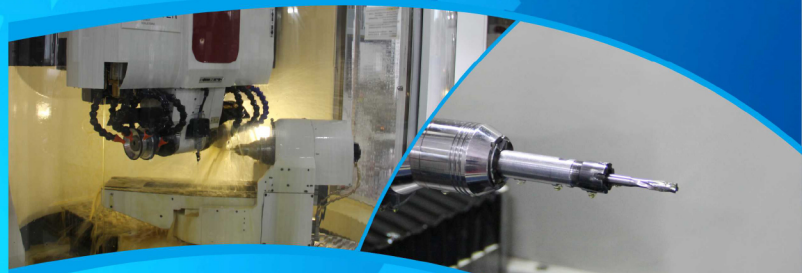
MaxinPath
迈新途科技

硬质合金型材

CEMENTED CARBIDE RODS AND BARS



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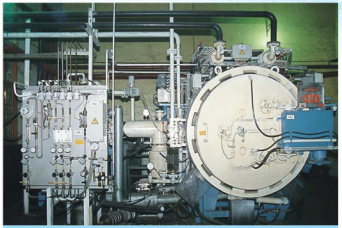
MaxinPath
迈新途科技

丹麦喷雾干燥塔
Spray dryer from Denmark

美国粉末挤压机
Powder extrusion machine from America



德国压力烧结炉/Sinter-Hip-Furnace from Germany

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硬质合金型材牌号

Grades of cemented carbide rods and bars

牌号 Grade	ISO编码 ISO Code	晶粒度 Grain Size μm	钴 Cobalt wt %	密度 Density g/cm³	硬度 Hardness		抗弯强度 TRS N/mm²
					HRA	HV30	
ZS31	K20-K40	0.8	10.0	14.42	91.5	1550	4200
ZS40	K20-K30	0.4	12.0	14.15	92.5	1700	4000
ZS50	K30-K40	0.5	13.0	14.10	91.7	1560	4200
ZK15F	K10-K20	0.8	6.0	14.95	92.8	1720	3600
ZK10UF	K05-K10	0.6	6.0	14.85	93.0	1800	3500
ZK30UF	K30-K40	0.6	10.0	14.45	92.0	1630	3800
ZK31UF	K20-K40	0.7	10.0	14.40	91.8	1600	4000
ZK10SF	K05-K10	0.4	6.0	14.75	94.0	2000	3500
ZK25SF	K05-K10	0.2-0.3	9.0	14.30	94.0	1950	4400
ZK30SF	K10-K20	0.4	10.0	14.30	92.5	1750	3800
ZK40SF	K20-K30	0.4	12.0	14.15	92.2	1630	4000
ZK45SF	K20-K30	0.4	11.5	14.10	92.3	1670	4000

注/Note：1、表中数据为典型值，仅供参考。我们保留因公司技术进步而修改数据的权利。

The data in the table are typical values, just for reference only. We reserve the right to change the data which are caused by technology improvement.

2、表中抗弯强度检测样品尺寸为φ3.25mm×38.5mm。

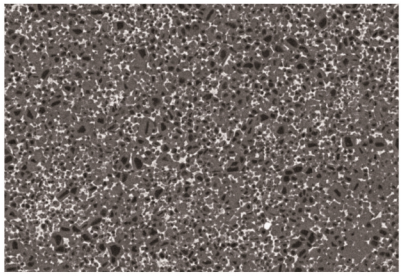
The size of TRS specimens is φ3.25mm×38.5mm.

硬质合金型材牌号推荐

Recommended applications of the grades

	牌号 Grade	使用推荐 Applications
近纳米晶合金 Near Nano Grades	ZK25SF	适用于淬硬钢（HRC55以上）、不锈钢、铝合金、纤维增强复合材料等精加工。 Suitable for finish-machining of hardened steel (above HRC55),stainless steel, aluminum alloy, as well as compostie materails,eg. GFRP.
超细晶合金 Ultrafine Grades	ZK10SF	适用于高硬材料、复合材料精加工，推荐制作铰刀、PCB刀具、雕刻刀。 Suitable for finish-machining of high hardness materials ,compostie materails, making reamers,PCB tools,gravers.
	ZS40	高硬度、高强度和耐磨性的极佳组合，适用铝合金、钛合金、耐热合金及淬火钢的加工。 Grade with an excellent combination of high hardness, high strength and wear resistance. Suitable for aluminum alloy, titanium alloy and heat-resistant alloy and hardened steel.
	ZK45SF	推荐制作高速铣刀，推荐用于不锈钢、合金钢、铝合金、钛合金的铣削加工。 Recommended for milling of stainless steel,alloy steel,aluminum alloy , titanium alloy .
	ZK40SF	适用于不锈钢、模具钢、铝合金、钛合金的铣削加工。 Suitable for milling of stainless steel, die steel, aluminum alloy ,titanium alloy.
	ZS50	具有优异的韧性，适用于不锈钢、合金钢等材料的粗、精加工。 With high toughness for high performance machining of stainless steel, alloy steel etc.
亚细晶合金 Submicron Grades	ZK10UF	适用于有色金属、铝合金、塑料材料、石墨（金刚石涂层）的切削加工。 Suitable for machining nonferrous metals, aluminum alloy, various plastics and graphite(with diamond coating).
	ZK15F	适用于金刚石涂层，具有优异的耐磨性。适用于铝合金、复合材料,有色金属、的切削加工。 Formulated for use with diamond coating, offering outstanding wear resistance. Suitable for aluminum alloy, composites and non-ferrous materials.
	ZS31	具有优异的韧性，适用于不锈钢、合金钢、钛合金、高温合金等材料的切削加工。 Offering high toughness for cutting stainless steel,alloy steel, titanium alloy,high temperature alloy etc.materials.
	ZK31UF	通用材质，适用于不锈钢、合金钢、模具钢、有色金属等材料的切削加工。 For general use of milling and drilling,suitable for cutting stainless steel,alloy steel, die steel, nonferrous metals etc.materials.
	ZK30UF	适用于不锈钢、模具钢、铸铁等材料的切削加工。 Suitable for cutting stainless steel, die steel, grey cast iron.

金属陶瓷
Cermet



牌 号 Grades	ISO.范围 ISO.Class	硬度* Hardness*		密度* Density* g/cm³	抗弯强度* TRS* MPa	断裂韧性* Density* MPa/m1'2	孔隙度 Porosity
		HRA	HV30				
ZYT10	P01-P10	93.5	1620	6.4	1980	7.8	A02B00C00
ZYT10A	P01-P10	92.8	1580	7.0	2250	8.1	A02B00C00
ZYT15	P10-P20	92.0	1520	6.5	2140	8.8	A02B00C00
ZYT15A	P10-P20	91.8	1500	6.7	2400	9.0	A02B00C00

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2、表中抗弯强度检测试样尺寸为φ3.25mm×38.5mm。
The size of TRS specimens is φ3.25mm×38.5mm.

磨削加工建议
Grinding Operation of Cermet

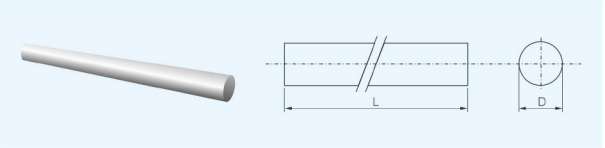
金属陶瓷属于硬脆性材料，导热性、抗热冲击性比WC基硬质合金差，在加工时应特别注意散热，并避免受到大的机械应力及热交变应力的冲击。建议使用高刚度，高稳定的磨床,并采用粗磨、半精磨和精磨分步加工工艺，选用散热性，自锐性好的烧结金刚石砂轮，陶瓷结合剂金刚石砂轮最佳。

As a kind of brittle material, the thermal conductivity and thermal shock resistance of Cermet are relatively poor, comparing with WC based Cemented Carbide. Thus, more attention must be paid to heat dispersion when grinding, avoiding too high mechanical or heat stress impact. Step by step grinding process, such as rough, pre-finish and finish grinding, is recommended. Use a heavy, stable and rigid machine where you can control your speed and feeds. The metal bond diamond wheel with good thermal conductivity and self-sharpening is chosen, ceramic bond dimond wheel is prefarred.

工 序 Procedure	砂轮种类 Grinding wheel	砂轮粒度 Particle size of diamond wheel	进给量 Feed	冷却方式 Coolant
粗磨 Rough	陶瓷或金属结合剂金刚石砂轮，浓度75-100% Ceramic or metal bond diamond wheel with 75-100 concentration	80#~100#	≤0.020	均匀充分冷却或干磨 Good and rich coolant or Dry machining
半精磨 Pre-finishing		120#~200#	≤0.010	
精磨 Finishing		200#~400#	≤0.005	

整体刀具用型材规格
Sizes and dimensions of cemented carbide rods and bars

标准尺寸毛坯棒材
Normal dimension unground rods

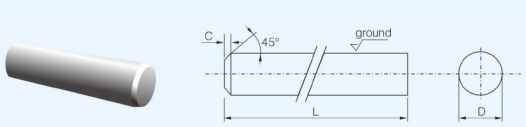


单位：mm

尺寸与公差/Dimension & Tolerance			
直径 D	直径公差 Tol. D	长度 L	长度公差 Tol. L
0.5	+0.50 +0.20	310/330	+5.0 +0
1.0			
1.5			
2.0			
2.5			
3.0			
3.5	+0.55 +0.20		
4.0			
4.5			
5.0			
5.5			
6.0			
6.5			
7.0			
7.5			
8.0			
8.5			
9.0			
9.5			
10.0	+0.55 +0.25		
10.5			
11.0			
11.5			
12.0			
12.5			
13.0			
13.5			
14.0			
14.5			

尺寸与公差/Dimension & Tolerance			
直径 D	直径公差 Tol. D	长度 L	长度公差 Tol. L
15.0	+0.55 +0.25	310/330	+5.0 0
15.5			
16.0			
16.5			
17.0			
18.0			
19.0			
20.0			
21.0			
22.0			
23.0			
24.0			
25.0			
26.0			
27.0			
28.0			
29.0			
30.0			
31.0			
32.0			
33.0			
34.0			
35.0			
36.0			
37.0			
38.0			
39.0			
40.0			

公制精磨倒角定尺寸棒材（h5/h6）
Ground rods with chamfer-Metric(h5/h6)



单位：mm

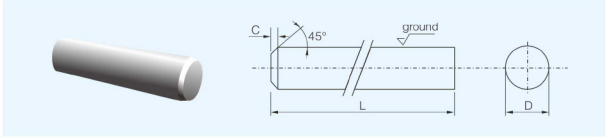
直径D	长度L	倒角C
3	35	0.4
3	50	0.4
3	75	0.4
3	100	0.4
4	45	0.4
4	50	0.4
4	75	0.4
4	100	0.4
5	50	0.5
5	75	0.5
5	100	0.5
6	50	0.5
6	60	0.5
6	75	0.5
6	100	0.5
6	120	0.5
6	150	0.5
8	60	0.6
8	75	0.6
8	80	0.6
8	100	0.6
8	120	0.6
8	150	0.6

直径D	长度L	倒角C
10	65	0.6
10	75	0.6
10	100	0.6
10	120	0.6
10	150	0.6
12	75	0.8
12	100	0.8
12	120	0.8
12	150	0.8
14	82	0.8
14	100	0.8
14	150	0.8
16	93	0.8
16	100	0.8
16	150	0.8
16	200	0.8
18	100	0.8
18	150	0.8
20	100	1.0
20	104	1.0
20	150	1.0
20	200	1.0
25	150	1.0

直径 Diameter		长度 Length		倒角角度 Angle of Chamfer
范围Range (mm)	公差Tol. (mm)	范围Range (mm)	公差Tol. (mm)	公差Tol.
3.0≤ΦD≤25.0	h5/h6	L≤200.0	+1.5 0	±3°

» 英制精磨倒角定尺寸棒材（h5/h6）

Ground rods with chamfer–Inch(h5/h6)



单位：inch

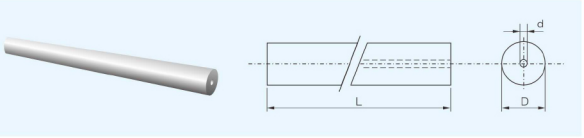
直径D	长度L	倒角C
1/8	1-1/2	0.015
1/8	2	0.015
1/8	2-1/2	0.015
1/8	3	0.015
3/16	1-1/2	0.020
3/16	2	0.020
3/16	2-1/2	0.020
3/16	3	0.020
1/4	1-1/2	0.024
1/4	2	0.024
1/4	2-1/2	0.024
1/4	3	0.024
1/4	4	0.024
5/16	2	0.024
5/16	2-1/2	0.024
5/16	3	0.024
5/16	3-1/2	0.024
5/16	4	0.024
3/8	2	0.024
3/8	2-1/2	0.024

直径D	长度L	倒角C
3/8	3	0.024
3/8	3-1/2	0.024
3/8	4	0.024
3/8	6	0.024
1/2	2-1/2	0.031
1/2	3	0.031
1/2	4	0.031
1/2	5	0.031
5/8	3	0.031
5/8	3-1/2	0.031
5/8	5	0.031
3/4	3	0.039
3/4	3-1/2	0.039
3/4	4	0.039
3/4	5	0.039
3/4	6	0.039
1	4	0.039
1	5	0.039
1	6	0.039

直径 Diameter		长度 Length		倒角角度 Angle of Chamfer
范围Range (inch)	公差Tol. (inch)	范围Range (inch)	公差Tol. (inch)	公差Tol.
0.125≤ΦD≤1.000	h5/h6	L≤6.0	+1/16 0	±3°

» 单直孔棒材

Unground rods with central coolant hole



单位：mm

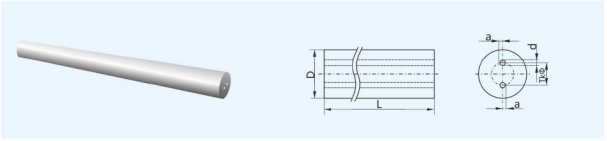
D	d	L
4.5	0.6	L≤330
6.0	1.0	
	1.5	
7.0	1.0	
	1.5	
	2.0	
8.0	1.3	
	2.5	
8.5	1.5	
	2.0	
9.0	1.0	
	1.5	
	2.0	
	2.5	
9.5	1.5	
	2.0	
	2.5	
10.0	2.0	
	3.0	
10.5	1.5	
	2.0	
	2.5	

D	d	L
12.3	2.0	L≤330
	3.0	
13.0	2.0	
14.3	2.0	
	3.0	
16.3	2.0	
	2.5	
	4.0	
17.0	2.0	
17.5	2.0	
18.0	3.0	
18.5	3.0	
20.0	3.0	
22.0	3.0	
24.0	4.0	
26.0	4.0	
28.0	4.0	
30.0	5.0	
32.0	5.0	

单位：mm

直径公差 Tol. D		孔径公差 Tol. d		长度公差 Tol. L	
D< 5.0	+0.70 +0.30	d< 3.0	±0.20	L< 50	+2.0 +0
5.0 ≤ D< 12.0	+1.00 +0.40	3.0 ≤ d < 4.0	±0.25	50 ≤ L< 100	+3.5 +0
12.0 ≤ D< 25.0	+1.10 +0.50	d ≥ 4.0	±0.30	100 ≤ L< 200	+4.5 +0
D ≥ 25.0	+1.20 +0.50			L ≥ 200	+6.0 +0

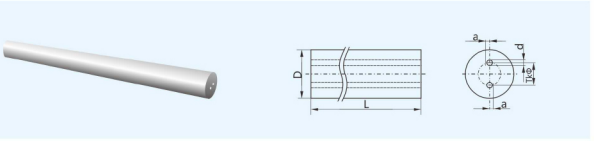
» 双直孔棒材（标准孔间距）
Unground rods with 2 straight coolant holes (standard bolt circle)



单位：mm

直 径 D	直径公差 Tol. D	孔 距 TKΦ	孔距公差 Tol. TKΦ	孔 径 d	孔径公差 Tol. d	孔位偏差 a	长 度 L	长度公差 Tol. L
4.2		1.8	-0.15	0.80		0.10		
5.2		2.0		0.80	±0.10	0.13		
6.3		3.0	-0.20	1.00				
7.3	+0.3	3.5		1.00		0.15		
8.3		4.0		1.00				
9.3		4.0		1.40		0.20		
10.3		5.0		1.40	±0.15			
11.3		5.0		1.40		0.28		
12.3		6.0		1.75		0.30		
13.3		6.0	-0.30	1.75		0.34		
14.3	+0.4	7.0		1.75		0.37		
15.3		7.0		2.00		0.40		
16.3		8.0		2.00				
17.3		8.0		2.00	±0.20	0.47	L≤330	+5.0 0
18.3		9.0		2.00				
19.3		9.0		2.00				
20.4		10.0		2.50				
21.4		10.0	-0.40	2.50				
22.4		11.0		2.50				
23.4		11.0		2.50				
24.4	+0.5	12.0		3.00		0.50		
25.4		12.0		3.00	±0.25			
26.4		13.0		3.00				
28.4		14.0	-0.50	3.00				
30.4		14.0		3.00				
32.4		14.0		3.00				
34.4		14.0		3.00				

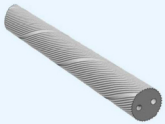
» 双直孔棒材（窄孔间距）
Unground rods with 2 straight coolant holes (narrow bolt circle)

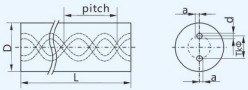


单位：mm

直 径 D	直径公差 Tol. D	孔 距 TKΦ	孔距公差 Tol. TKΦ	孔 径 d	孔径公差 Tol. d	孔位偏差 a	长 度 L	长度公差 Tol. L
6.3		1.5	-0.20	0.80				
7.3		1.5		0.80				
8.3		2.6		1.00		0.15		
8.3	+0.3	1.5		0.80	±0.10			
8.3		2.0		0.80				
9.3		2.6		1.00		0.20		
10.3		2.6		1.00				
11.3		3.5		1.20		0.28		
12.3		3.5		1.20		0.30		
13.3		3.5	-0.30	1.20	±0.15	0.34		
14.3	+0.4	5.0		1.50		0.37		
15.3		5.0		1.50		0.40	L≤330	+5.0 0
16.3		5.0		1.50				
17.3		6.2		2.00		0.47		
18.3		6.2		2.00				
19.3		6.2		2.00				
20.4		6.2		2.00				
21.4	+0.5	6.2		2.00	±0.20			
22.4		6.2		2.00				
23.4		7.5	-0.40	2.00				
24.4		7.5		2.00		0.50		
25.4		7.5		2.00				
26.4		7.5		2.00				

» 双螺旋孔棒材（30°）
Unground rods with 2 helical coolant holes (30°)





单位：mm

型 号 Type	直 径 D	直径公差 Tol. D	孔 距 TKΦ	孔距公差 Tol. TKΦ	孔 径 d	孔径公差 Tol. d	圆心偏离 a	长 度 L+5	螺 距 Pitch
XC2L040210730330	4.20	+1.0 +0.3	2.10	±0.15	0.70	±0.15	0.10	330	21.77
XC2L050240730330	5.20	+1.1 +0.3	2.40	±0.20	0.70	±0.15	0.13	330	27.21
XC2L060180730330	6.20	+1.1 +0.3	1.80	±0.20	0.70	±0.15	0.15	330	32.65
XC2L060240730330	6.20	+1.1 +0.3	2.40	±0.20	0.70	±0.15	0.15	330	32.65
XC2L060241030330	6.20	+1.1 +0.3	2.40	±0.20	1.00	±0.20	0.15	330	32.65
XC2L070351030330	7.20	+1.1 +0.3	3.50	±0.20	1.00	±0.20	0.15	330	38.09
XC2L080260630330	8.20	+1.2 +0.3	2.60	±0.20	0.60	±0.15	0.15	330	43.53
XC2L080280730330	8.20	+1.2 +0.3	2.80	±0.20	0.70	±0.20	0.15	330	43.53
XC2L080331030330	8.20	+1.2 +0.3	3.30	±0.20	1.00	±0.20	0.15	330	43.53
XC2L080351030330	8.20	+1.2 +0.3	3.50	±0.20	1.00	±0.20	0.15	330	43.53
XC2L080381030330	8.20	+1.2 +0.3	3.80	±0.20	1.00	±0.20	0.15	330	43.53
XC2L090451430330	9.20	+1.2 +0.3	4.50	±0.30	1.40	±0.20	0.20	330	48.97
XC2L100240730330	10.20	+1.2 +0.4	2.40	±0.20	0.70	±0.15	0.20	330	54.41
XC2L100281030330	10.20	+1.2 +0.4	2.80	±0.20	1.00	±0.20	0.20	330	54.41
XC2L100351030330	10.20	+1.2 +0.4	3.50	±0.20	1.00	±0.20	0.20	330	54.41
XC2L100451430330	10.20	+1.2 +0.4	4.50	±0.30	1.40	±0.20	0.20	330	54.41
XC2L100481430330	10.20	+1.2 +0.4	4.80	±0.30	1.40	±0.20	0.20	330	54.41
XC2L110491430330	11.20	+1.2 +0.4	4.90	±0.40	1.40	±0.20	0.28	330	59.86
XC2L120491430330	12.20	+1.2 +0.4	4.90	±0.40	1.40	±0.20	0.30	330	65.30

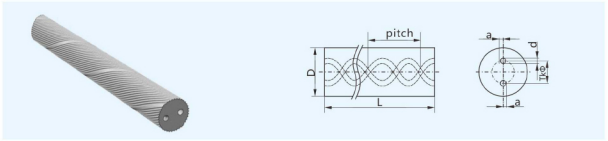
XC2L 10 035 10 30 330

- 表示长度，用三位整数表示，不足三位整数时前面加“0”
- 表示螺旋角，用两位整数表示，不足两位整数时前面加“0”
- 表示孔径，放大十倍后用两位整数表示，不足两位整数时前面加“0”
- 表示孔间距，放大十倍后用三位整数表示，不足三位整数时前面加“0”
- 表示外径，用两位整数表示，不足两位整数时前面加“0”
- 表示双螺旋孔棒材

单位：mm

型 号 Type	直 径 D	直径公差 Tol. D	孔 距 TKΦ	孔距公差 Tol. TKΦ	孔 径 d	孔径公差 Tol. d	圆心偏离 a	长 度 L+5	螺 距 Pitch
XC2L120561830330	12.20	+1.2 +0.4	5.60	±0.40	1.75	±0.20	0.30	330	65.30
XC2L120591430330	12.20	+1.2 +0.4	5.90	±0.40	1.40	±0.20	0.30	330	65.30
XC2L130611830330	13.20	+1.2 +0.4	6.10	±0.40	1.80	±0.20	0.34	330	70.74
XC2L140330830330	14.20	+1.3 +0.4	3.30	±0.20	0.80	±0.20	0.37	330	76.18
XC2L140421430330	14.20	+1.3 +0.4	4.20	±0.30	1.40	±0.20	0.37	330	76.18
XC2L140671830330	14.20	+1.3 +0.4	6.70	±0.40	1.75	±0.20	0.37	330	76.18
XC2L140702030330	14.20	+1.3 +0.4	7.00	±0.40	2.00	±0.20	0.37	330	76.18
XC2L150711830330	15.20	+1.3 +0.4	7.10	±0.40	1.75	±0.20	0.40	330	81.62
XC2L160791830330	16.20	+1.4 +0.4	7.90	±0.40	1.75	±0.20	0.40	330	87.06
XC2L160792030330	16.20	+1.4 +0.4	7.90	±0.40	2.00	±0.20	0.40	330	87.06
XC2L170791830330	17.20	+1.4 +0.4	7.90	±0.40	1.75	±0.20	0.47	330	92.50
XC2L180881830330	18.20	+1.4 +0.4	8.75	±0.40	1.75	±0.20	0.50	330	97.95
XC2L180901730330	18.20	+1.4 +0.4	9.00	±0.40	1.70	±0.20	0.50	330	97.95
XC2L180922030330	18.20	+1.4 +0.4	9.20	±0.40	2.00	±0.20	0.50	330	97.95
XC2L190972030330	19.20	+1.4 +0.4	9.70	±0.40	2.00	±0.20	0.50	330	103.39
XC2L200992030330	20.20	+1.4 +0.4	9.90	±0.50	2.00	±0.20	0.50	330	108.83
XC2L200992530330	20.20	+1.4 +0.4	9.90	±0.50	2.50	±0.20	0.50	330	108.83
XC2L211072030330	21.20	+1.4 +0.4	10.65	±0.50	2.00	±0.20	0.50	330	114.27
XC2L221112030330	22.20	+1.4 +0.4	11.10	±0.50	2.00	±0.20	0.50	330	119.71

» 双螺旋孔棒材（40°）
Unground rods with 2 helical coolant holes (40°)



XC2L 10 032 10 40 330

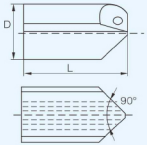
- 表示长度，用三位整数表示，不足三位整数时前面加“0”
- 表示螺旋角，用两位整数表示，不足两位整数时前面加“0”
- 表示孔径，放大十倍后用两位整数表示，不足两位整数时前面加“0”
- 表示孔间距，放大十倍后用三位整数表示，不足三位整数时前面加“0”
- 表示外径，用两位整数表示，不足两位整数时前面加“0”
- 表示双螺旋孔棒材

单位：mm

型 号 Type	直 径 D	直径公差 Tol. D	孔 距 TKΦ	孔距公差 Tol. TKΦ	孔 径 d	孔径公差 Tol. d	圆心偏差 a	长 度 L+5	螺 距 Pitch
XC2L060190740330	6.00	+1.1 +0.5	1.90	±0.20	0.70	±0.15		330	22.46
XC2L070220740330	7.00	+1.1 +0.5	2.20	±0.20	0.70	±0.15	0.15	330	26.21
XC2L080240740330	8.00	+1.1 +0.5	2.40	±0.30	0.70	±0.15		330	29.95
XC2L090300740330	9.00	+1.1 +0.5	3.00	±0.30	0.70	±0.15	0.20	330	33.70
XC2L100321040330	10.00	+1.1 +0.5	3.20	±0.30	1.00	±0.15		330	37.44
XC2L110331040330	11.00	+1.1 +0.5	3.30	±0.40	1.00	±0.15	0.28	330	41.18
XC2L120381240330	12.00	+1.1 +0.5	3.80	±0.40	1.20	±0.20	0.30	330	44.93
XC2L130401040330	13.00	+1.1 +0.5	4.00	±0.40	1.00	±0.20	0.34	330	48.67
XC2L140431240330	14.00	+1.1 +0.5	4.30	±0.40	1.20	±0.20	0.37	330	52.42
XC2L150471240330	15.00	+1.1 +0.5	4.70	±0.40	1.20	±0.20	0.40	330	56.16
XC2L160511340330	16.00	+1.2 +0.5	5.10	±0.40	1.30	±0.20		330	59.90
XC2L170551240330	17.00	+1.2 +0.5	5.50	±0.40	1.20	±0.25	0.50	330	63.65
XC2L180591440330	18.00	+1.2 +0.5	5.90	±0.40	1.40	±0.25		330	67.39
XC2L190641440330	19.00	+1.2 +0.5	6.40	±0.50	1.40	±0.25		330	71.14
XC2L200661540330	20.00	+1.2 +0.5	6.60	±0.50	1.50	±0.25		330	74.88

深孔钻坯料

Blanks of Deep hole drill bit



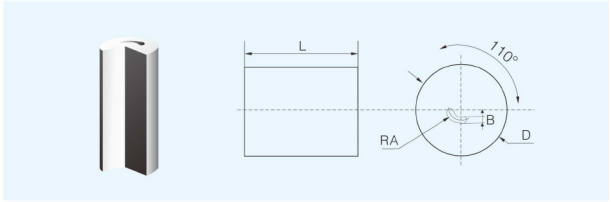
单位：mm

型号 Type	直径 D	直径公差 Tol. D	ϕB	公差 Tol. ϕB	ϕC	公差 Tol. ϕC	长度 L	长度公差 Tol. L
ϕ10.5*36S	10.5		1.9		2.3		36.0	
ϕ11.0*38S	11.0		2.0		2.4		38.0	
ϕ11.5*38S	11.5		2.0		2.4		38.0	
ϕ12.0*40S	12.0		2.2		2.5		40.0	
ϕ12.5*40S	12.5		2.2		2.5		40.0	
ϕ13.0*40S	13.0		2.4		2.7		40.0	
ϕ13.5*40S	13.5		2.4		2.7		40.0	
ϕ14.0*40S	14.0	+0.50 -0.10	2.5	±0.20	2.8	±0.20	40.0	+3.0 +0.0
ϕ14.5*40S	14.5		2.5		2.8		40.0	
ϕ15.0*42S	15.0		2.4		3.3		42.0	
ϕ15.5*42S	15.5		2.8		3.3		42.0	
ϕ16.0*45S	16.0		2.5		3.5		45.0	
ϕ16.5*45S	16.5		3.0		3.5		45.0	
ϕ17.0*45S	17.0		2.6		3.7		45.0	
ϕ17.5*45S	17.5		2.6		3.7		45.0	

单位：mm

型号 Type	直径 D	直径公差 Tol. D	ϕB	公差 Tol. ϕB	ϕC	公差 Tol. ϕC	长度 L	长度公差 Tol. L
ϕ18.0*51S	18.0		3.2		3.9		51.0	
ϕ19.0*51S	19.0		3.2		3.9		51.0	
ϕ20.0*55S	20.0		3.5		4.2		55.0	
ϕ21.0*55S	21.0		3.5		4.2		55.0	
ϕ22.0*58S	22.0		3.5		4.5		58.0	
ϕ23.0*58S	23.0		3.5		4.5		58.0	
ϕ24.0*58S	24.0		4.0		5.0		58.0	
ϕ25.0*61S	25.0		4.0		5.0		61.0	
ϕ26.0*61S	26.0		4.0		5.0		61.0	
ϕ27.0*61S	27.0		4.5		5.5		61.0	
ϕ28.0*63S	28.0		4.5		5.5	±0.35	63.0	
ϕ29.0*63S	29.0	+1.5 +0.5	4.5	±0.35	5.5		63.0	+3.0 +0.0
ϕ30.0*65S	30.0		5.0		6.0		65.0	
ϕ31.0*65S	31.0		5.0		6.0		65.0	
ϕ32.0*65S	32.0		5.0		6.0		65.0	
ϕ33.0*65S	33.0		5.0		6.0		65.0	
ϕ34.0*65S	34.0		5.5		6.5		65.0	
ϕ35.0*65S	35.0		5.5		6.5		65.0	
ϕ36.0*65S	36.0		6.0		7.0		65.0	
ϕ37.0*65S	37.0		6.0		7.0		65.0	
ϕ38.0*65S	38.0		6.0		7.0		65.0	
ϕ39.0*65S	39.0		6.5		7.5		65.0	
ϕ40.0*65S	40.0		6.5		7.5		65.0	

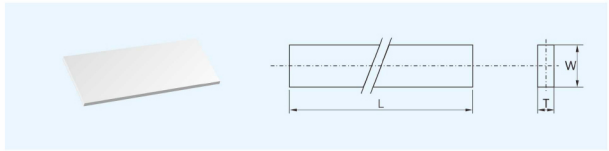
肾型孔枪钻刀头
Gun drill bits with kidney-shaped hole



单位：mm

型 号 Type	D +0.4 −0.1	RA ± 0.15	B ± 0.20	L +3.0 +0
ϕ4.5*32Y	4.5	1.1	0.7	32
ϕ5.5*32Y	5.5	1.3	0.8	
ϕ6.3*32Y	6.3	1.6	0.9	
ϕ6.9*32Y	6.9	1.7	1.2	
ϕ7.6*34Y	7.6	1.7	1.2	34
ϕ8.0*34Y	8.0	1.8	1.3	
ϕ8.6*36Y	8.6	1.9	1.3	36
ϕ9.0*36Y	9.0	2.0	1.4	
ϕ9.7*36Y	9.7	2.2	1.4	
ϕ10.5*36Y	10.5	3.2	2.4	

挤压板条产品
Cemented carbide bars

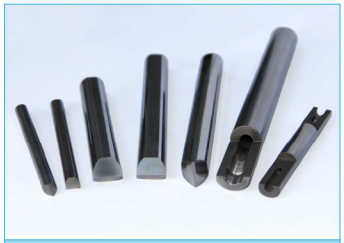


单位：mm

宽 度 W	厚 度 T	长 度 L
1.0	1.0~5.0	≤330
1.5	1.5~6.0	
2.0	2.0~25.0	
2.5		
3.0		
3.5		
4.0	4.0~30.0	
4.5		
5.0		
5.5		
6.0		
6.5	7.0~30.0	
7.0		
7.5		
8.0		
8.5		
9.0		
9.5		
10.0		
10.5		

宽 度 W	厚 度 T	长 度 L
11.0	7.0~30.0	≤330
11.5		
12.0		
12.5		
13.0		
13.5		
14.0		
14.5		
15.0		
15.5		
16.0		
16.5		
17.0		
17.5		
18.0		
18.5		
19.0		
19.5		
20.0		

» 非常规材料/形状产品
Special products



AS30定制棒材、管材——具有优越抗震吸震性能的刀具基体材料
AS30 custom-made rods – For making the solid cutting tool which has high shock resistance

特殊形状预成型坯料——根据客户需求按图生产
Special dimension blanks – as customer's requirements or drawings

» 附录
Appendix

» 硬质合金常用名词解释
Physical and mechanical properties of cemented carbide

☆密度
硬质合金的的密度(比重)是合金质量与其体积之比，采用阿基米德排水法进行测量（ISO3369）。
硬质合金的密度通常用于确定牌号的主要成分，对于WC-Co系列硬质合金而言，合金密度随着钴含量的增加而减少。

☆硬度
硬质合金的硬度是指合金抵抗金刚石压头压入表面的能力，主要采用洛氏硬度（HRA）或维氏硬度（HV）来表示（ISO3738或ISO3878）。
洛氏硬度（HRA）或维氏硬度（HV）测量的原理不同，两种硬度的转换需特别注意。

☆抗弯强度
硬质合金的抗弯强度是表征合金抵抗弯曲断裂的能力，即合金标准试样在规定跨距的中点加载负荷至断裂时单位面积上所承受的力的大小（ISO3327）。
硬质合金的的抗弯强度随试样的形状、表面状态及检测设备的不同，检测值会有很大变化。
硬质合金的抗弯强度只适合作为牌号选择的参考。

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

☆ Hardness
The hardness of material is defined as the ability of resistance to another harder material which penetrates it, Mainly determined based on the Rockwell hardness test (ISO.3738) or the Vickers hardness test (ISO.3878). As the principles of the Vickers and Rockwell tests are different, care must be taken when converting from one system to another.

☆ TRS
The Transverse Rupture Strength (TRS) is the ability of material to resist bending, tested according to the standard three points bending test (ISO.3327).

» 国际标准（ISO）硬质合金成分性能分类

ISO standard (classified by compositions)

ISO	美国工业分类号 Classification（USA）	WC	TiC	TaC(NbC)	Co	Ni	Mo	密度 Density (g /m³)	硬度 Hardness (HV)	抗弯强度 TRS (N/mm²)
P01	C8	—	80	—	—	10	10	5.8	1900	850
P01	C8	50	35	7	6	—	—	8.5	1900	1100
P05	C7	78	16	—	6	—	—	11.4	1820	1300
P10	C7	69	15	8	8	—	—	11.5	1740	1400
P15	C6	78	12	3	7	—	—	11.7	1660	1500
P20	C6	79	8	5	8	—	—	12.1	1580	1600
P25	C6	82	6	4	8	—	—	12.9	1530	1700
P30	C5	84	5	2	9	—	—	13.3	1490	1850
P40	C5	85	5	—	10	—	—	13.4	1420	1950
P50	—	78	3	3	16	—	—	13.1	1250	2300
M10	—	85	5	4	6	—	—	13.4	1590	1800
M20	—	82	5	5	8	—	—	13.3	1540	1900
M30	—	86	4	—	10	—	—	13.6	1440	2000
M40	—	84	4	2	10	—	—	14.0	1380	2100
K01	C4	97	—	—	3	—	—	15.2	1850	1450
K05	C4	95	—	1	4	—	—	15.0	1780	1550
K10	C3	92	—	2	6	—	—	14.9	1730	1700
K20	C2	94	—	—	6	—	—	14.8	1650	1950
K30	C1	91	—	—	9	—	—	14.4	1400	2250
K40	C1	89	—	—	11	—	—	14.1	1320	2500

» 国际标准（ISO）硬质合金的用途

ISO standards (classified by applications)

主要排屑类别 Sort of chips removal		使用类别 Application		性能提高方向 Performance advanced			
合金类别 Sort of alloy	被加工材料大类 Suitable for machining(general)	ISO应用分类号/No	被加工材料 Suitable for machining	合金性能 Alloy physical property		切削性能 Cutting performance	
P	长切屑的黑色金属 Black metal with long chips	P01	钢、钢铸件 steel and steel casting	↑ 耐磨性 Wear resistance ↑	↓ 韧性 Toughness ↓	↑ 切削速度 Cutting Speed ↑	进给量 Feed Rate ↓
		P10	钢、钢铸件 steel and steel casting				
		P20	钢、钢铸件、长切屑的可锻铸铁 steel, steel casting and malleable cast iron with long chips				
		P30	钢、钢铸件、长切屑的可锻铸铁 steel, steel casting and malleable cast iron with long chips				
		P40	钢、有砂夹杂和孔眼的钢铸铁 steel, steel casting iron with hole and grit.				
		P50	钢、有砂夹杂和孔眼的中或低抗拉强度的钢铸铁 steel, low or medium strength of extension steel casting iron with hole and grit.				
M	长或短切削的黑色金属；有色金属 Black metals with long and short chips, Nonferrous metals	M10	钢、钢铸件、锰钢、灰口铸铁、合金铸铁 steel, steel casting, manganese steel, grey cast iron and cast alloy iron	↑ 耐磨性 Wear resistance ↑	↓ 韧性 Toughness ↓	↑ 切削速度 Cutting Speed ↑	进给量 Feed Rate ↓
		M20	钢、钢铸件、奥氏体钢或锰钢、灰口铸铁 steel, steel casting, Austenite steel or manganese steel and grey cast iron				
		M30	钢、钢铸件、奥氏体钢、灰口铸铁、耐高温合金 steel, steel casting, Austenite steel, grey cast iron and high temperature resistance alloy				
		M40	高速切削软钢、低抗拉强度钢、有色金属和轻合金 free-cutting soft steel, low strength of extension steel, nonferrous metal and light alloy				
K	短切屑的黑色金属、有色金属、非金属材料 Black metal with short chips, nonferrous metal and non-metallic materials	K10	非常硬的灰口铸铁，冷硬铸铁、高硅铝合金、淬火钢、高耐磨塑料、硬纸板、陶瓷 grey cast iron with high hardness, chilled cast iron, high-silicon aluminum alloy, quenched steel, high wearproof plastic, hard paperboard and ceramic	↑ 耐磨性 Wear resistance ↑	↓ 韧性 Toughness ↓	↑ 切削速度 Cutting Speed ↑	进给量 Feed Rate ↓
		K20	布氏硬度220以上的灰口铸铁、有色金属、紫黄铜、铝 grey cast iron of Brinell hardness(BHN)>220, nonferrous metal, violet brass and aluminum				
		K30	低硬度的灰口铸铁、低抗拉强度钢、压缩木材 low Brinell hardness grey cast iron, low strength of extension steel and compressed wood				
		K40	软木或硬木、有色金属 soft and hard wood, nonferrous metal				