



TUNGSTEN CARBIDE  
**RODS**  
硬质合金棒材

**温州宏丰合金有限公司**

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**WENZHOU HONGFENG ALLOY CO.,LTD**

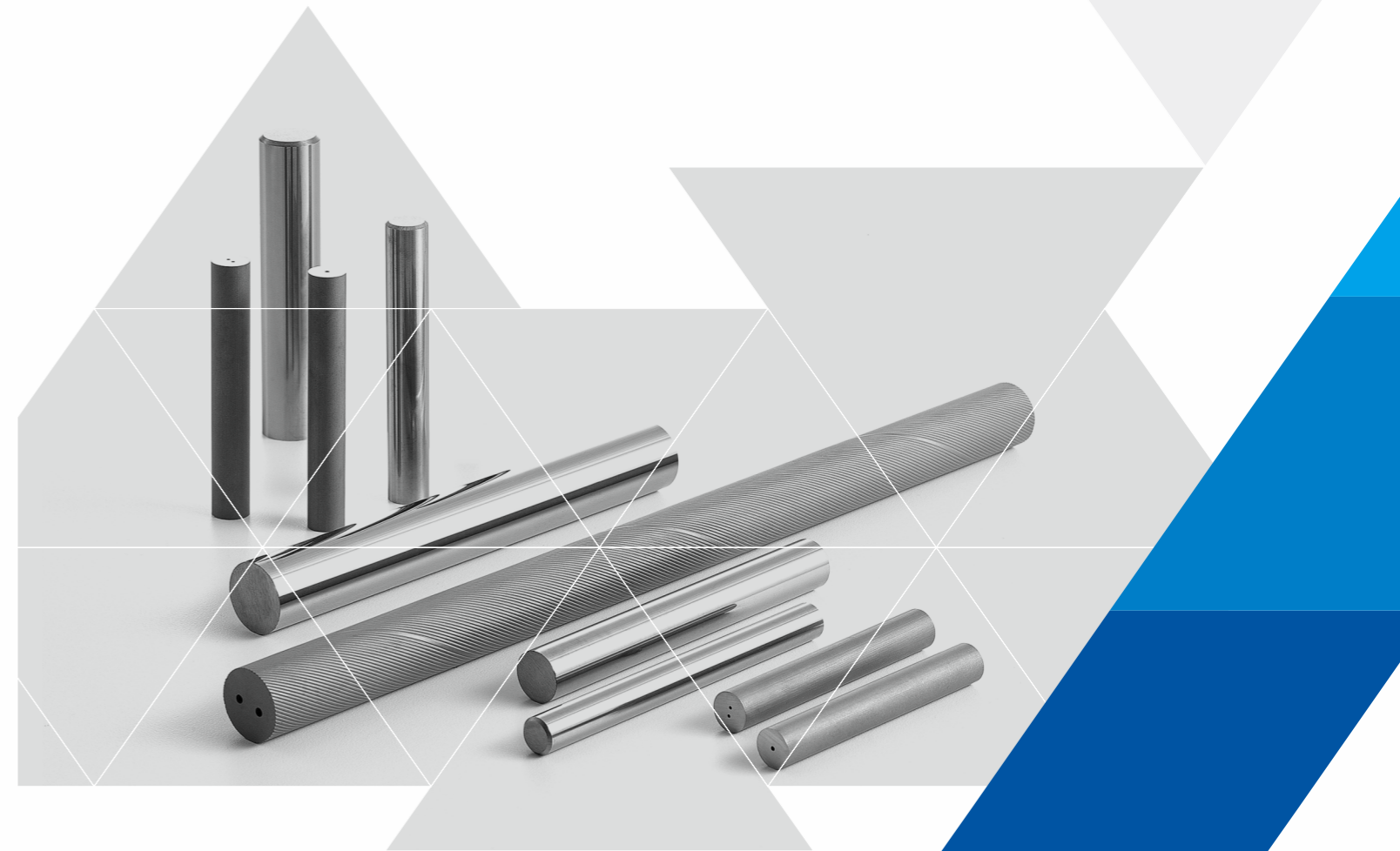
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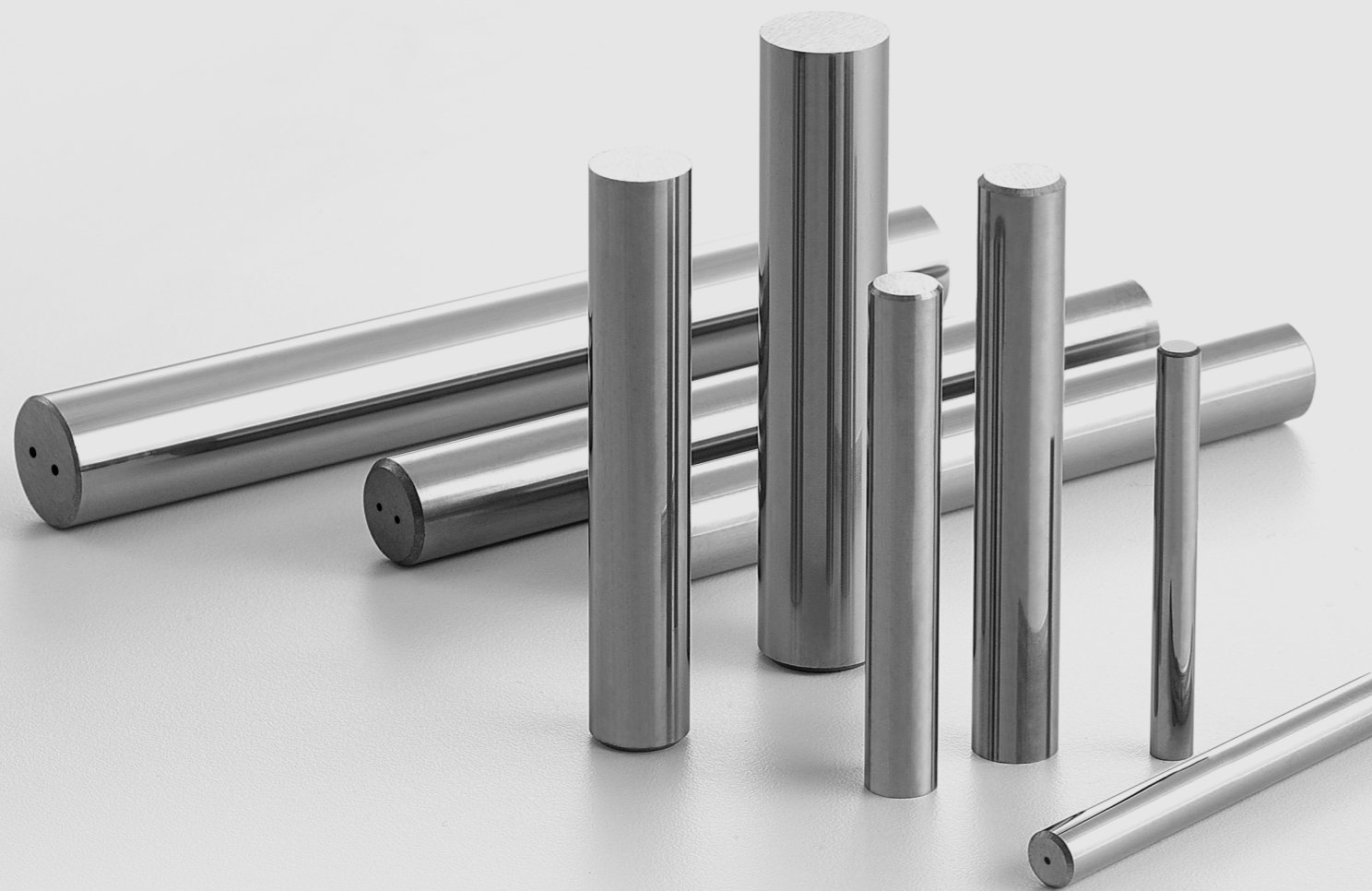
版本: V202212



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温州宏丰 | 股票代码 300283



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# COMPANY PROFILE

## 企业简介

温州宏丰合金有限公司(简称“温州宏丰合金”)是一家国家高新技术企业,是温州宏丰电工合金股份有限公司的全资子公司(简称“温州宏丰”)。公司坐落于国家级工业园温州经济技术开发区,分别距离温州国际机场6公里、温州高铁站30公里。公司致力于高品质硬质合金系列产品的研发、生产,以及行业专业解决方案的提供。产品作为切削刀具材料、模具材料以及耐磨零件广泛应用在汽车、电子、航空、采掘、工程基建等领域。

公司拥有国际一流的硬质合金制造设备和检测设备、CNAS国家认可实验室、CNC五轴联动自动化装备。温州宏丰合金始终保持着强劲的发展势头,为全球用户提供最高性价比的硬质合金产品和服务,为现代工业领域解决高强度、耐高温、耐磨损问题,提供了优良的产品和完善的解决方案。硬质合金年产1000多吨,客户遍布全球三十多个工业发达国家和地区,同时温州宏丰在美国和德国设立的全资子公司可为海外客户提供必要的技术和业务支持。

Wenzhou Hongfeng Alloy Co., Ltd (hereafter called "Wenzhou Hongfeng Alloy") is a national High-tech corporation, which is wholly-owned subsidiary of Wenzhou Hongfeng Electrical Alloy Co., Ltd (here after called "WZHF"). It is located in National Wenzhou Economical and Technological Development Zone, which is 6 kilometers to Wenzhou International Airport and 30 kilometers to Wenzhou high-speed train station respectively. We are committed to research and produce a series of cemented carbide with high quality and offer professional solution for industries. The products can be used as cutting tool materials, mould materials and wear resistance parts, they are widely used in automobile, electronics, aerospace industry, excavating and engineering infrastructure, etc.

Wenzhou Hongfeng Alloy has world-class carbide manufacturing equipments, detection equipments, CNAS National Approved Laboratory and five-axis CNC auto equipments. We always have maintained a strong momentum of development, providing cost-effective cemented carbide and service for global users, providing excellent products and perfect solutions of high strength, high temperature and wear resistance for modern industry fields. The annual output of cemented carbide are more than 1000 tons. Our customers located in over 30 industrially developed countries and regions. Meanwhile, WZHF has established wholly-owned subsidiaries in USA and Germany which can provide overseas customers with necessary technical and business support.

### 宏扬广大 丰硕共享

Create exceptional advancement and share our great achievements



### CNAS

国家认可实验室  
CNAS National  
Approved Laboratory

### CNC

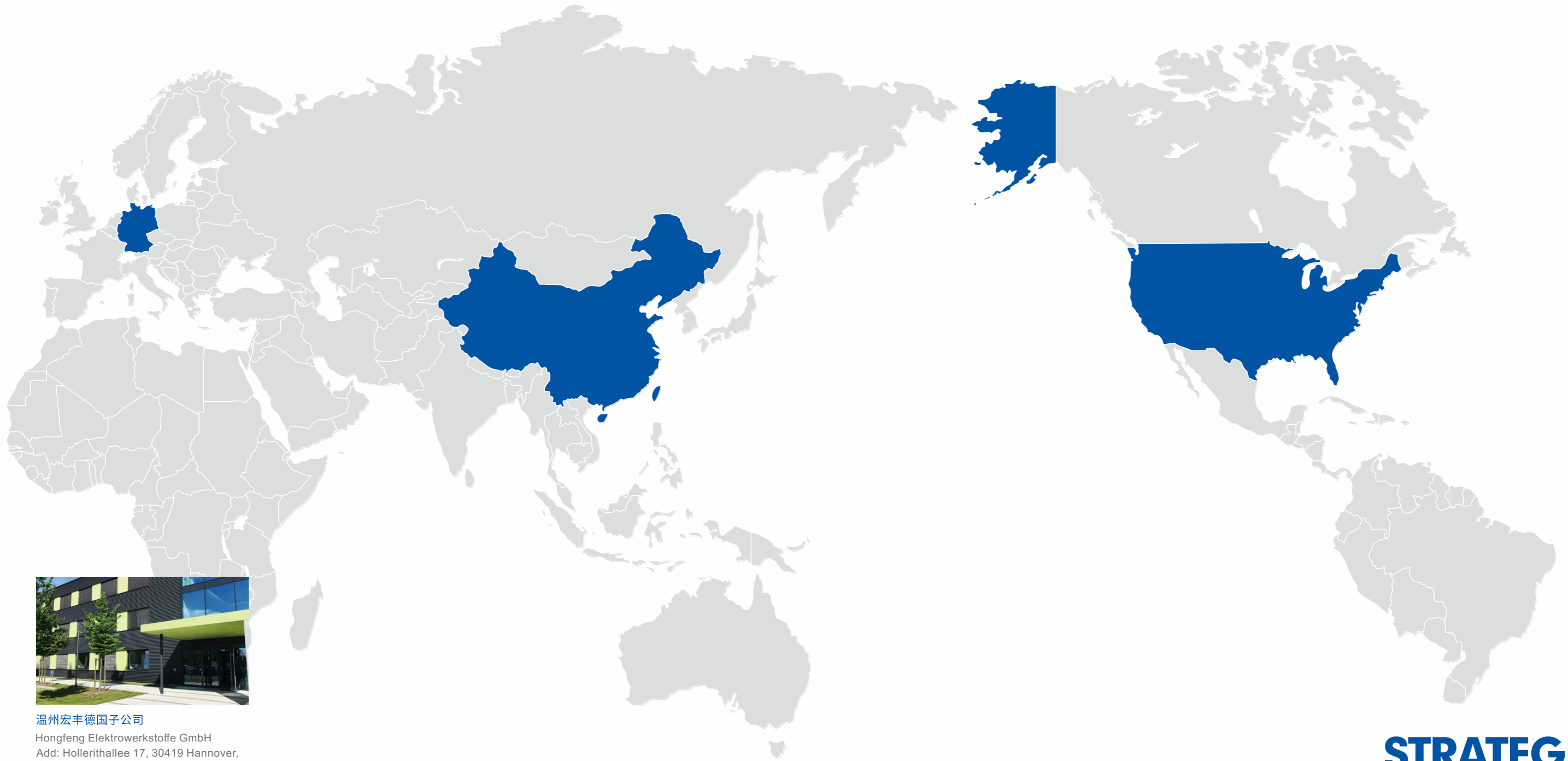
五轴联动自动化装备  
Five-axis CNC  
auto equipments

### 1000+

硬质合金年产1000多吨  
Annual output  
more than 1000 tons

### 30+

全球三十多个国家和地区  
Sell to more than 30  
countries and regions



**温州宏丰德国子公司**  
 Hongfeng Elektrowerkstoffe GmbH  
 Add: Hollerithallee 17, 30419 Hannover, Germany



**温州宏丰合金有限公司**  
 Wenzhou Hongfeng Alloy Co., Ltd



**温州宏丰电工合金股份有限公司**  
 Wenzhou Hongfeng Electrical Alloy Co., Ltd



**温州宏丰金属基功能复合材料有限公司**  
 Wenzhou Hongfeng Metal-matrix Engineered Composite Material Co.,Ltd



**温州宏丰美国子公司**  
 Hongfeng Composite Material Corp.  
 Add: 15 E. Uwchlan Ave, Suite 424  
 Exton, Pennsylvania 19341,USA

# STRATEGIC DISTRIBUTION

## 战略分布

以用户需求为起点，  
我们尽心打造全球战略生产服务体系。

Starting from user demands,  
We strive to build a global strategic production service system.

# 先锋创新力

## PIONEERING CREATIVITY



温州宏丰已获授权专利135项，其中国际专利16项，国内发明专利79项，实用新型专利38项，外观设计专利2项。

Wenzhou Hongfeng has been granted 135 patents, including 16 international patents, 79 domestic invention patents, 38 utility model patents and 2 design patents.

# 尖端生产力 SOPHISTICATED PRODUCTIVITY



**PVA低压炉**  
PVA HIP-Sintering Furnace



**喷雾塔**  
Spray Tower

引进先进设备, 提能增效, 行业领先;  
匠心铸就品质, 精益求精, 质量至上。

Introducing advanced equipment, improving capacity and efficiency,  
leading the industry. Ingenuity creates quality,  
striving for perfection and quality first.



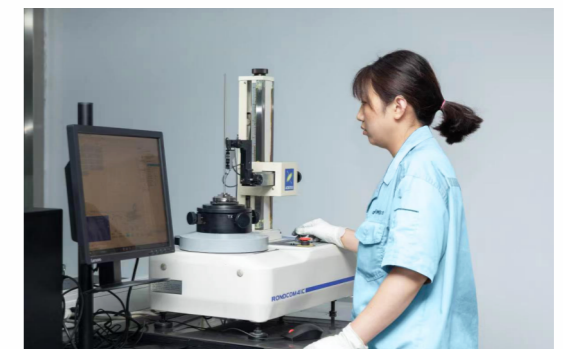
**场发射扫描电子显微镜**  
Field Emission Scanning Electron Microscope



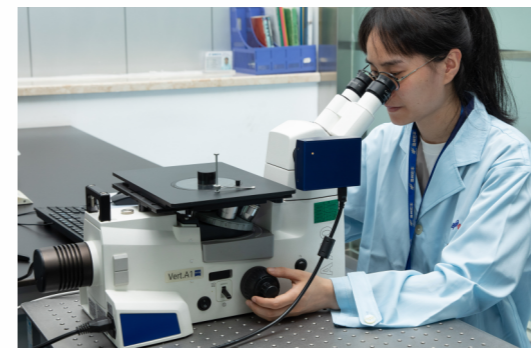
**电感耦合等离子体发射光谱仪**  
Inductively Coupled Plasma Optical Emission Spectrometer



**图像尺寸测量仪**  
Image Dimension Measurement System



**圆度仪**  
Roundness Tester



**金相显微镜**  
Metallographic Microscope



**万能材料试验机**  
Universal Material Testing System

以智慧赋能制造, 以数字提升管理。  
建立高质量、高标准、高效率的智造体系。

With intelligent manufacturing and digital management.  
To establish a high quality, high standard and high efficiency  
intelligence manufacturing system.

## 赋能智造力

## INTELLIGENCE AND CREATIVITY

# 牌号信息

## GRADE INFORMATION

分类 Classification	牌号 Grade	钴含量 Cobalt Content (Co%)	硬度 Hardness (HRA)	硬度 Hardness (HV30)	密度 Density (g/cm³)
超细晶 ULTRAFINE	HU12U	6	93.8	1900	14.80
	HU18U	9	93.0	1850	14.50
	HU24U	12	92.6	1760	14.12
	HU20X	10	92.2	1730	14.43
亚微细 SUBMICRON	HU20	10	91.9	1600	14.45
	HU20E	10	91.8	1600	14.45
	HU12	6	92.5	1740	14.85
	HF30F	10	91.8	1600	14.30

晶粒度 Grain Size (μm)	抗弯强度 TRS (N/mm²)	推荐用途 Application Recommended
0.4	3900	适用于高硬材料精加工, PCB钻头、铣刀, 雕刻刀。 Applicable to the high hardness material processing, including PCB drills, milling cutters and gravers.
0.4	3900	适用于高硬难加工材料、不锈钢加工, 微型刀具。 Applicable to processing the hardness and difficult-to-machine materials, stainless machining and micro cutter.
0.4	4200	高速铣削牌号, 适用于HRC55-60的合金钢、不锈钢、有色金属、钛合金、高温合金等。 Special carbide material of high-speed milling, applicable to alloy steel (HRC50-60), stainless steel, non-ferrous metal, titanium alloy, super alloy etc.
0.6	3800	通用型高速铣刀、钻头材质, 适用于合金钢、不锈钢、铸铁、有色金属、高温合金等。 For general use of high-speed milling and drilling, applicable to alloy steel, stainless steel, cast iron, non-ferrous metal, super alloy etc.
0.7	3800	通用型铣刀、钻头材质, 适用于合金钢、不锈钢、有色金属、高温合金等材料。 For general use of milling and drilling, applicable to alloy steel, stainless steel, non-ferrous metal, super alloy etc.
0.7	3700	通用经济型铣刀、钻头材质, 适用于合金钢、不锈钢、有色金属、高温合金等材料。 For general use of economic milling and drilling, applicable to alloy steel, stainless steel, non-ferrous metal, super alloy etc.
1.0	3000	金刚石涂层最佳材质, 适用于纤维增强材料(碳纤维和玻璃纤维)、复合材料、高硅铝合金和石墨制品。 The best material for diamond coating, suitable for fiber reinforced material (carbon fiber and glass fiber), composite material, high-silicon aluminum alloy and graphite products.
0.8	3500	经济型铣刀材质, 适用于合金钢、有色金属等材料。 Economic grade for milling, applicable to alloy steel, non-ferrous metal etc.

# 实心棒材长棒系列

## SOLID RODS

### 公制 METRIC

外径 $\phi D$ (mm)			长度 L (mm) (0,+5)	外径 $\phi D$ (mm)			长度 L (mm) (0,+5)
毛坯 Unground	公差 Tol.	精磨 Ground		毛坯 Unground	公差 Tol.	精磨 Ground	
		h6/h5	h6/h5				
1.3	+0/+0.15	1.0	310/330	16.8	+0/+0.50	16.5	310/330
2.3	+0/+0.15	2.0	310/330	17.3	+0/+0.50	17.0	310/330
3.3	+0/+0.15	3.0	310/330	17.8	+0/+0.50	17.5	310/330
3.8	+0/+0.20	3.5	310/330	18.3	+0/+0.50	18.0	310/330
4.3	+0/+0.20	4.0	310/330	18.8	+0/+0.50	18.5	310/330
4.8	+0/+0.20	4.5	310/330	19.3	+0/+0.50	19.0	310/330
5.3	+0/+0.20	5.0	310/330	20.3	+0/+0.50	20.0	310/330
5.8	+0/+0.20	5.5	310/330	21.3	+0/+0.50	21.0	310/330
6.3	+0/+0.20	6.0	310/330	22.3	+0/+0.50	22.0	310/330
6.8	+0/+0.30	6.5	310/330	23.3	+0/+0.50	23.0	310/330
7.3	+0/+0.30	7.0	310/330	24.3	+0/+0.50	24.0	310/330
7.8	+0/+0.30	7.5	310/330	25.3	+0/+0.50	25.0	310/330
8.3	+0/+0.30	8.0	310/330	26.3	+0/+0.50	26.0	310/330
8.8	+0/+0.30	8.5	310/330	27.3	+0/+0.50	27.0	310/330
9.3	+0/+0.30	9.0	310/330	28.3	+0/+0.50	28.0	310/330
9.8	+0/+0.30	9.5	310/330	29.3	+0/+0.50	29.0	310/330
10.3	+0/+0.30	10.0	310/330	30.3	+0/+0.50	30.0	310/330
10.8	+0/+0.30	10.5	310/330	31.3	+0/+0.50	31.0	310/330
11.3	+0/+0.30	11.0	310/330	32.3	+0/+0.50	32.0	310/330
11.8	+0/+0.30	11.5	310/330	33.3	+0/+0.50	33.0	310/330
12.3	+0/+0.30	12.0	310/330	34.3	+0/+0.50	34.0	310/330
12.8	+0/+0.40	12.5	310/330	35.3	+0/+0.50	35.0	310/330
13.3	+0/+0.40	13.0	310/330	36.3	+0/+0.50	36.0	310/330
13.8	+0/+0.40	13.5	310/330	37.3	+0/+0.50	37.0	310/330
14.3	+0/+0.40	14.0	310/330	38.3	+0/+0.50	38.0	310/330
14.8	+0/+0.40	14.5	310/330	39.3	+0/+0.50	39.0	310/330
15.3	+0/+0.40	15.0	310/330	40.3	+0/+0.50	40.0	310/330
15.8	+0/+0.40	15.5	310/330	45.3	+0.20/+0.70	45.0	310/330
16.3	+0/+0.40	16.0	310/330	50.3	+0.20/+0.70	50.0	310/330

# 实心棒材长棒系列

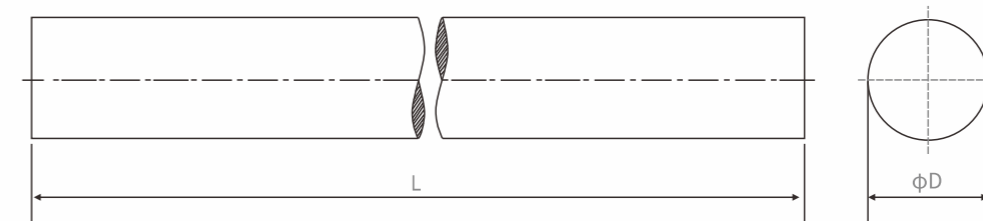
## SOLID RODS

### 英制 INCH

外径 $\phi D$ (inch)	毛坯公差 Unground tol.	精磨公差 Ground tol.	长度 L (inch) (0,+0.197)
1/8	+0.0118/+0.0177	h6/h5	13
3/16	+0.0118/+0.0196	h6/h5	13
1/4	+0.0118/+0.0236	h6/h5	13
5/16	+0.0118/+0.0236	h6/h5	13
3/8	+0.0118/+0.0236	h6/h5	13
1/2	+0.0118/+0.0275	h6/h5	13
5/8	+0.0118/+0.0275	h6/h5	13
3/4	+0.0118/+0.0314	h6/h5	13
1	+0.0118/+0.0314	h6/h5	13
1-1/4	+0.0118/+0.0314	h6/h5	13
1-1/2	+0.0118/+0.0314	h6/h5	13

注:其他尺寸可定制

Remark:Other dimension customized available





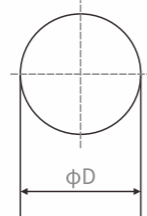
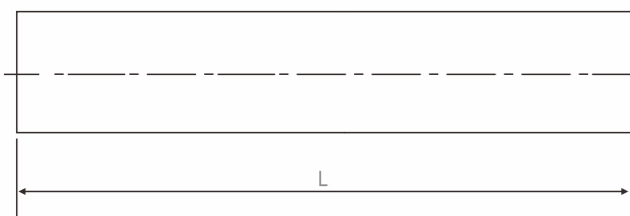
# 实心棒材短棒系列

## SOLID RODS CUT TO LENGTH

### 公制 METRIC

外径 $\phi D$ (mm)			倒角尺寸 C (mm) ( $\pm 0.1; 45^\circ \pm 3^\circ$ )	长度 L (mm) (0, +1)
毛坯 Unground	公差 Tol.	精磨 Ground h6/h5		
3.3	+0/+0.15	3	0.4	50
3.3	+0/+0.15	3	0.4	70
3.3	+0/+0.15	3	0.4	100
4.3	-0.10/+0.10	4	0.4	50
4.3	-0.10/+0.10	4	0.4	70
4.3	-0.10/+0.10	4	0.4	100
5.3	-0.10/+0.10	5	0.5	50
5.3	-0.10/+0.10	5	0.5	70
5.3	-0.10/+0.10	5	0.5	80
6.3	-0.10/+0.10	6	0.6	50
6.3	-0.10/+0.10	6	0.6	60
6.3	-0.10/+0.10	6	0.6	100
8.3	-0.05/+0.20	8	0.6	60
8.3	-0.05/+0.20	8	0.6	80
8.3	-0.05/+0.20	8	0.6	100
10.3	-0.05/+0.20	10	0.8	70
10.3	-0.05/+0.20	10	0.8	90

外径 $\phi D$ (mm)			倒角尺寸 C (mm) ( $\pm 0.1; 45^\circ \pm 3^\circ$ )	长度 L (mm) (0, +1)
毛坯 Unground	公差 Tol.	精磨 Ground h6/h5		
10.3	-0.05/+0.20	10	0.8	100
11.3	-0.05/+0.25	11	0.8	110
12.3	-0.05/+0.25	12	0.8	75
12.3	-0.05/+0.25	12	0.8	90
12.3	-0.05/+0.25	12	0.8	100
12.3	-0.05/+0.25	12	0.8	120
14.3	+0/+0.40	14	0.8	75
14.3	+0/+0.40	14	0.8	110
14.3	+0/+0.40	14	0.8	125
16.3	+0/+0.40	16	0.8	100
16.3	+0/+0.40	16	0.8	125
18.3	+0/+0.50	18	1.0	100
18.3	+0/+0.50	18	1.0	150
20.3	+0/+0.50	20	1.0	100
20.3	+0/+0.50	20	1.0	120
20.3	+0/+0.50	20	1.0	150
25.3	+0/+0.50	25	1.0	100
25.3	+0/+0.50	25	1.0	150



# 实心棒材短棒系列

## SOLID RODS CUT TO LENGTH

### 英制 INCH

外径 $\phi D$ (inch)	毛坯公差 Unground tol.	精磨公差 Ground tol.	倒角尺寸 C (inch) ( $\pm 0.004; 45^\circ \pm 3^\circ$ )	长度 L (inch) (0, +0.003)
1/8	+0.0118/+0.0177	h6/h5	0.012	2-1/4
1/8	+0.0118/+0.0177	h6/h5	0.012	2-1/2
1/8	+0.0118/+0.0177	h6/h5	0.012	2
1/8	+0.0118/+0.0177	h6/h5	0.012	1-1/2
1/8	+0.0118/+0.0177	h6/h5	0.012	3
1/8	+0.0118/+0.0177	h6/h5	0.012	4
3/16	+0.0078/+0.0157	h6/h5	0.016	1-1/2
3/16	+0.0078/+0.0157	h6/h5	0.016	2
3/16	+0.0078/+0.0157	h6/h5	0.016	2-1/2
3/16	+0.0078/+0.0157	h6/h5	0.016	3
3/16	+0.0078/+0.0157	h6/h5	0.016	4
3/16	+0.0078/+0.0157	h6/h5	0.016	6
1/4	+0.0098/+0.0196	h6/h5	0.024	2
1/4	+0.0098/+0.0196	h6/h5	0.024	2-1/2
1/4	+0.0098/+0.0196	h6/h5	0.024	3
1/4	+0.0098/+0.0196	h6/h5	0.024	3-1/4
1/4	+0.0098/+0.0196	h6/h5	0.024	4
1/4	+0.0098/+0.0196	h6/h5	0.024	6
5/16	+0.0098/+0.0196	h6/h5	0.024	2
5/16	+0.0098/+0.0196	h6/h5	0.024	2-1/2
5/16	+0.0098/+0.0196	h6/h5	0.024	3
5/16	+0.0098/+0.0196	h6/h5	0.024	3-1/2
5/16	+0.0098/+0.0196	h6/h5	0.024	4
5/16	+0.0098/+0.0196	h6/h5	0.024	6
3/8	+0.0098/+0.0196	h6/h5	0.024	2
3/8	+0.0098/+0.0196	h6/h5	0.024	2-1/2
3/8	+0.0098/+0.0196	h6/h5	0.024	3
3/8	+0.0098/+0.0196	h6/h5	0.024	3-1/2
3/8	+0.0098/+0.0196	h6/h5	0.024	4

外径 $\phi D$ (inch)	毛坯公差 Unground tol.	精磨公差 Ground tol.	倒角尺寸 C (inch) ( $\pm 0.004; 45^\circ \pm 3^\circ$ )	长度 L (inch) (0, +0.003)
3/8	+0.0098/+0.0196	h6/h5	0.024	5
3/8	+0.0098/+0.0196	h6/h5	0.024	6
1/2	+0.0118/+0.0275	h6/h5	0.031	2-1/2
1/2	+0.0118/+0.0275	h6/h5	0.031	3
1/2	+0.0118/+0.0275	h6/h5	0.031	3-1/2
1/2	+0.0118/+0.0275	h6/h5	0.031	4
1/2	+0.0118/+0.0275	h6/h5	0.031	4-1/2
1/2	+0.0118/+0.0275	h6/h5	0.031	5
1/2	+0.0118/+0.0275	h6/h5	0.031	6
1/2	+0.0118/+0.0275	h6/h5	0.031	8
5/8	+0.0118/+0.0275	h6/h5	0.031	3
5/8	+0.0118/+0.0275	h6/h5	0.031	3-1/2
5/8	+0.0118/+0.0275	h6/h5	0.031	4
5/8	+0.0118/+0.0275	h6/h5	0.031	5
5/8	+0.0118/+0.0275	h6/h5	0.031	6
5/8	+0.0118/+0.0275	h6/h5	0.031	8
3/4	+0.0118/+0.0314	h6/h5	0.039	4
3/4	+0.0118/+0.0314	h6/h5	0.039	5
3/4	+0.0118/+0.0314	h6/h5	0.039	6
3/4	+0.0118/+0.0314	h6/h5	0.039	8
1	+0.0118/+0.0314	h6/h5	0.039	3
1	+0.0118/+0.0314	h6/h5	0.039	4
1	+0.0118/+0.0314	h6/h5	0.039	5
1	+0.0118/+0.0314	h6/h5	0.039	6

注:其他尺寸可定制  
Remark:Other dimension customized available



带孔棒材

# RODS WITH HOLES

## 30°双孔螺旋棒系列

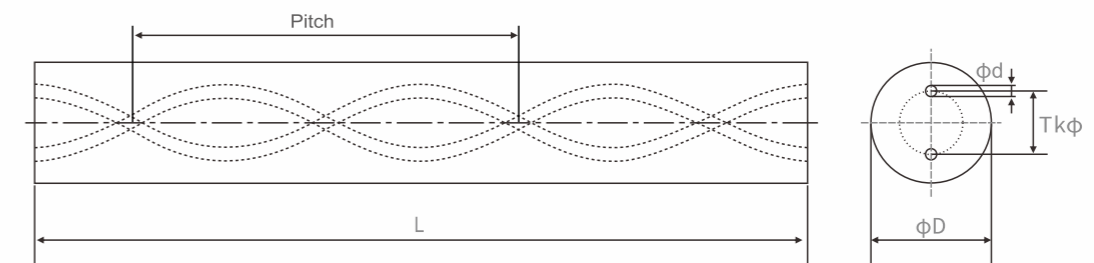
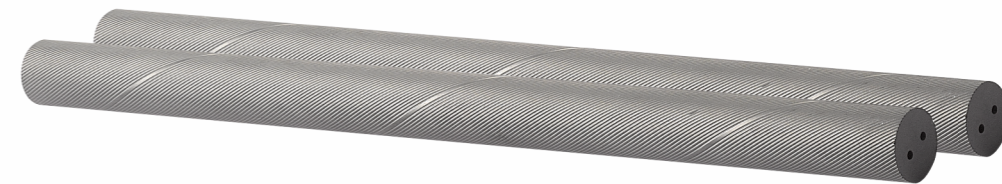
RODS WITH 2 HELICAL COOLANT HOLES 30°

公制 METRIC

毛坯 Unground	外径 $\phi D$ (mm)		内孔 $\phi d$ (mm)		孔间距 $Tk\phi$ (mm)		螺距 Pitch ( $\pm 0.5^\circ$ )	孔偏离 Hole Deviation	长度 L (mm) (0,+5)
	公差 Tol.	精磨 Ground h6/h5	直径 Dia.	公差 Tol.	间距 Bolt core	公差 Tol.			
6.0	+0.7/+1.1	6.0	0.70	$\pm 0.10$	2.60	+0/-0.4	32.65	0.15	330
8.0	+0.8/+1.2	8.0	1.00	$\pm 0.15$	4.00	+0/-0.4	43.53	0.15	330
10.0	+0.8/+1.2	10.0	1.40	$\pm 0.15$	4.80	+0/-0.6	54.41	0.20	330
12.0	+0.9/+1.3	12.0	1.40	$\pm 0.15$	6.25	+0/-0.8	65.30	0.30	330
14.0	+0.9/+1.3	14.0	1.75	$\pm 0.20$	7.10	+0/-0.8	76.18	0.40	330
15.0	+0.9/+1.3	15.0	1.75	$\pm 0.20$	7.70	+0/-0.8	81.62	0.40	330
16.0	+1.0/+1.4	16.0	1.75	$\pm 0.20$	8.30	+0/-0.8	87.06	0.40	330
18.0	+1.0/+1.4	18.0	2.00	$\pm 0.25$	9.55	+0/-0.8	97.95	0.50	330
20.0	+1.0/+1.4	20.0	2.00	$\pm 0.25$	10.40	+0/-1.0	108.83	0.50	330
22.0	+1.0/+1.5	22.0	2.00	$\pm 0.25$	11.60	+0/-1.0	119.71	0.50	330
25.0	+1.1/+1.6	25.0	2.00	$\pm 0.25$	13.30	+0/-1.0	136.03	0.50	330

注:其他尺寸可定制

Remark:Other dimension customized available



# 单直孔棒系列

RODS WITH CENTRAL COOLANT HOLE

## 公制 METRIC

毛坯 Unground	外径 $\phi D$ (mm)		内孔 $\phi d$ (mm)		孔偏离 Hole Deviation	长度 L (mm) (0, +5)
	公差 Tol.	精磨 Ground h6/h5	直径 Dia.	公差 Tol.		
4.3	+0/+0.2	4	0.6	$\pm 0.1$	0.07	330
5.3	+0/+0.2	5	1.0	$\pm 0.1$	0.07	330
6.3	+0/+0.2	6	1.0	$\pm 0.1$	0.07	330
8.3	+0/+0.3	8	1.2	$\pm 0.15$	0.07	330
10.3	+0/+0.3	10	2.0	$\pm 0.2$	0.10	330
12.3	+0/+0.3	12	2.0	$\pm 0.2$	0.10	330
14.3	+0/+0.4	14	2.0	$\pm 0.2$	0.12	330
16.3	+0/+0.4	16	2.0	$\pm 0.2$	0.12	330
18.3	+0/+0.5	18	3.0	$\pm 0.25$	0.15	330
20.3	+0/+0.5	20	3.0	$\pm 0.25$	0.15	330
22.3	+0/+0.5	22	3.0	$\pm 0.25$	0.15	330
24.3	+0/+0.5	24	4.0	$\pm 0.25$	0.15	330
26.3	+0/+0.5	26	4.0	$\pm 0.25$	0.15	330
28.3	+0/+0.5	28	4.0	$\pm 0.25$	0.15	330
30.3	+0/+0.5	30	5.0	$\pm 0.25$	0.15	330
32.3	+0/+0.5	32	5.0	$\pm 0.25$	0.15	330

# 单直孔棒系列

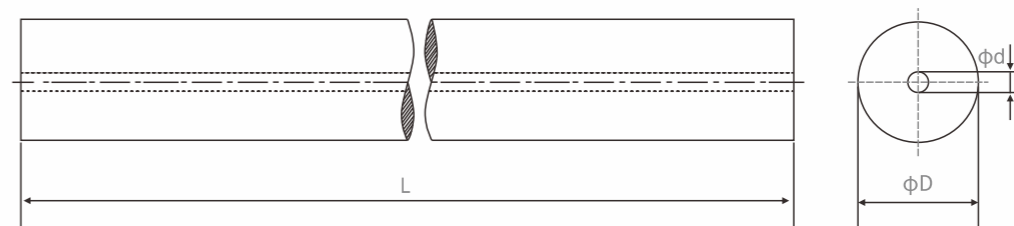
RODS WITH CENTRAL COOLANT HOLE

## 英制 INCH

外径 $\phi D$ (inch)	毛坯公差 Unground tol.	精磨公差 Ground tol.	内孔 $\phi d$ (inch)		孔偏离 Hole Deviation	长度 L (inch) (0, +0.197)
			直径 Dia.	公差 Tol.		
1/4	+0.0118/+0.0236	h6/h5	3/77	$\pm 0.0039$	0.0027	13
9/32	+0.0118/+0.0236	h6/h5	3/77	$\pm 0.0039$	0.0027	13
5/16	+0.0118/+0.0236	h6/h5	4/85	$\pm 0.0059$	0.0027	13
25/64	+0.0118/+0.0236	h6/h5	1/16	$\pm 0.0059$	0.0039	13
13/32	+0.0118/+0.0236	h6/h5	1/16	$\pm 0.0059$	0.0039	13
27/64	+0.0118/+0.0236	h6/h5	1/16	$\pm 0.0059$	0.0039	13
31/64	+0.0118/+0.0275	h6/h5	3/38	$\pm 0.0098$	0.0047	13
1/2	+0.0118/+0.0275	h6/h5	3/38	$\pm 0.0098$	0.0047	13
9/16	+0.0118/+0.0275	h6/h5	5/51	$\pm 0.0098$	0.0047	13
5/8	+0.0118/+0.0275	h6/h5	2/17	$\pm 0.0098$	0.0047	13
3/4	+0.0118/+0.0314	h6/h5	2/17	$\pm 0.0098$	0.0059	13
13/16	+0.0118/+0.0314	h6/h5	2/17	$\pm 0.0098$	0.0059	13

注:其他尺寸可定制

Remark:Other dimension customized available



# 双直孔棒系列

## RODS WITH 2 STRAIGHT COOLANT HOLES

### 公制 METRIC

外径 $\phi D$ (mm)			内孔 $\phi d$ (mm)		孔间距 $Tk\phi$ (mm)		孔偏离 Hole Deviation	长度 L (mm) (0, +5)
毛坯 Unground	公差 Tol.	精磨 Ground	直径 Dia.	公差 Tol.	间距 Bolt core	公差 Tol.		
		h6/h5						
6.3	+0/+0.2	6	1.0	$\pm 0.10$	2.90	+0/-0.2	0.15	330
7.3	+0/+0.3	7	1.0	$\pm 0.10$	3.40	+0/-0.2	0.15	330
8.3	+0/+0.3	8	1.0	$\pm 0.10$	3.85	+0/-0.2	0.15	330
9.3	+0/+0.3	9	1.0	$\pm 0.10$	2.45	+0/-0.2	0.20	330
10.3	+0/+0.3	10	1.4	$\pm 0.15$	4.85	+0/-0.3	0.20	330
11.3	+0/+0.3	11	1.4	$\pm 0.15$	4.85	+0/-0.3	0.30	330
12.3	+0/+0.3	12	1.8	$\pm 0.20$	5.85	+0/-0.3	0.30	330
13.3	+0/+0.4	13	1.8	$\pm 0.20$	5.85	+0/-0.3	0.34	330
14.3	+0/+0.4	14	1.8	$\pm 0.20$	6.85	+0/-0.3	0.37	330
15.3	+0/+0.4	15	2.0	$\pm 0.20$	6.85	+0/-0.3	0.40	330
16.3	+0/+0.4	16	2.0	$\pm 0.20$	7.85	+0/-0.3	0.45	330
17.3	+0/+0.5	17	2.0	$\pm 0.20$	7.85	+0/-0.3	0.47	330
18.3	+0/+0.5	18	2.0	$\pm 0.20$	8.85	+0/-0.3	0.50	330
19.3	+0/+0.5	19	2.0	$\pm 0.20$	8.85	+0/-0.3	0.50	330
20.3	+0/+0.5	20	2.5	$\pm 0.25$	9.80	+0/-0.3	0.50	330
21.3	+0/+0.5	21	2.5	$\pm 0.25$	9.80	+0/-0.3	0.50	330
22.3	+0/+0.5	22	2.5	$\pm 0.25$	10.80	+0/-0.4	0.50	330
23.3	+0/+0.5	23	2.5	$\pm 0.25$	10.80	+0/-0.4	0.50	330
24.3	+0/+0.5	24	3.0	$\pm 0.25$	11.75	+0/-0.4	0.50	330
25.3	+0/+0.5	25	3.0	$\pm 0.25$	11.75	+0/-0.4	0.50	330
26.3	+0/+0.5	26	3.0	$\pm 0.25$	13.00	+0/-0.5	0.50	330
28.3	+0/+0.5	28	3.0	$\pm 0.25$	14.00	+0/-0.5	0.50	330
30.3	+0/+0.5	30	3.0	$\pm 0.25$	14.00	+0/-0.5	0.50	330
32.3	+0/+0.5	32	3.0	$\pm 0.25$	14.00	+0/-0.5	0.50	330

# 双直孔棒系列

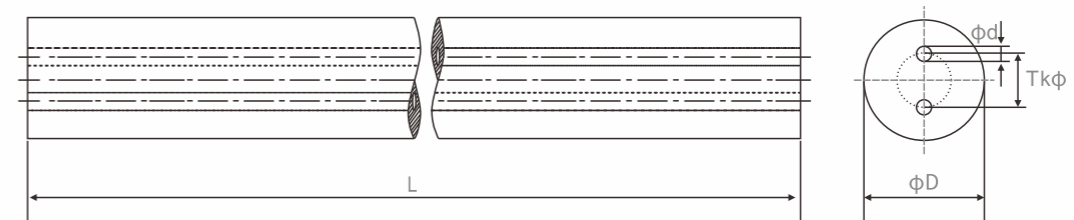
## RODS WITH 2 STRAIGHT COOLANT HOLES

### 英制 INCH

外径 $\phi D$ (inch)	毛坯公差 Unground tol.	精磨公差 Ground tol.	内孔 $\phi d$ (inch)		孔间距 $Tk\phi$ (inch)		孔偏离 Hole Deviation	长度 L (inch) (0, +0.197)
			直径 Dia.	公差 Tol.	间距 Bolt core	公差 Tol.		
1/4	+0.0118/+0.0236	h6/h5	3/77	$\pm 0.0039$	4/35	+0/-0.0078	0.0059	13
9/32	+0.0118/+0.0236	h6/h5	3/77	$\pm 0.0039$	2/15	+0/-0.0078	0.0059	13
5/16	+0.0118/+0.0236	h6/h5	4/85	$\pm 0.0059$	5/33	+0/-0.0078	0.0059	13
25/64	+0.0118/+0.0236	h6/h5	1/16	$\pm 0.0059$	17/89	+0/-0.0118	0.0079	13
13/32	+0.0118/+0.0236	h6/h5	1/16	$\pm 0.0059$	17/89	+0/-0.0118	0.0118	13
27/64	+0.0118/+0.0236	h6/h5	1/16	$\pm 0.0059$	3/13	+0/-0.0118	0.0118	13
31/64	+0.0118/+0.0275	h6/h5	3/38	$\pm 0.0098$	3/13	+0/-0.0118	0.0118	13
1/2	+0.0118/+0.0275	h6/h5	3/38	$\pm 0.0098$	3/13	+0/-0.0118	0.0134	13
9/16	+0.0118/+0.0275	h6/h5	5/51	$\pm 0.0098$	24/89	+0/-0.0118	0.0146	13
5/8	+0.0118/+0.0275	h6/h5	2/17	$\pm 0.0098$	17/55	+0/-0.0118	0.0177	13
3/4	+0.0118/+0.0314	h6/h5	2/17	$\pm 0.0098$	23/66	+0/-0.0118	0.0197	13
13/16	+0.0118/+0.0314	h6/h5	2/17	$\pm 0.0098$	27/70	+0/-0.0118	0.0197	13

注:其他尺寸可定制

Remark:Other dimension customized available



# h6/h5标准

## h6/h5 STANDARD

### OVERVIEW

外径 Diameter (mm)	h6 标准 (mm)	h5 标准 (mm)
0 < φ ≤ 3	+0/-0.006	+0/-0.004
3 < φ ≤ 6	+0/-0.008	+0/-0.005
6 < φ ≤ 10	+0/-0.009	+0/-0.006
10 < φ ≤ 18	+0/-0.011	+0/-0.008
18 < φ ≤ 30	+0/-0.013	+0/-0.009
30 < φ ≤ 40	+0/-0.016	+0/-0.011

### 棒材表面粗糙度

#### Surface Roughness of Rods

类型 Type	精度 Accuracy
镜面棒材 Polished Rods	0.00-0.05 μm
精磨棒材 Ground Rods	0.00-0.10 μm
亚光洁度 Matt Finished	0.10-0.20 μm

# 材质项目名词解释

## DEFINITIONS OF PHYSICAL PROPERTIES

### 硬度 Hardness

金属材料抵抗其它更硬物体压入表面的能力称为硬度，主要采用洛氏或维氏硬度测量法，两种硬度值转换时需要注意换算

The Hardness of material is defined as the ability to fight against the hard pressed into surface of the object, mainly using measurements of Rockwell and Vickers. As the principles of the Vickers and Rockwell tests are different, care must be taken when converting from one system to the other.

### 矫顽磁力 Coercive Force

矫顽磁力测量的是合金试样完全去磁化所需的反向磁场大小，它用来评定合金的组织状况，矫顽力随钴含量降低而增大，当钴含量一定时，碳化钨晶粒越细，钴相分散程度越高，矫顽力也越大

Coercive Force is a measure of the residual magnetism in the hysteresis loop when the Cobalt (Co) binder in grade of cemented carbide is magnetized and then demagnetized. It can be used to assess the status of carbide organization. The finer the grain size of the carbide phase the higher will be the coercive force value.

### 磁饱和 Magnetic Saturation

磁饱和是最大磁化强度与质量的比值，通过测定硬质合金中具有磁性的钴 (Co) 粘结相的磁饱和，可以评定合金成份。低磁饱和值表示合金含碳量低，或者含有η相碳化物，高磁饱和值表示存在“游离碳或石墨”

Magnetic Saturation: is the ratio of magnetic intensity to quality. Magnetic Saturation measurements on the Cobalt (Co) binder phase in cemented carbide are used by the industry to evaluate its composition. Low Magnetic Saturation values indicate a low carbon level and/or the presence of Eta-Phase Carbides. High Magnetic Saturation values indicate the presence of 'free-carbon' or Graphite.

### 密度 Density

材料的密度 (比重) 是材料质量与其体积的比率，使用液体置换法进行测定，硬质合金密度随WC-Co相中钴含量增加而减小

The Density (specific gravity) of a material is the ratio of its mass to its volume. It is measured using a water displacement technique. Cemented carbide density decreases linearly with increasing Cobalt content for the Wc-Co grades.

### 抗弯强度 Transverse Rupture Strength

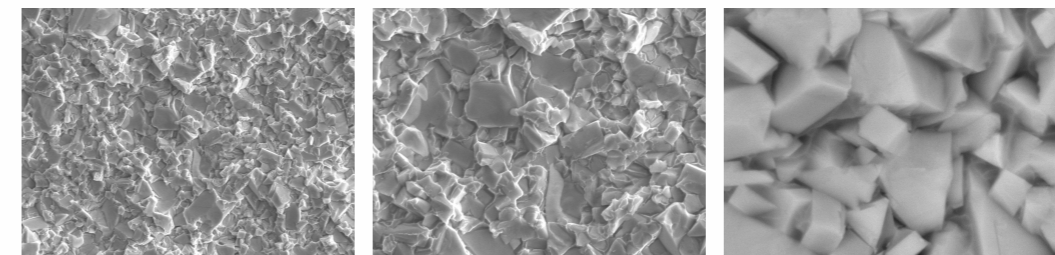
抗弯强度是表征材料抵抗弯曲不断裂的能力，即试样跨距中点加载负荷至断裂时，单位面积上所受的力大小

Transverse Rupture Strength (TRS) is the ability of material to resist bending, measured at the breaking point of a material in a standard three point bend test.

### 金相 Metallographic Analysis

硬质合金烧结钴相粘结后，过量钴可能在某些结构区域中存在，形成“钴池”；而当粘结相不完全粘结，则将形成一些少量残余孔隙，合金中钴池及孔隙率使用金相显微镜检验得到

Cobalt Lakes will bond after sintering, excess cobalt may exist in certain area of the structure, forming the cobalt pool; If bonding phase is incompletely adhesive, there will form some residual pores. Cobalt pools and porosity can be detected by using metallographic microscope.



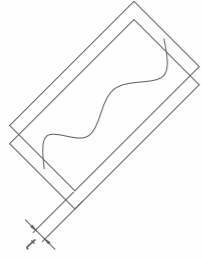
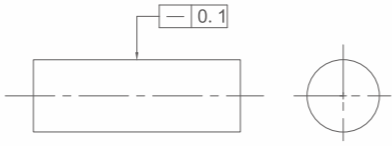
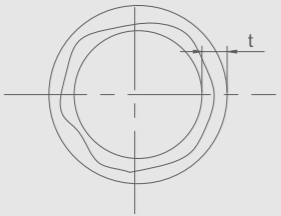
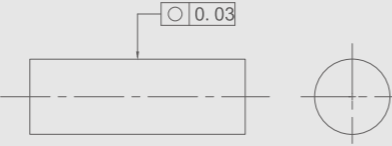
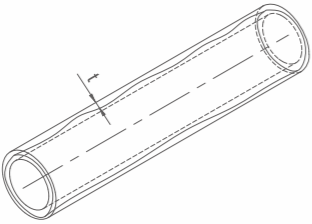
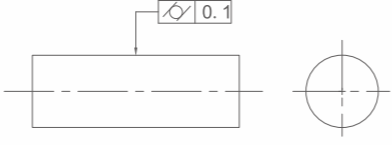
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X1500

X30000

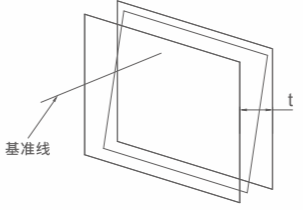
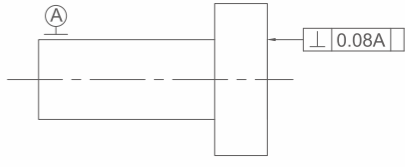
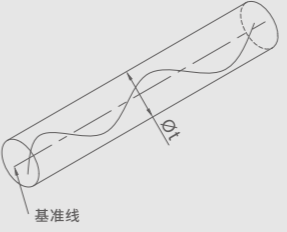
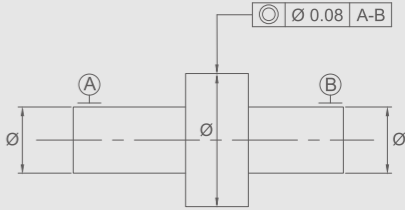
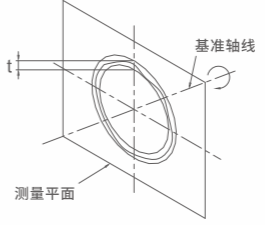
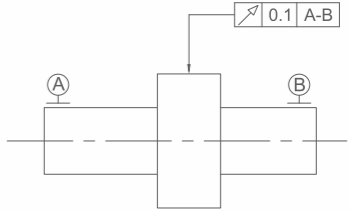
# 尺寸项目名词

## DEFINITIONS OF GEOMETRICAL TOLERANCE

	公差带定义 Definition of Tolerance Zone	标注和解释 Indication and Explanation
<p>直线度 Straightness Tolerance</p>	 <p>在给定方向上公差带是距离为公差值t的两平行平面之间的区域</p> <p>The tolerance zone, in the considered plane, is limited by two parallel straight lines a distance t apart and in the specified direction only.</p>	 <p>被测圆柱面的任一素线必须位于距离为公差值0.1的两平行平面之内</p> <p>Any extracted (actual) line on the upper surface parallel to the plane of projection in which the indication is shown, shall be contained between two parallel straight lines 0.1 apart.</p>
<p>圆度 Roundness Tolerance</p>	 <p>是在同一正截面上, 半径差为公差值t的两同心圆之间的区域</p> <p>The tolerance zone, in the considered cross-section, is limited by two concentric circles with a difference in radii of t.</p>	 <p>被测圆柱面任一正截面的圆周必须位于半径差为公差值0.03的两同心圆之间</p> <p>The extracted (actual) circumferential line, in any cross-section of the cylindrical and conical surfaces shall be contained between two co-planar concentric circles, with a difference in radii of 0.03.</p>
<p>圆柱度 Cylindricity</p>	 <p>是半径差为公差值t的两同轴圆柱面之间的区域</p> <p>The tolerance zone is limited by two coaxial cylinders with a difference in radii of t.</p>	 <p>是在同一正截面上, 半径差为公差值t的两同心圆之间的区域</p> <p>The tolerance zone, in the considered cross-section, is limited by two concentric circles with a difference in radii of t.</p>

# 尺寸项目名词

## DEFINITIONS OF GEOMETRICAL TOLERANCE

	公差带定义 Definition of Tolerance Zone	标注和解释 Indication and Explanation
<p>垂直度 Perpendicularity Tolerance of a Surface</p>	 <p>是距离为公差值t且垂直于基准线的两平行平面之间的区域</p> <p>The tolerance zone is limited by two parallel planes a distance apart and perpendicular to the datum.</p>	 <p>被测面必须位于距离为公差值0.08且垂直于基准线A(基准轴线)的两平行平面之间</p> <p>The extracted (actual) surface shall be contained between two parallel planes 0.08 apart that is perpendicular to datum axis A.</p>
<p>同轴度 Concentricity Tolerance of a Point</p>	 <p>是直径为公差值t的圆柱面内区域, 该圆柱面的轴线与基准轴线同轴</p> <p>The tolerance zone is limited by a circle of diameter t; the tolerance value shall be preceded by the symbol Ø. The centre of the circular tolerance zone coincides with the datum point.</p>	 <p>大圆柱面的轴线必须位于直径为公差值Ø0.08且与公共基准线A-B(公共基准轴线)同轴的圆柱面内</p> <p>The extracted (actual) median line of the tolerance cylinder shall be within a cylindrical zone of diameter 0.08 the axis of which is the common datum straight line A-B.</p>
<p>圆跳动 Circular run-out Tolerance</p>	 <p>是在垂直于基准轴线的任一半径位置的测量平面内、半径差为公差值t且圆心在基准轴线上的两同心圆之间的区域</p> <p>The tolerance zone is limited within any cross-section perpendicular to the datum axis by two concentric circles with a difference in radii of t, the centers of which coincide with the datum.</p>	 <p>当被测要素围绕公共基准线A-B(公共基准轴线)旋转一周时, 在任一测量平面内的径向圆跳动均不得大于0.1</p> <p>The extracted (actual) line in any cross-section plane perpendicular to common datum straight line A-B shall be contained between two coplanar concentric circles with a difference in radii of 0.1.</p>