的优秀案例。此外，通过调整进给量，走刀次数以及变更切削油剂，也可实现更好的工具耐久性及其成本的降低。

Compared to taps, thread mills have fewer cutting condition limitations. There are no worries about chip management or coolant lubricity, and stable threading is possible. In this example, we were able to improve the yield rate of small diameter internal threads in a high value workpiece. Further durability improvements and cost reductions can be expected by adjusting the feed rate and number of passes, and changing the cutting fluid.

WX-PNC



Type1



Type2



CARBIDE WX 30° SHANK h6 SPEED FEED P40

螺纹种类 : M

单位:mm Unit:mm

商品号 EDP No.	最小加工径 Min. Cutting Bore Dia.	螺距 Pitch	外径 Dc	全长 L	螺纹部长度 ℓ	颈长 h	柄径 Ds	槽数 Flutes	形状类型 Type	库存 Stock
3900000	M 6	0.75	4.5	60	12.8	15	6	3	1	
3900001		1			13					
3900009	M 8	0.5	6	65	16.5	-	6	3	2	
3900011		1			17					
3900012		1.25			17.5					
3900021	M10	1	7.5	70	21	26	8	3	1	
3900023		1.5			22.5					
3900032	M12	1.25	9.5	85	26.3	28	10	4	1	
3900033		1.5			25.5					
3900034		1.75			26.3					
3900036	M14	0.5	10	85	28.5	-	10	4	2	○
3900041		0.75			29.3					
3900042		1			29					
3900043		1.5			30					
3900044		2			30					
3900052	M16	1	12	95	33	-	12	4	2	
3900053		1.5			34.5					
3900054		2			34					
3900065	M18	2.5	14	105	40	45	16	4	1	
3900073	M20	1.5	16	105	42	-	16	4	2	
3900075		2.5			42.5					
3900083	M27	1.5	20	120	49.5	-	20	5	2	
3900084		2			50					
3900086		3			51					

· 标识说明请参阅 P.1。

· See p.1 for explanation of icons.

- WX-PNC (M) 为内螺纹加工专用工具。
- 按螺纹尺寸区分的工具选型表请参阅 P.42。
- ThreadPro 的走刀类型选择为“复数走刀”。

- WX-PNC (M) is only for milling internal threads.
- Please see p.42 for Tool Selection Guide by Screw Size.
- Please select "Multi-feed" for the path type in ThreadPro.

NEXT





FROM

螺纹种类 : U·UNJ·UNJ 嵌套螺纹用 U·UNJ·UNJ Helicoil / EG / STI

单位:mm Unit:mm

商品号 EDP No.	最小加工径 Min. Cutting Bore Dia.	牙数 T.P.I.	外径 Dc	全长 L	螺纹部长度 ℓ	颈长 h	柄径 Ds	槽数 Flutes	形状类型 Type	库存 Stock
3900350	1/4	20	4.55	60	10.2	11.4	6	3	1	○
3900351		28			10	10.9				
3900355	5/16	18	6.2	65	12.7	14.1	8	3	1	
3900356		24								
3900360	3/8	16	7.6	65	14.3	-	8	3	2	
3900361		24			14.8					
3900365	7/16	14	8.8	75	18.1	19.9	10	3	1	
3900366		20			17.8	19.1				
3900370	1/2	13	9.4	75	19.5	21.5	10	4	1	
3900371		20			19.1	20.4				
3900375	9/16	12	10.9	85	23.3	25.4	12	4	1	
3900380		18	11.4		22.6	24				
3900382	5/8	11	10.9	85	25.4	27.7	12	4	1	
3900385	3/4	10	15.7	95	30.5	-	16	4	2	
3900388	7/8	9	18.9	110	33.9	36.7	20	4	1	
3900390		12				36				
3900392	1	8	18.9	110	38.1	41.3	20	4	1	

· 标识说明请参阅P.1.

· See p.1 for explanation of icons.

- WX-PNC(U·UNJ)为内螺纹加工专用工具。
- 按螺纹尺寸区分的工具选型表请参阅P.42。
- ThreadPro的走刀类型选择为“复数走刀”。

- WX-PNC(U·UNJ) is only for milling internal threads.
- Please see p.42 for Tool Selection Guide by Screw Size.
- Please select "Multi-feed" for the path type in ThreadPro.

■ 切削条件基准表 Cutting Conditions

WX-PNC

加工材料 Work Material	切削速度 Cutting speed (m/min)	进给量 Feed Rate (mm/t)
镍基合金 Ni-Based Alloy (Inconel 718)	20 ~ 60	0.01 ~ 0.03
钛合金 Titanium Alloy (Ti-6Al-4V)	20 ~ 60	0.02 ~ 0.06
析出硬化体不锈钢 Precipitation Stainless Steel (SUS630)	20 ~ 60	0.02 ~ 0.06

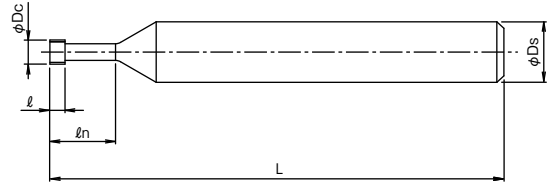
1. 此切削条件基准表适用于水溶性切削油剂。
2. 根据工件刚性，机械及夹具的刚性，有必要改变切削条件。
3. 螺纹加工深度较深的情况以及螺距较大的情况下，请选择小进给量，并多走几刀进行加工。
4. 加工后的平行内螺纹使用有锥度的通规，旋入时如有困难，请追加ZERO CUT。

1. The indicated speeds and feeds are for water-soluble.
2. Please adjust the cutting conditions depending on the rigidity of machine, tool holders, and workpiece clamping.
3. If the tapping length is long, or when machining a large-pitch thread, select a smaller feed and separate the machining process into a few segments.
4. If a machined parallel internal thread is tapered and prevents the go-gauge from going through, add a zero cut (finish machining).



Drill ADO-SUS series WH055-5D
VPH-GDS
Tap WHR-NI-SFT WHR-NI-POT WXR-PNC
Thread Mill WH-VM-PNC WX-PNC
End Mill NEO series
Ceramic End Mill series
Indexable XC5035 XC5040

WH-VM-PNC



螺纹种类 : M

单位:mm Unit:mm

商品号 EDP No.	最小加工径 Min. Cutting Bore Dia.	螺距 Pitch	外径 Dc	全长 L	螺纹部长度 ℓ	螺纹部牙数 Thread per Cutting Part	颈长 ℓn	柄径 Ds	槽数 Flutes	库存 Stock
3900500	M2	0.4	1.5	40	1.2	3	4.4	6	3	○
3900501	M2.5	0.45	1.9	40	1.4	3	5.6	6	3	
3900502	M3	0.5	2.4	40	1.5	3	6.5	6	3	
3900503	M4	0.7	3.1	40	2.1	3	8.7	6	3	
3900504	M5	0.8	4	40	2.4	3	10.8	6	3	

螺纹种类 : U · UNJ

单位:mm Unit:mm

商品号 EDP No.	最小加工径 Min. Cutting Bore Dia.	螺距 Pitch	外径 Dc	全长 L	螺纹部长度 ℓ	螺纹部牙数 Thread per Cutting Part	颈长 ℓn	柄径 Ds	槽数 Flutes	库存 Stock
3900513	No.8	32	3.2	40	2.4	3	9.1	6	3	○

· 标识说明请参阅P.1。 · See p.1 for explanation of icons.

- WX-VM-PNC(M, U · UNJ)为内螺纹加工专用工具。
- 按螺纹尺寸区分的工具选型表请参阅P.42。
- ThreadPro的走刀类型选择为“复数走刀”。

- WH-VM-PNC (M, U · UNJ) is only for milling internal threads.
- Please see p.42 for Tool Selection Guide by Screw Size.
- Please select "Multi-feed" for the path type in ThreadPro.

■ 切削条件基准表 Cutting Conditions

WH-VM-PNC

加工材料 Work Material	切削速度 Cutting Speed (m/min)	进给量 Feed Rate (mm/t)
镍基合金 Ni-Based Alloy (Inconel 718)	20 ~ 60	0.01 ~ 0.03
钛合金 Titanium Alloy (Ti-6Al-4V)	20 ~ 60	0.02 ~ 0.06
析出硬化体不锈钢 Precipitation Stainless Steel (SUS630)	20 ~ 60	0.02 ~ 0.06

1. 此切削条件基准表适用于使用水溶性切削油剂的通常情况。根据加工机器，加工回数的设定，无上述的限制。可广泛对应各种情况。
2. 根据工件刚性，机器及夹具的刚性，有必要改变切削条件。
3. 螺纹加工深度较深的情况以及螺距较大的情况下，请选择小进给量。
4. 加工后的平行内螺纹使用有锥度的通规，旋入时如有困难，请追加螺纹精加工工序。

1. The above Cutting Conditions is to be used as a general conditions for using water-soluble coolant. This conditions may not be applicable depending on the machining equipment or the number of passes. They can be addressed in a wide range of ways.
2. Please adjust the cutting conditions depending on the rigidity of machine, tool holders, and workpiece clamping.
3. If the tapping length is long, or when machining a large-pitch thread, select a smaller feed and separate the machining process into a few segments.
4. If a machined parallel internal thread is tapered and prevents the go-gauge from going through, add a zero cut (finish machining).

加工方法 Machining Method

- ① 螺纹的深处加工3个牙。
① Machine three pitches at the bottom of the hole.
- ② 1次回转1P后向Z轴方向移动进行反复圆弧切削。
② Repeat arc cutting movement only 1P in the Z axial direction for each rotation.
- ③ 最后孔口加工后完成。
③ To finish, machine the hole entry.



公制螺纹用 Metric screw thread (Internal)

Page		P.39	P.41
螺距 Pitch	最小加工径 Min. Cutting Bore Dia.	WX-PNC	WH-VM-PNC
P0.4	M 2		3900500
P0.45	M 2.5		3900501
P0.5	M 3		3900502
	M 8	3900009	
	M 14	3900036	
P0.7	M 4		3900503
P0.75	M 6	3900000	
	M 14	3900041	
P0.8	M 5		3900504
P1.0	M 6	3900001	
	M 8	3900011	
	M 10	3900021	
	M 14	3900042	
	M 16	3900052	
P1.25	M 8	3900012	
	M 12	3900032	
P1.5	M 10	3900023	
	M 12	3900033	
	M 14	3900043	
	M 16	3900053	
	M 20	3900073	
P1.75	M 12	3900034	
	M 14	3900044	
P2.0	M 16	3900054	
	M 27	3900084	
	M 18	3900065	
P2.5	M 20	3900075	
	M 27	3900086	

美制螺纹用 Unified screw thread (Internal)

Page		P.40	P.41
牙数 T.P.I.	最小加工径 Min. Cutting Bore Dia.	WX-PNC	WH-VM-PNC
32	No. 8		3900513
28	1/4	3900351	
24	5/16	3900356	
	3/8	3900361	
20	1/4	3900350	
	7/16	3900366	
	1/2	3900371	
18	5/16	3900355	
	9/16	3900380	
16	3/8	3900360	
14	7/16	3900365	
13	1/2	3900370	
12	9/16	3900375	
	7/8	3900390	
11	5/8	3900382	
10	3/4	3900385	
9	7/8	3900388	
8	1	3900392	



Drill
WH055-5D
ADO-SUS
series

VPH-GDS

Tap
WHR-NI-POT
WHR-NI-SFT

Thread Mill
WX-PNC
WH-VM-PNC

End Mill
AE-VMSS
AE-VMS
NEO
series

W-HSCT
series

Ceramic End Mill
series

Indexable
XC5035
XC5040

铣削的新标准

The New Standard for Milling

正前角

Positive Rake Angle

降低切削阻力
Reduces cutting force

高刚性

High Rigidity

加工精度的提高
Improves milling accuracy

新型沟槽形状

New Flute Form

良好的排屑性
Facilitates excellent chip evacuation

Superior Surface Quality

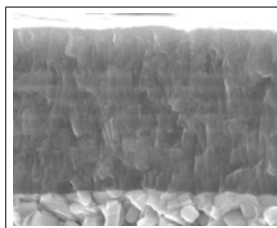
加工面
质量

DUARISE涂层

DUARISE Coating

· 润滑性、耐磨损性、高温氧化性优良的复合多层结构可以有效抑制裂纹传播。

Provides excellent lubricity, superior friction-resistance and high oxidation temperature. Multi-layer construction minimizes the thermal cracks that often occurred while using water-soluble oil.

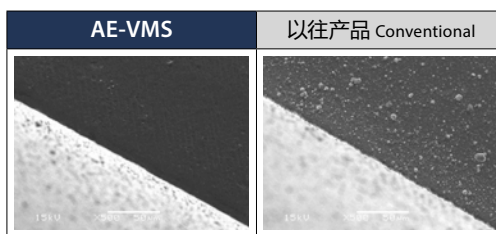


复合多层结构
Multi-Layer Construction

附着强化层
Adhesion Reinforcing Layer

· 涂层表面进行了平滑处理可以提高加工面精度

Smoothing surface coating treatment made an excellent quality of surface finishing.



High Efficiency

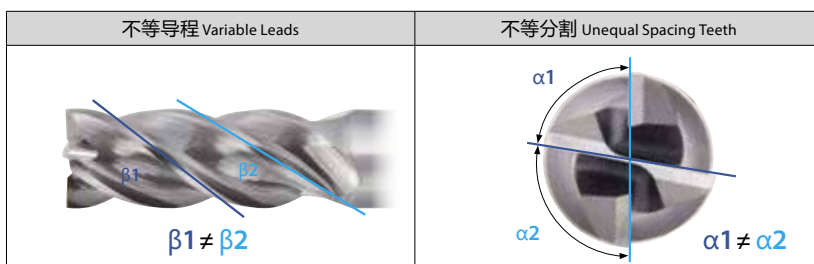
高效率

抑制振动

Suppression of Vibration

采用不等分割、不等导程设计，可以实现稳定，高效的加工。

Unequal spacing of teeth and variable-lead geometry enables stable and high efficiency milling



Stable Performance

安定加工

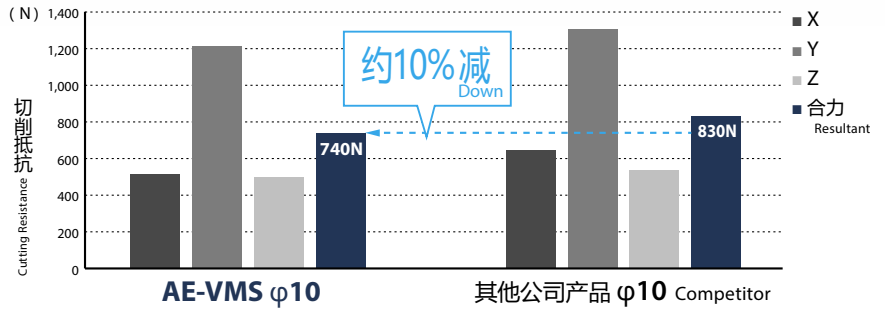
低阻力 Low Cutting Force

- 锋利性优良的正前角刃形，可以降低切削阻力
- 兼顾工具刚性与排屑性的新型沟槽形状，可以实现稳定加工，并抑制毛刺产生。

- Sharp positive rake angle reduces cutting force.
- New flute form with high tool rigidity and excellent chip evacuation properties enables stable milling and the suppression of burrs.

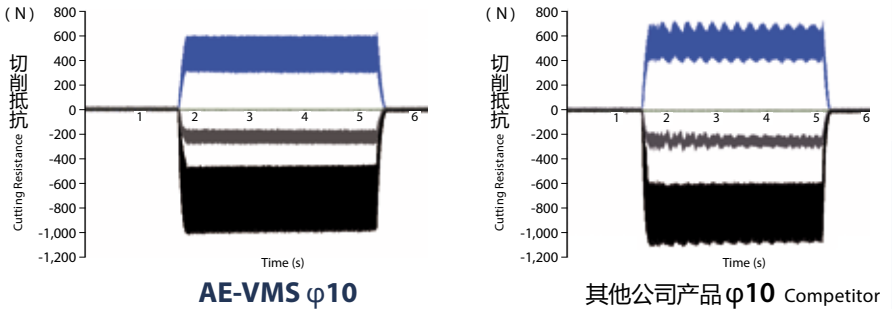
■ 与其他公司产品相比，减少约10%切削阻力

10% lower cutting force versus the competitors



■ 悬伸L/D = 4也可以稳定加工

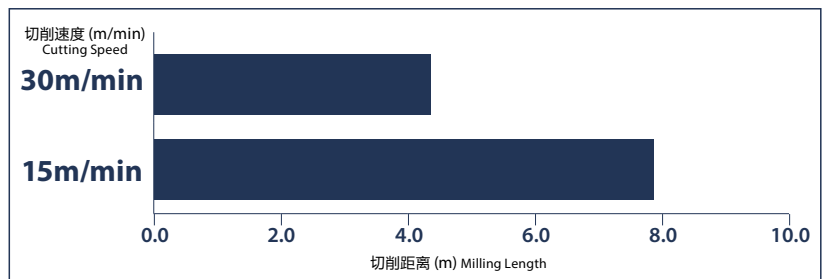
Stable performance even when the overhang length is L/D=4



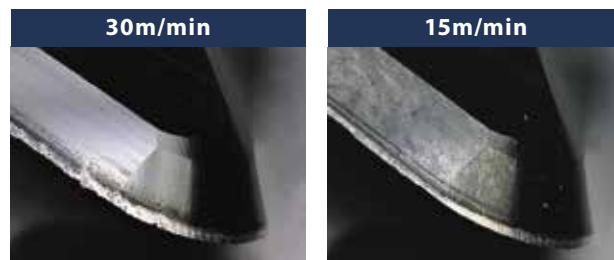
■ AE-VMS 加工 Inconel 材料的案例 Cutting data of AE-VMS in Inconel

使用工具 Tool	AE-VMS φ12xR2
加工材料 Work Material	Inconel 718
加工方法 Milling Method	侧铣 Side Milling
切削速度 Cutting Speed	15m/min (398min ⁻¹) 30m/min (796min ⁻¹)
每刃进给量 Feed per Tooth	0.050mm/t
切削深度 Depth of Cut	ap=12mm (1D) ae=1.2mm(0.1D)
切削油剂 Coolant	非水溶性切削油剂 Non-Water-Soluble
使用机械 Machine	立式加工中心 (BT50) Vertical Machining Center

■ 达到磨损VB=0.2mm时的切削距离 Cutting distance when wear of VB=0.2mm is reached

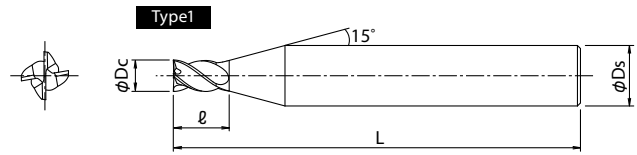


■ 切削距离为 4.0m 时的刀具照片 Image of tool after milling 4m



AE-VMS也可加工 Inconel 718材料。
将切削速度降低至一半的话，刀具寿命将延长2倍。
The AE-VMS excels even in Inconel 718. Tool life can be doubled by reducing the cutting speed (m/min) by half.

AE-VMSS



平头型 Square Type

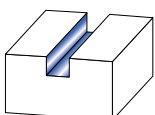
单位:mm Unit:mm

商品号 EDP No.	外径 Dc	全长 L	刃长 ℓ	柄径 Ds	形状 Type	库存 Stock
8556410	1	40	1.5	4	1	○
8556415	1.5	40	2.3	4	1	
8556420	2	40	3	4	1	
8556425	2.5	40	3.8	4	1	
8556430	3	45	4.5	6	1	
8556435	3.5	45	5.3	6	1	
8556440	4	45	6	6	1	
8556445	4.5	45	6.8	6	1	
8556450	5	45	7.5	6	1	
8556455	5.5	45	8.3	6	1	
8556460	6	45	9	6	2	
8556465	6.5	60	9.8	8	1	
8556470	7	60	10.5	8	1	
8556475	7.5	60	11.3	8	1	
8556480	8	60	12	8	2	
8556485	8.5	70	12.8	10	1	
8556490	9	70	13.5	10	1	
8556495	9.5	70	14.3	10	1	
8556500	10	70	15	10	2	
8556505	10.5	75	15.8	12	1	
8556510	11	75	16.5	12	1	
8556515	11.5	75	17.3	12	1	
8556520	12	75	18	12	2	

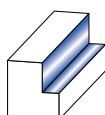
· 标识说明请参阅 P.1.

· See p.1 for explanation of icons.

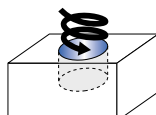
加工形态 Application



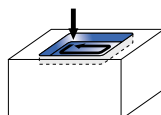
槽铣
Slot Milling



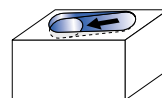
侧铣
Side Milling



螺旋线加工
Helical Milling



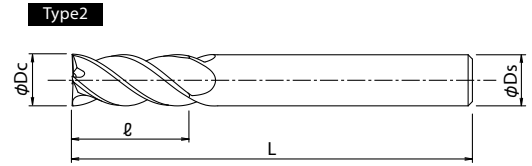
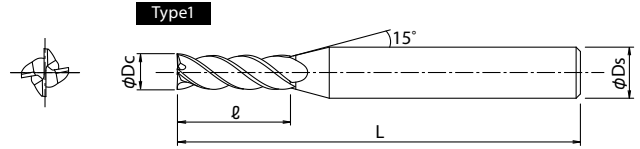
轮廓加工
Contour Milling



斜线加工
Ramping



AE-VMS



平头型 Square Type

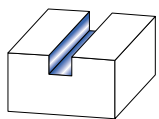
单位:mm Unit:mm

商品号 EDP No.	外径 Dc	全长 L	刃长 ℓ	柄径 Ds	形状 Type	库存 Stock
8555830	3	60	8	6	1	○
8555840	4	60	11	6	1	
8555850	5	60	13	6	1	
8555860	6	60	13	6	2	
8555880	8	70	19	8	2	
8555900	10	80	22	10	2	
8555920	12	90	26	12	2	
8555960	16	100	32	16	2	
8556000	20	110	40	20	2	
8556010	25	120	50	25	2	

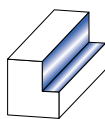
· 标识说明请参阅P.1.

· See p.1 for explanation of icons.

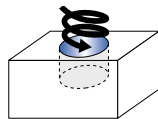
加工形态 Application



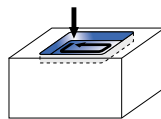
槽铣
Slot Milling



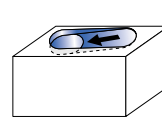
侧铣
Side Milling



螺旋线加工
Helical Milling



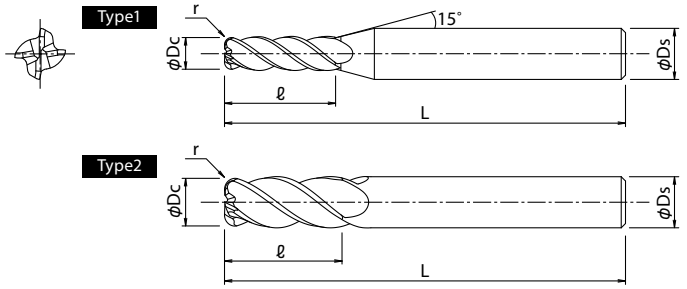
轮廓加工
Contour Milling



斜线加工
Ramping

Drill WH055-5D
 ADO-SUS series
 VPH-GDS
 Tap WHR-NI-POT WHR-NI-SFT
 Thread Mill WWH-VM-PNC WX-PNC
 End Mill AE-VMS
 NEO series
 W-HSCT series
 Ceramic End Mill series
 Indexable XC5035
 XC5040

AE-VMS



圆弧角型 铣刀 Radius Type

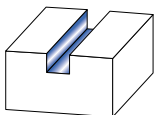
单位:mm Unit:mm

商品号 EDP No.	外径 Dc	全长 L	刃长 l	柄径 Ds	形状 Type	库存 Stock
8556050	3 × R0.2	60	8	6	1	○
8556060	3 × R0.5					
8556070	4 × R0.2	60	11	6	1	
8556080	4 × R0.5					
8556090	4 × R1					
8556100	5 × R0.2	60	13	6	1	
8556110	5 × R0.5					
8556120	5 × R1					
8556130	6 × R0.3	60	13	6	2	
8556140	6 × R0.5					
8556150	6 × R1					
8556160	8 × R0.3					
8556170	8 × R0.5	70	19	8	2	
8556180	8 × R1					
8556190	8 × R1.5					
8556200	8 × R2					
8556210	10 × R0.3	80	22	10	2	
8556220	10 × R0.5					
8556230	10 × R1					
8556240	10 × R1.5					
8556250	10 × R2					
8556260	10 × R3					
8556270	12 × R0.5	90	26	12	2	
8556280	12 × R1					
8556290	12 × R1.5					
8556300	12 × R2					
8556310	12 × R3					

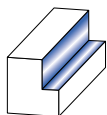
· 标识说明请参阅 P.1.

· See p.1 for explanation of icons.

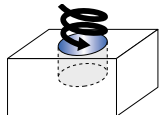
加工形态 Application



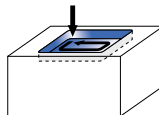
槽铣
Slot Milling



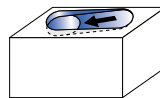
侧铣
Side Milling



螺旋线加工
Helical Milling



轮廓加工
Contour Milling



斜线加工
Ramping



仿形加工
Copying



■ 切削条件基准表 Cutting Conditions

AE-VMSS · AE-VMS

侧铣 Side Milling

加工材料 Work Material	镍基合金 Ni-Based Alloy (Inconel 718)		钛合金 Titanium Alloy (Ti-6Al-4V)		析出硬化体不锈钢 Precipitation Stainless Steel (SUS630)	
切削速度 Cutting Speed	25~40m/min		60~80m/min		70~90m/min	
外径 Mill Dia. (mm)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
1	12,730	160	25,460	350	29,280	370
1.5	8,490	180	16,980	400	19,520	410
2	6,370	190	12,730	420	14,640	440
2.5	5,090	210	10,190	460	11,710	480
3	4,240	220	8,490	480	9,760	510
4	3,180	240	6,370	530	7,320	550
5	2,550	250	5,090	540	5,860	560
6	2,120	250	4,240	550	4,880	580
8	1,590	230	2,790	430	3,200	450
10	1,270	220	2,230	410	2,560	430
12	1,060	210	1,860	400	2,140	420
16	700	210	1,190	400	1,370	410
20	560	200	950	380	1,100	390
25	320	190	760	490	880	510
切削深度 Depth of Cut			a_p 1.5D		a_e 0.2D	

槽铣 Slot Milling

加工材料 Work Material	镍基合金 Ni-Based Alloy (Inconel 718)		钛合金 Titanium Alloy (Ti-6Al-4V)		析出硬化体不锈钢 Precipitation Stainless Steel (SUS630)	
切削速度 Cutting Speed	20~30m/min		50~70m/min		60~80m/min	
外径 Mill Dia. (mm)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
1	9,550	120	22,280	300	25,620	320
1.5	6,370	130	14,850	340	16,980	360
2	4,770	140	11,140	350	12,810	360
2.5	3,820	150	8,910	390	10,190	410
3	3,180	160	7,430	410	8,540	430
4	2,390	170	5,570	440	6,410	460
5	1,910	180	4,460	470	5,120	490
6	1,590	180	3,710	460	4,270	480
8	1,190	200	2,390	430	2,750	450
10	950	180	1,910	400	2,200	420
12	800	180	1,590	400	1,830	420
16	500	110	990	250	1,140	260
20	400	120	800	260	920	270
25	250	90	640	240	730	250
切削深度 Depth of Cut			a_p 0.25D			

1. 请使用高刚性，高精度的机械、刀柄。
2. 转速是通过基准切削速度的中央值计算出的。请根据工件的夹持力，机械的刚性等使用情况进行转速、进给速度的调整。
3. 为了适应加工材料，请采用发烟量少的油剂。
4. 干式加工情况下，为了不造成切屑阻塞，请使用气枪除去切屑。
5. 不锈钢加工中，推荐使用水溶性切削油剂。
6. 对加工精度有要求的情况下，请适当下调转速，进给速度及切深量。

1. Use a rigid and precise machine and holder.
2. The rotational speed is calculated by the median of the recommended cutting speed. Adjustment may be necessary depending on the rigidity of the workpiece fixture and machine.
3. Please use a suitable fluid with high smoke retardant properties.
4. During dry (no fluid) milling, please use air blow to remove disposable chips from the milling area and to eliminate chip packing.
5. Please use water-soluble coolant when machining stainless steel.
6. Reduce speed and feed as well as depth of cut when high precision is required.



Drill WH055-5D
 ADO-SUS series
 VPH-GDS
 Tap WHR-NI-POT | WHR-NI-SFT
 Thread Mill WX-PNC
 WH-VM-PNC
 AE-VMSS
 AE-VMS
 End Mill NEO series
 W-HSCT series
 Ceramic End Mill series
 Indexable XC5035
 XC5040

不等导程铣刀NEO系列的特点

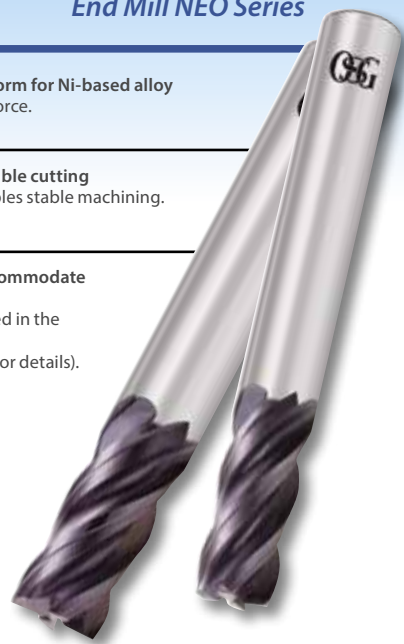
Features of Variable-Lead End Mill NEO Series

- 独特的正前角刃形对应镍基耐热合金加工
实现降低切削热，降低切削抵抗。
- 采用不等导程设计，实现稳定切削发挥防振效果，
可实现稳定加工
- 丰富的产品线适合不同的加工形状
标准品中没有的尺寸可制作非标品。(请参照以下内容)

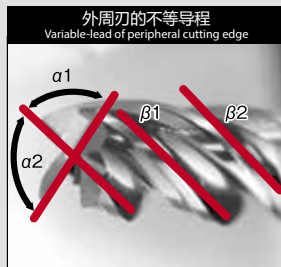
Proprietary positive cutting edge form for Ni-based alloy
It reduces cutting heat and cutting force.

The variable lead shape ensures stable cutting
The vibration absorption effect enables stable machining.

An abundant variety of tools to accommodate
machining shapes
Sizes and shapes that are not included in the
standard lineup (see below) can be
ordered as special items (see below for details).



此形状
可抑制振动!!
This shape suppresses chattering!!



-ADVANCED NEO-

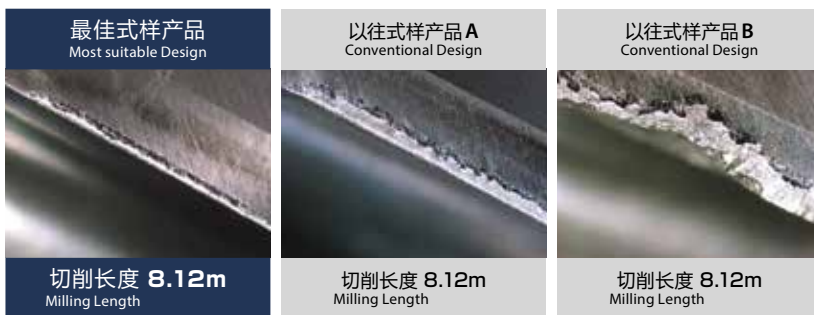
为需要更长工具寿命的客户而制作 特殊对应案例
for the customers who demand even longer tool life - Exaple of tools made upon requests.

选择最适合的刃数、涂层、母材，实现了惊人的耐久性。请随时联系我们。
Astonishing durability can be achieved through the selection of the ideal number of flutes, coatings, and base materials. Please feel free to contact us.

实现最佳式样 Implementation of the ideal method

使用工具 Tool	NEO-EMS φ12(特殊品 X 8刃) (Special) (Flutes)
加工材料 Work Material	Inconel 718(46HRC)
加工方法 Milling Method	侧铣 Side Milling
切削速度 Cutting Speed	50m/min(1,326min ⁻¹)
进给速度 Feed	530mm/min(0.05mm/t)
切削深度 Depth of Cut	ap=7mm(0.58D) ae=1mm(0.08D)
切削油剂 Coolant	水溶性切削油剂(20倍) Water-Soluble(5%)
使用机械 Machine	立式加工中心(BT40) Vertical Machining Center

相同刃数(8刃)的比较 Comparision in same number of flutes (8FL)



不仅仅是刃数多，比起以往式样有着惊人的寿命
There are not just more flutes, the durability is dramatically increased over the conventional method.

最佳式样的提案! We suggest the ideal method!

外径 Dc		刃数 Z	
以上 and Over	小于 Less		
φ10	φ12	6刃以下	6FL and less
φ12	φ16	8刃以下	8FL and less
φ16	φ20	10刃以下	10FL and less
φ20	φ25	12刃以下	12FL and less
φ25	—	14刃以下	14FL and less

※每种尺寸请根据上述刃数对应用途来选择。
※We select the number of flutes for each size as indicated above.

涂层 Coating

标准品FX涂层以外，还有
WXS、WXL、TiAlN、SS以
及V涂层可供选择。

In addition to the standard FX
products, we select from WXS, WXL,
TiAlN, SS and V Coating.

母材 Base Materials

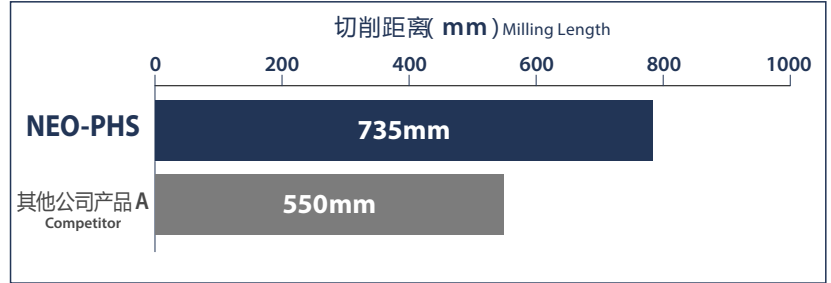
请咨询我社
营业人员。

Please contact our sales staff.

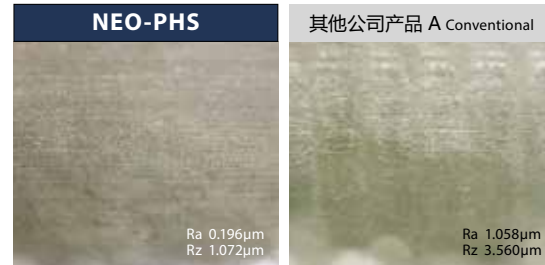


■ 可槽铣!耐久·加工面良好 Suitable for slot milling! Good durability and machining surface

使用工具 Tool	NEO-PHS $\phi 10$
加工材料 Work Material	Inconel 718
加工方法 Milling Method	槽铣 Slot Milling
切削速度 Cutting Speed	24m/min (775min ⁻¹)
进给速度 Feed	100mm/min (0.032mm/t)
切削深度 Depth of Cut	ap=10mm (1D)
切削油剂 Coolant	水溶性切削油剂 (20倍) Water-Soluble (5%)
使用机械 Machine	立式加工中心 (BT40) Vertical Machining Center



■ 切削距离 315mm 时的加工面照片 Image of work surface after milling 315mm

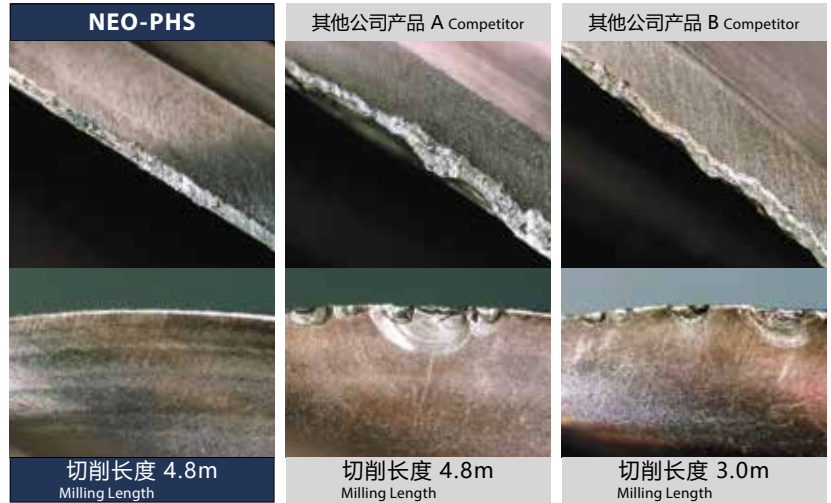


■ 采用最适用于加工难加工材料的刃尖式样(正前角刃型), 实现稳定的加工

Using the ideal cutting edge (positive edge form) for cutting difficult-to-machine materials, stable machining can be achieved

使用工具 Tool	NEO-PHS $\phi 10$
加工材料 Work Material	Inconel 718 (46HRC)
加工方法 Milling Method	侧铣 Side Milling
切削速度 Cutting Speed	40m/min (1,300min ⁻¹)
进给速度 Feed	210mm/min (0.04mm/t)
切削深度 Depth of Cut	ap=15mm (1.5D) ae=0.5mm (0.05D)
切削油剂 Coolant	水溶性切削油剂 (20倍) Water-Soluble (5%)
使用机械 Machine	立式加工中心 (BT40) Vertical Machining Center

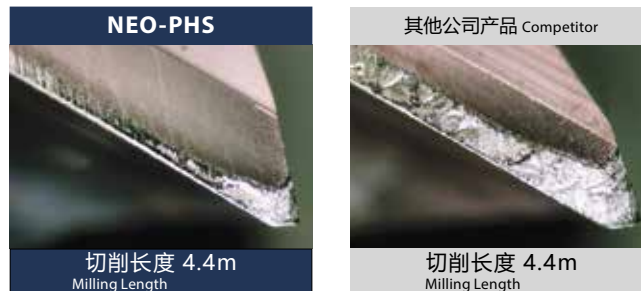
与其他公司产品相比外周刃发生崩刃的情况少, 可以稳定加工。
Chipping of the outer cutting edge does not happen as with the competitor's product, making stable cutting possible.



■ 即使是难以显示不等导程效果的 $\phi 6$ 加工时也能长寿命

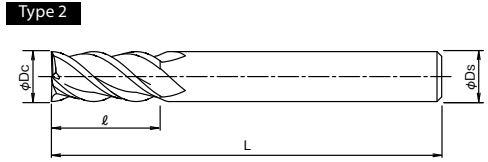
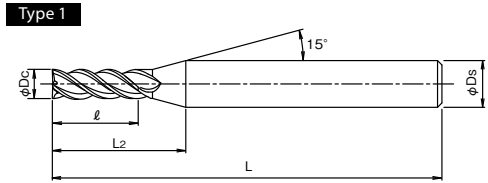
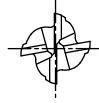
Long tool life even on 6mm diameter which is difficult to show the advantage of uneven helix angle

使用工具 Tool	NEO-PHS $\phi 6$
加工材料 Work Material	Inconel 718 (46HRC)
加工方法 Milling Method	侧铣 Side Milling
切削速度 Cutting Speed	40m/min (2,100min ⁻¹)
进给速度 Feed	250mm/min (0.03mm/t)
切削深度 Depth of Cut	ap=9mm (1.5D) ae=0.3mm (0.05D)
切削油剂 Coolant	水溶性切削油剂 (20倍) Water-Soluble (5%)
使用机械 Machine	立式加工中心 (BT30) Vertical Machining Center



其他公司产品随着磨损出现了溶着现象。
NEO-PHS则磨损小, 保持良好的刃尖状态。
The competition showed welding after progressed wear.
NEO-PHS showed minimum wear, still sharp edges.

NEO-PHS



CARBIDE FX $\frac{D_c \leq 12}{12 < D_c}$ $\frac{0 \sim -0.02}{0 \sim -0.03}$ SHRINK FIT $36^\circ \sim 39^\circ$ SPEED FEED P54

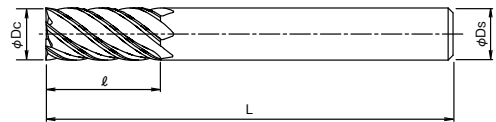
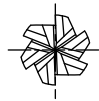
单位:mm Unit:mm

商品号 EDP No.	外径 Dc	全长 L	刃长 ℓ	L ₂	柄径 Ds	形状 Type	库存 Stock
8529230	3	50	6	12.8	6	1	○
8529240	4		8	13			
8529250	5		10	13.2			
8529260	6		12				
8529280	8	60	16		8	2	
8529300	10	70	20		10		
8529320	12	75	24		12		
8529360	16	100	32		16		
8529400	20	105	40		20		
8529450	25	120	50		25		

· 标识说明请参阅 P.1.

· See p.1 for explanation of icons.

NEO-EMS



CARBIDE FX $\frac{D_c \leq 16}{16 < D_c}$ $\frac{0 \sim -0.02}{0 \sim -0.03}$ SHRINK FIT $37^\circ \sim 38^\circ \sim 39^\circ$ SPEED FEED P54

单位:mm Unit:mm

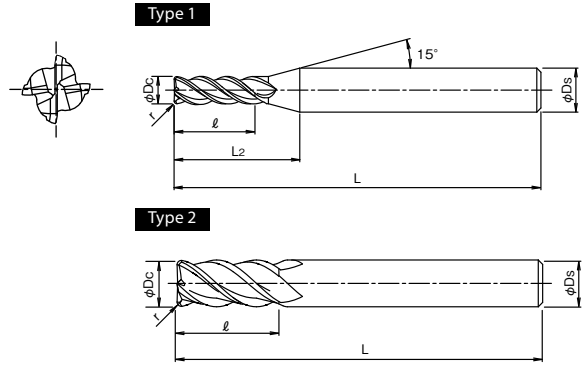
商品号 EDP No.	外径 Dc	全长 L	刃长 ℓ	柄径 Ds	库存 Stock
8519360	6	50	12	6	○
8519380	8	60	16	8	
8519400	10	70	20	10	
8519420	12	75	24	12	
8519460	16	100	32	16	
8519500	20	105	40	20	
8519550	25	120	50	25	

· 标识说明请参阅 P.1.

· See p.1 for explanation of icons.



NEO-CR-PHS



CARBIDE FX $D_{c \leq 12}$ $0 \rightarrow -0.02$ SHRINK $36^\circ-39^\circ$ SPEED FEED P54
 $12 < D_c$ $0 \rightarrow -0.03$ FIT

单位:mm Unit:mm

商品号 EDP No.	外径 x 球半径 $D_c \times r$	全长 L	刃长 l	L_2	柄径 D_s	形状 Type	库存 Stock					
8529531	3 × R0.2	50	6	12.8	6	1	○					
8529533	3 × R0.5		8	13								
8529541	4 × R0.2							10	13.2			
8529543	4 × R0.5									12		
8529545	4 × R1										16	
8529551	5 × R0.2											20
8529553	5 × R0.5											
8529555	5 × R1	—										
8529562	6 × R0.3		75	32	12	2						
8529563	6 × R0.5	16										
8529565	6 × R1		100	20								
8529582	8 × R0.3	105			40							
8529583	8 × R0.5		25									
8529585	8 × R1	50										
8529587	8 × R1.5		120									
8529589	8 × R2	25										
8529602	10 × R0.3		120	50								
8529603	10 × R0.5	25										
8529605	10 × R1		25									
8529607	10 × R1.5	25										
8529609	10 × R2		25									
8529613	10 × R3	25										
8529633	12 × R0.5		25									
8529635	12 × R1	25										
8529637	12 × R1.5		25									
8529639	12 × R2	25										
8529643	12 × R3		25									
8529662	16 × R1	25										
8529663	16 × R1.5		25									
8529664	16 × R2	25										
8529665	16 × R3		25									
8529682	20 × R1	25										
8529684	20 × R2		25									
8529685	20 × R3	25										
8529686	20 × R4		25									
8529687	20 × R5	25										
8529702	25 × R1		25									
8529704	25 × R2	25										
8529705	25 × R3		25									
8529706	25 × R4	25										
8529707	25 × R5		25									

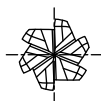
· 标识说明请参阅P.1.

· See p.1 for explanation of icons.



Drill: WH055-5D
 ADO-SUS series
 VPH-GDS
 Tap: WHR-NI-POT | WHR-NI-SFT
 Thread Mill: WH-VM-PNC | WX-PNC
 End Mill: AE-VMSS | AE-VMSS | NEO series
 W-HSCT series
 Ceramic End Mill series
 Indexable: XC5035 | XC5040

NEO-CR-EMS



单位:mm Unit:mm

商品号 EDP No.	外径 x 球半径 Dc x r	全长 L	刃长 ℓ	柄径 Ds	库存 Stock
8519662	6 × R0.3	50	12	6	○
8519663	6 × R0.5				
8519665	6 × R1				
8519682	8 × R0.3	60	16	8	
8519683	8 × R0.5				
8519685	8 × R1				
8519687	8 × R1.5				
8519689	8 × R2				
8519702	10 × R0.3	70	20	10	
8519703	10 × R0.5				
8519705	10 × R1				
8519707	10 × R1.5				
8519709	10 × R2				
8519713	10 × R3	75	24	12	
8519733	12 × R0.5				
8519735	12 × R1				
8519737	12 × R1.5				
8519739	12 × R2				
8519743	12 × R3	100	32	16	
8519762	16 × R1				
8519763	16 × R1.5				
8519764	16 × R2				
8519765	16 × R3				
8519782	20 × R1	105	40	20	
8519784	20 × R2				
8519785	20 × R3				
8519786	20 × R4				
8519787	20 × R5				
8519802	25 × R1	120	50	25	
8519804	25 × R2				
8519805	25 × R3				
8519806	25 × R4				
8519807	25 × R5				

· 标识说明请参阅P.1.

· See p.1 for explanation of icons.



■ 切削条件基准表 Cutting Conditions

NEO-PHS · NEO-CR-PHS

■ 侧铣 Side Milling

■ 槽铣 Slotting

加工材料 Work Material	镍基合金 Ni-Based Alloy (Inconel 718)			钛合金 Titanium Alloy (Ti-6Al-4V)		析出硬化体不锈钢 Precipitation Stainless Steel (SUS630)		镍基合金 Ni-Based Alloy (Inconel 718)		钛合金 Titanium Alloy (Ti-6Al-4V)		析出硬化体不锈钢 Precipitation Stainless Steel (SUS630)	
	外径 Mill Dia. (mm)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
3	3,800	220	7,400	545	7,400	545	2,500	125	7,200	440	7,200	440	
4	3,000	240	5,850	630	5,850	630	1,900	135	5,400	495	5,400	495	
5	2,450	245	4,800	670	4,800	670	1,500	145	4,300	535	4,300	535	
6	2,100	250	4,050	695	4,050	695	1,250	145	3,600	545	3,600	545	
8	1,600	225	3,050	675	3,050	675	945	155	2,700	510	2,700	510	
10	1,250	215	2,450	635	2,450	635	760	145	2,150	455	2,150	455	
12	1,050	210	2,050	605	2,050	605	630	145	1,800	435	1,800	435	
16	765	210	1,550	505	1,550	505	475	110	1,350	365	1,350	365	
20	635	200	1,250	460	1,250	460	380	110	1,100	330	1,100	330	
25	510	185	990	395	990	395	300	105	865	235	865	235	

切削深度 Depth of Cut		$ap \leq 1.5D$ $ae \leq 0.05D$		$ap \leq 0.2D$

1. 请使用高刚性，高精度的机械、刀柄。
2. 请根据切削深度，机械的刚性等使用情况进行转速、进给速度的调整。
3. 为了适应加工材料，请采用气冷或发烟量少的切削油剂。
4. 干式加工情况下，为了不造成切屑阻塞，请使用气冷除去切屑。

1. Use a rigid and precise machine and holder.
2. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
3. Use an air blow or a suitable cutting fluid with high smoke retardant properties.
4. During dry (no fluid) milling, please use air blow to remove disposable chips from the milling area and to eliminate chip packing.



加工时产生的火花或由于刀具破损产生的发热会引起火灾。请一定要采取适当的防火措施。此基准表适用于高速高精度加工中心。

Caution: Sparks generated during operation or heat caused by tool breakage can cause fire. Be sure to use all proper fire-prevention measures. The conditions below are for high speed / high precision machining centers.

NEO-EMS · NEO-CR-EMS

■ 侧铣 Side Milling

■ 高速侧铣 High Speed Side Milling

加工材料 Work Material	镍基合金 Ni-Based Alloy (Inconel 718)			钛合金 Titanium Alloy (Ti-6Al-4V)		析出硬化体不锈钢 Precipitation Stainless Steel (SUS630)		镍基合金 Ni-Based Alloy (Inconel 718)		钛合金 Titanium Alloy (Ti-6Al-4V)		析出硬化体不锈钢 Precipitation Stainless Steel (SUS630)	
	外径 Mill Dia. (mm)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
6	2,200	360	4,300	1,050	4,300	1,050	4,300	745	8,350	2,100	8,350	2,100	
8	1,650	330	3,200	1,000	3,200	1,000	3,250	675	6,250	2,050	6,250	2,050	
10	1,350	310	2,600	925	2,600	925	2,600	640	5,050	1,900	5,050	1,900	
12	1,100	305	2,150	875	2,150	875	2,150	625	4,200	1,800	4,200	1,800	
16	835	305	1,600	735	1,600	735	1,650	620	3,150	1,500	3,150	1,500	
20	670	300	1,300	665	1,300	665	1,300	610	2,550	1,350	2,550	1,350	
25	535	265	1,050	575	1,050	575	1,050	550	2,000	1,150	2,000	1,150	

切削深度 Depth of Cut		$ap \leq 1.5D$ $ae \leq 0.05D$		$ap \leq 1D$ $ae \leq 0.02D$ $ae \text{ Max} = 0.5\text{mm}$

1. 请使用高刚性，高精度的机械、刀柄。
2. 请根据切削深度，机械的刚性等使用情况进行转速、进给速度的调整。
3. 为了适应加工材料，请采用气冷或发烟量少的切削油剂。
4. 干式加工情况下，为了不造成切屑阻塞，请使用气冷除去切屑。

1. Use a rigid and precise machine and holder.
2. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
3. Use an air blow or a suitable cutting fluid with high smoke retardant properties.
4. During dry (no fluid) milling, please use air blow to remove disposable chips from the milling area and to eliminate chip packing.



Drill
WH055-5D

Drill
ADO-SUS
series

VPH-GDS

Tap
WHR-N-SFT

Tap
WHR-N-POT

Thread Mill
WX-PNC

Thread Mill
WH-VM-PNC

AE-VMSS

AE-VMS

End Mill
NEO
series

W-HSCT
series

Ceramic End Mill
series

XC5035

Indexable
XC5040

硬质合金倒角铣刀的特点

W-HSCT-P
W-HSCT-N

Carbide Chamfering Cutter
Features

独有的3刃式样 Unique 3flutes design

- 抑制加工中的振动
Eliminates vibration
- 实现高效率，高进给加工
Enabled high feed high production

再研磨OK!

Regrindable

正前角型
Positive Type

· 铝合金、铜合金、耐热合金、不锈钢
For Aluminum Alloy, Copper Alloy, Heat Resistant Alloy, and Stainless Steel

负前角型
Negative Type

· 铸铁、碳素钢、合金钢
For Cast Iron, Carbon Steel, and Alloy Steel



40°螺旋槽
& 宽容屑槽

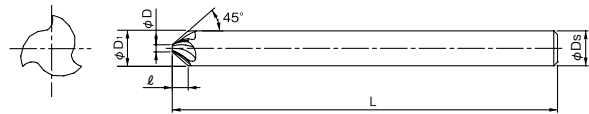
40° helix angle & wider chip pocket

- 兼具锋利性和光滑的加工表面!
Superior sharpness and smooth surface finish!
- 减少毛刺!
Cut down burres
- 卓越的切屑排出性
Superb chip ejection capability

WXL涂层
WXL Coating

3刃型硬质合金倒角铣刀 Carbide 3-flute Chamfering Cutter

W-HSCT-P · W-HSCT-N



W-HSCT-P (WXL 涂层 正前角普通型) (WXL Coated Positive type Regular) 单位:mm Unit:mm

商品号 EDP No.	先端径 x 锥形半角 x 大径 D × α × D ₁	全长 L	刃长 ℓ	柄径 D _s	库存 Stock
9200106	1 × 45° × 6	50	2.5	6	○
9200108	1 × 45° × 8	60	3.5	8	
9200110	2 × 45° × 10	70	4	10	
9200112	2 × 45° × 12	75	5	12	
9200116	2 × 45° × 16	100	7	16	

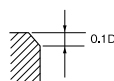
W-HSCT-N (WXL 涂层 负前角普通型) (WXL Coated Negative type Regular) 单位:mm Unit:mm

商品号 EDP No.	先端径 x 锥形半角 x 大径 D × α × D ₁	全长 L	刃长 ℓ	柄径 D _s	库存 Stock
9200156	1 × 45° × 6	50	2.5	6	○
9200158	1 × 45° × 8	60	3.5	8	
9200160	2 × 45° × 10	70	4	10	
9200162	2 × 45° × 12	75	5	12	
9200166	2 × 45° × 16	100	7	16	

切削条件基准表 Cutting Conditions

加工材料 Work Material	镍基合金 Ni-Based Alloy (Inconel 718)			钛合金 Titanium Alloy (Ti-6Al-4V)			析出硬化体不锈钢 Precipitation Stainless Steel (SUS630)			耐热合金 Heat Resistant Alloy Steel (Titanium, Inconel)		
	颈径 Mill Dia. (mm)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	每刃进给量 Feed per Tooth (mm/t)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	每刃进给量 Feed per Tooth (mm/t)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	每刃进给量 Feed per Tooth (mm/t)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
6	1,150	70	0.02	2,650	190	0.024	2,650	190	0.024	1,150	70	0.02
8	900	60	0.022	1,990	160	0.027	1,990	160	0.027	900	60	0.022
10	700	55	0.026	1,590	150	0.031	1,590	150	0.031	700	55	0.025
12	585	55	0.031	1,330	150	0.038	1,330	150	0.038	585	55	0.03
16	440	45	0.034	990	120	0.04	990	120	0.04	440	45	0.033

切削深度
Depth of Cut



采用即使在高温环境下也能高速加工的陶瓷材料 实现超越硬质合金铣刀的高效率粗加工

Optimum ceramic grade selected for high-speed machining at high temperatures, with roughing efficiency surpassing carbide end mills

外周刃型 Peripheral cutting edge type

CM-RMS

最合适的沟槽形状 Optimum flute geometry

流畅的排屑

Enables smooth chip evacuation

负前角刃型 Negative cutter form

提高刃尖刚性

Increases cutting edge rigidity

选型多样 Variety of lineup

根据用途选择4刃或6刃

Select 4- or 6-cutting edge specification based on your application needs

底刃型 End cutting edge type

CM-CRE

对应3D加工 Suitable for 3D machining

不仅可对应平面铣削，连叶片等的加工也能对应

Not only excels in flat surface milling, but also in the machining of blades

大径式样 Large-diameter specification

- 降低加工中的折损率
- 不受加工机械的最大转速限制，可达最佳的切削速度
- Reduces risk of breakage during machining
- Achieves optimum cutting speed without being restricted by the capability of the machining center

可再研磨 Regrindable

可通过切断使用部进行再研磨
Can be reincarnated by cutting away the used portion

Drill	WH055-5D
ADO-SUS series	
VPH-GDS	
Tap	WHR-NI-SFT
WHR-NI-POT	
Thread Mill	WX-PNC
WH-VM-PNC	
End Mill	AE-VMSS
NEO series	AE-VMS
W-HSCT series	
Ceramic End Mill series	
Indexable	XC5035
XC5040	



4刃 外周刃型
4-flute peripheral cutting edge type

切屑溶着少，可继续使用 Continuous use is possible with low level of cutting chip welding

使用工具 Tool	CM-RMS φ12×R1.5×4Z	其他公司产品 4刃 Competitor 4-Flute
加工材料 Work Material	Inconel 718(45HRC)	
加工方法 Machining Method	从外周至内侧成涡形(似半圆)铣削 Milling spirally inward from the outer periphery	
切削速度 Cutting Speed	500m/min (13,260min ⁻¹)	
进给速度 Feed	3,182mm/min (0.06mm/t)	
切深量 Depth of Cut	ap=7.2mm ae=1.2mm	
切削油剂 Coolant	气冷 Air Blow	
使用机械 Machine	立式加工中心 Vertical Machining Center	



φ153 × 100



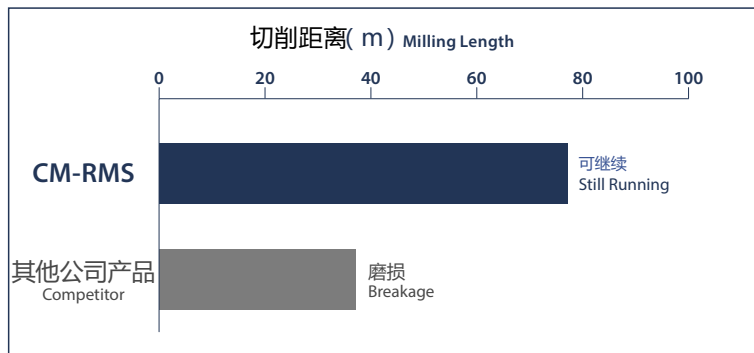
铣削路径 Cutter path



6刃 外周刃型
6-flute peripheral cutting edge type

无切损的稳定加工 Stable machining free of breakage

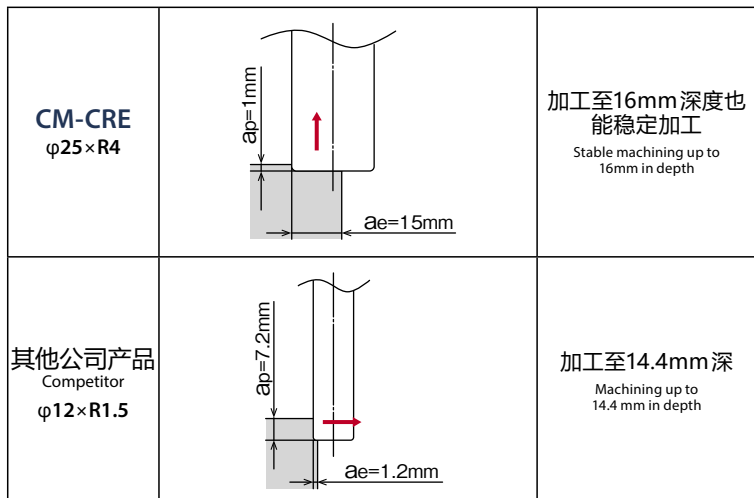
使用工具 Tool	CM-RMS φ12×R1.5×6Z	其他公司产品 6刃 Competitor 6-Flute
加工材料 Work Material	Inconel 718(45HRC)	
加工方法 Machining Method	从外周至内侧成涡形(似半圆)铣削 Milling spirally inward from the outer periphery	
切削速度 Cutting Speed	500m/min (13,260min ⁻¹)	
进给速度 Feed	4,774mm/min (0.06mm/t)	
切深量 Depth of Cut	ap=7.2mm ae=1.2mm	
切削油剂 Coolant	气冷 Air Blow	
使用机械 Machine	立式加工中心 Vertical Machining Center	



底刃型
End cutting edge type

排屑量1.4倍！稳定的高效率加工 1.4 times the chip removal rate! Stable and high-efficiency machining

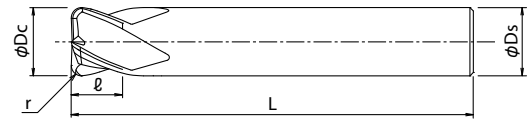
使用工具 Tool	CM-CRE 7刃 7-Flute	其他公司产品 4刃 Competitor 4-Flute
加工材料 Work Material	Inconel 718(45HRC)	
加工方法 Machining Method	从外周至内侧成涡形(似半圆)铣削 Milling spirally inward from the outer periphery	
切削速度 Cutting Speed	600m/min (7,600min ⁻¹)	500m/min (13,260min ⁻¹)
进给速度 Feed	2,660mm/min (0.05mm/t)	3,182mm/min (0.06mm/t)
切削油剂 Coolant	气冷 Air Blow	
使用机械 Machine	立式加工中心 Vertical Machining Center	
排出量 Chip Removal Volume	39.9cc/min	27.5cc/min
走刀数 Number of Passes	16 passes	2 (有时有折损) 2 passes (occasional breakage)



CM-RMS



4刃
4-Flute Type



6刃
6-Flute Type



外周刃型 Peripheral cutting edge type

单位:mm Unit:mm

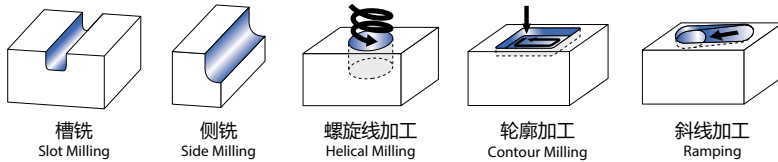
商品号 EDP No.	外径 × 球半径 × 刃数 Dc × r × Z	全长 L	刃长 ℓ	柄径 Ds	刃数 Z	库存 Stock
8557100	6 × R0.75 × 4Z	60	4.5	6	4	○
8557110	8 × R1.0 × 4Z	60	6	8	4	
8557120	10 × R1.25 × 4Z	65	7.5	10	4	
8557130	12 × R1.5 × 4Z	70	9	12	4	
8557200	6 × R0.75 × 6Z	60	4.5	6	6	
8557210	8 × R1.0 × 6Z	60	6	8	6	
8557220	10 × R1.25 × 6Z	65	7.5	10	6	
8557230	12 × R1.5 × 6Z	70	9	12	6	

· 标识说明请参阅P.1.

· See p.1 for explanation of icons.

加工形态 Application

4刃型 4-Flute Type



6刃型 6-Flute Type



■ 4刃型切削条件基准表 4-Flute Type Cutting Conditions

加工材料 Work Material		镍基合金 Ni-Based Alloy(Inconel 718)					
加工方法 Machining Method		侧铣 Side Milling			槽铣 Slotting		
外径 Mill Dia. (mm)	切削速度 Cutting Speed (m/min)	每刃进给量 Feed per Tooth (mm/t)	切深量 Depth of Cut (mm)		切削速度 Cutting Speed (m/min)	每刃进给量 Feed per Tooth (mm/t)	切深量 Depth of Cut (mm)
			ap	ae			
6	400~800	0.02~0.04	≤4.5 (0.75D)	≤0.6 (0.1D)	400~800	0.02~0.04	≤1.2 (0.2D)
8	400~800	0.02~0.04	≤6.0 (0.75D)	≤0.8 (0.1D)	400~800	0.02~0.04	≤1.6 (0.2D)
10	400~800	0.04~0.07	≤7.5 (0.75D)	≤1.0 (0.1D)	400~800	0.04~0.07	≤2.0 (0.2D)
12	400~800	0.04~0.07	≤9.0 (0.75D)	≤1.2 (0.1D)	400~800	0.04~0.07	≤2.4 (0.2D)

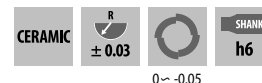
■ 6刃型切削条件基准表 6-Flute Type Cutting Conditions

加工材料 Work Material		镍基合金 Ni-Based Alloy(Inconel 718)			
加工方法 Machining Method		侧铣 Side Milling			
外径 Mill Dia. (mm)	切削速度 Cutting Speed (m/min)	每刃进给量 Feed per Tooth (mm/t)	切深量 Depth of Cut (mm)		
			ap	ae	
6	400~800	0.02~0.04	≤4.5 (0.75D)	≤0.6 (0.1D)	
8	400~800	0.02~0.04	≤6.0 (0.75D)	≤0.8 (0.1D)	
10	400~800	0.04~0.07	≤7.5 (0.75D)	≤1.0 (0.1D)	
12	400~800	0.04~0.07	≤9.0 (0.75D)	≤1.2 (0.1D)	



Drill WH055-5D
 ADO-SUS series
 VPH-GDS
 Tap WHR-NI-POT I/WHR-NI-SFT
 Thread Mill IWH-VM-PNC IWX-PNC
 End Mill AE-VMSS
 NEO series
 W-HSCT series
 Ceramic End Mill series
 Indexable XC5035
 XC5040

CM-CRE



底刃型 End cutting edge type

单位:mm Unit:mm

商品号 EDP No.	外径 × 球半径 × 刃数 $D_c \times r \times Z$	全长 L	刃长 ℓ	柄径 D_s	刃数 Z	库存 Stock
8557016	16 × R4	120	5	16	5	○
8557020	20 × R4	120	5	20	6	
8557025	25 × R4	120	5	25	7	

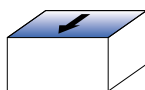
· 标识说明请参阅P.1。

· See p.1 for explanation of icons.

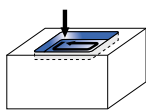
加工形态 Application



仿型加工
Copying



平面加工
Planing

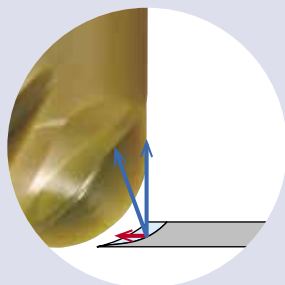


轮廓加工
Pocket Milling

■ 切削条件基准表 Cutting Conditions

为防止颈部干扰, 请制作加工方案时设置脱模斜度(3°以上)。
Specify a draft (at least 3°) in the milling program to avoid neck interferences.

加工材料 Work Material	镍基合金 Ni-Based Alloy (Inconel 718)			
	外径 Mill Dia. (mm)	切削速度 Cutting Speed (m/min)	每刃进给量 Feed per Tooth (mm/t)	切深量 Depth of Cut (mm)
				ap
16	400~800	0.03~0.05	1	≤ 9.6 (0.6D)
20	400~800	0.04~0.06	1	≤ 12.0 (0.6D)
25	400~800	0.05~0.08	1	≤ 15.0 (0.6D)



防止突发折损

Highly resistance against sporadic breakage

- 平面铣削时, 由于切入角较小, 切削阻力随半径方向(←)减小, 因此可以抑制振动和突发折损的发生。
- When cutting in flat surfaces, the cutting resistance is low in the radial direction due to the small cutting edge angle, thereby minimizes vibration and sporadic breakage.



注意事项 Caution

如Inconel 718这类的耐热合金具有在超过700°C的高温下开始软化，从而使加工更加容易的特性。发挥这类加工材料特性的情况下推荐使用陶瓷铣刀。

Heat-resistant alloys such as Inconel 718 have a tendency to soften when temperature exceeds 700°C, enabling easier machining. Ceramic end mills are ideal for these materials as they excel under high temperatures and can generate the heat required to soften the machined materials.

! 推荐使用气冷

冷却夹具、除去切屑时使用。冷却夹具有助于保持夹具精度。请使用耐热性的夹具。

Use of air blow recommended.

Use air blow to cool the holder and remove chips. Cooling the holder helps maintain holder accuracy. Use a heat-resistant holder.

! 推荐连续加工

断续加工易产生崩刃，可能降低刀具寿命。

为了防止突发折损，请在加工初期进入(吃入)时将进给速度调至50%以下，之后再慢慢提高进给速度。切削速度过高时，加工材料在高温下会熔化。此时，推荐将切削速度调低。

Continuous machining recommended.

Intermittent machining is likely to cause chipping, resulting in shorter tool life.

Reduce the feed by 50% or more at the entry (chamfer) in the initial cutting stage. Then, raise the feed gradually.

Excessively high cutting speeds raise the temperature of the workpiece and may melt it. To avoid this, lower the cutting speed.

! 加工后无需将刃尖附着的溶着物去除就可进行下次加工

如果强行剥落可能会导致刃尖脱落从而降低刀具寿命。

必要时，请去除除刃尖外的沟槽底部、背部附着的溶着物。

After a cutting cycle, use the cutting edges as they are, without removing any fused deposits on them.

Forcibly removing fused deposits can result in cutting edge chipping and shortened tool life.

Fused deposits may be found on the flute end and back of the cutting edge. Remove them when necessary.

! 请使用全覆盖式机械

加工中高温的切屑四处飞散有可能引起火灾或使操作人员受伤的危险。

且，请勿将可燃物品放置在加工工件四周。

Use fully covered machines.

During machining, high temperature cutting chips may scatter, which can create fire hazards and potential injury to the operator. Ensure that the workpiece area is clear of any inflammable objects.

! 由于在高温下加工，工件表面将会形成变质层。

在进行路径设置时，请考虑到加工后的变质层余量。

High temperatures produced during machining can form altered layers on workpiece surfaces.

When making path settings, ensure that a machining allowance for removing the altered layers is taken into account.

! 用CM-CRE进行深壁加工或轮廓加工时，请务必设定脱模斜度(3°以上)。

有可能受颈部干扰导致折损。

When using CM-CRE to perform vertical wall or pocket milling, always specify a draft (at least 3°).

Neck interference may occur, resulting in tool breakage.

WH-O55-5D

Drill
ADC-SJS
series

VPH-GDS

Tap
WHR-NI-POT
WHR-NI-SFT

Thread Mill
WH-VM-PNC
WX-PNC

AE-VMSS

AE-VMS

End Mill
NEO
series

W-HSCT
series

Ceramic End Mill
series

XC5035

Indexable
XC5040



耐热合金用刀片材料种类 XC5035/XC5040的特点

Inserts for HRSA
Features

OSG PHOENIX 系列中，有适用于加工耐热合金的刀片。
OSG Phoenix offers inserts optimal for machining HRSA.

1 使用高韧性的硬质合金材料种类

Special carbide grade with very high toughness is used.

2 采用高硬度涂层，实现优异的耐磨损性

Superior wear resistance is achieved by applying super hard coating.

3 具有锋利的切削刃能降低切削阻力， SM 断屑槽可顺畅排屑

Sharpness of the cutting edge of SM breaker is ideal to reduce cutting resistance and smooth chip evacuation.

材料种类 Grades	母材硬度 (HRA) Hardness	涂层 Coating	加工材料 Work Material
		CVD	
XC5035	89.3	TiN-Ti (CN) + Al ₂ O ₃ + Ti (BN)	不锈钢· 耐热合金 Stainless Steel· HRSA
XC5040	89.3	TiN-TiB ₂	不锈钢· 耐热合金 Stainless Steel· HRSA

■ 可搭载的工具 (举例) Applicable Body (Examples)



PSE
方肩铣刀
Shoulder Cutter



PSEL
玉米铣刀
Roughing End Mill



PSFL
4角刀片玉米铣刀
4-Corner Roughing End Mill



PRC
圆刀片铣刀
Radius Cutter



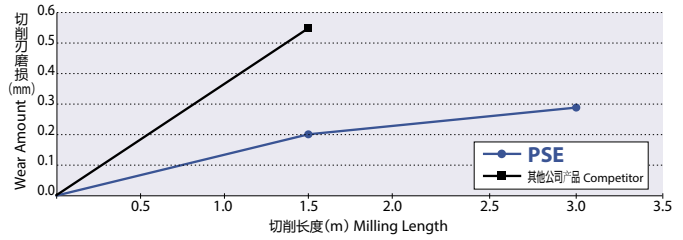
PHC
高进给圆弧角铣刀
High Feed Cutter

Inconel718 (45HRC)的长寿命加工 Long tool life on Inconel 718

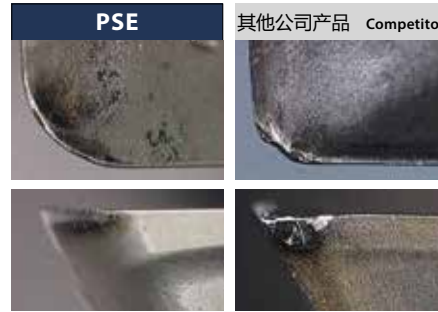
使用工具 Tool	PSE11R032SS32-5S (φ32×5刃)	其他公司产品 Competitor
使用刀片(材质) Insert (grade)	ZDKT11T308ER-SM (XC5040)	硬质合金涂层刀片 Coated Carbide Insert
加工材料 Work Material	Inconel 718 (45HRC)	
切削速度 Cutting Speed	30m/min (298min ⁻¹)	25m/min (248min ⁻¹)
进给速度 Feed	120mm/min (0.08mm/t)	80mm/min (0.08mm/t)
切削深度 Depth of Cut	ap=1mm ae=20mm	ap=1mm ae=20mm
切削油剂 Coolant	水溶性切削油剂 Water-Soluble	
使用机械 Machine	立式加工中心 (BT40) Vertical Machining Center	

与以往刀具相比,切削参数提高50%后仍可继续加工,耐久性提高2倍,且为正常磨损,仍可继续加工。

Our product was able to mill at conditions that were 50% higher than those for competitors' tools. It provided double the durability with normal wear and was able to continue milling.

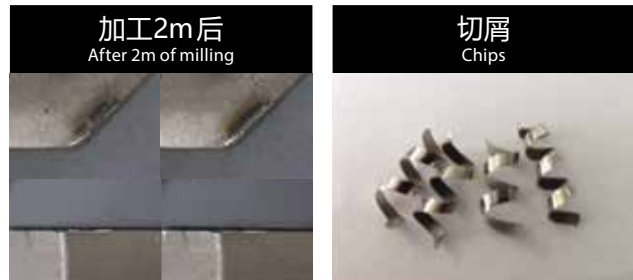


加工1.5m后的照片 After 1.5m of milling



Inconel718的长寿命加工 Long tool life on Inconel 718

使用工具 Tool	PAO06R125M38.1-12 (φ125×12刃)	其他公司产品 Competitor
使用刀片(材质) Insert (grade)	OZKU060508ER-SM (XC5040)	双面式样刀片 Double-sided Insert
加工材料 Work Material	Inconel 718	
切削速度 Cutting Speed	40m/min (100min ⁻¹)	
进给速度 Feed	120mm/min (0.1mm/t)	
切削深度 Depth of Cut	ap=1.5mm ae=50mm	
切削油剂 Coolant	水溶性切削油剂 Water-Soluble	
使用机械 Machine	立式加工中心 (BT50) Vertical Machining Center	

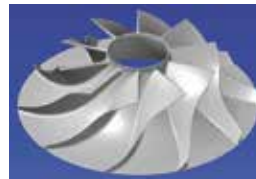


其他公司产品在很早就发生崩刃·磨损, PAO (XC5040)可以抑制磨损并提高约4倍寿命。

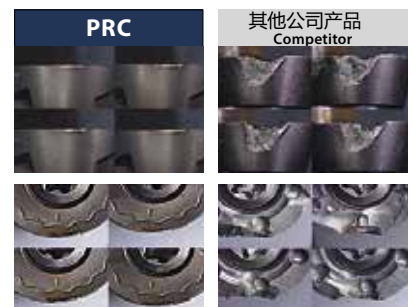
The competitor tool exhibited chipping and breakage at an early stage. In contrast, the PAO (XC5040) demonstrated strong resistance to wear and achieved four times the durability versus the competition.

Inconel718 (45HRC)的长寿命加工 Long-life milling of Inconel 718(45HRC)

使用工具 Tool	PRC12R050M22-5 (φ50×5刃)	其他公司产品 Competitor
使用刀片(材质) Insert (grade)	RPHT1204MOEN-SM (XC5035)	硬质合金涂层刀片 Coated Carbide Insert
加工材料 Work Material	Inconel 718 (45HRC)	
切削速度 Cutting Speed	40m/min (255min ⁻¹)	60m/min (382min ⁻¹)
进给速度 Feed	270mm/min (0.21mm/t)	270mm/min (0.14mm/t)
切削深度 Depth of Cut	ap=0.5mm ae=30mm	
切削油剂 Coolant	水溶性切削油剂 Water-Soluble	
使用机械 Machine	卧式加工中心 (BT50) Horizontal Machining Center	
耐久度 Durability	10m	2m



加工2m后的照片 After 2m of milling



其他公司产品加工2m后磨损大,且刀片的其他刃角也无法使用。与之相较,PRC可加工10mm,大大提升了寿命。

The competitor's tool broke extensively after milling 2m, and the damage extended to other corners, rendering the tool unusable. In contrast, the PRC was able to mill 10m, resulting in a considerably longer tool life.

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OSG Corporation

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