

# 硬质合金

CEMENTED CARBIDE  
FOR HIGH PRECISION STAMPING

# 精密冲压 模具材料



# 公司简介

## Company Profile

九江金鹭是厦门钨业核心企业之一，厦门钨业是在上交所上市的集团性股份公司，公司是国家级重点高新技术企业，是国家火炬计划钨材料产业基地，公司建立了国家级的企业技术中心和国家钨材料工程技术中心。

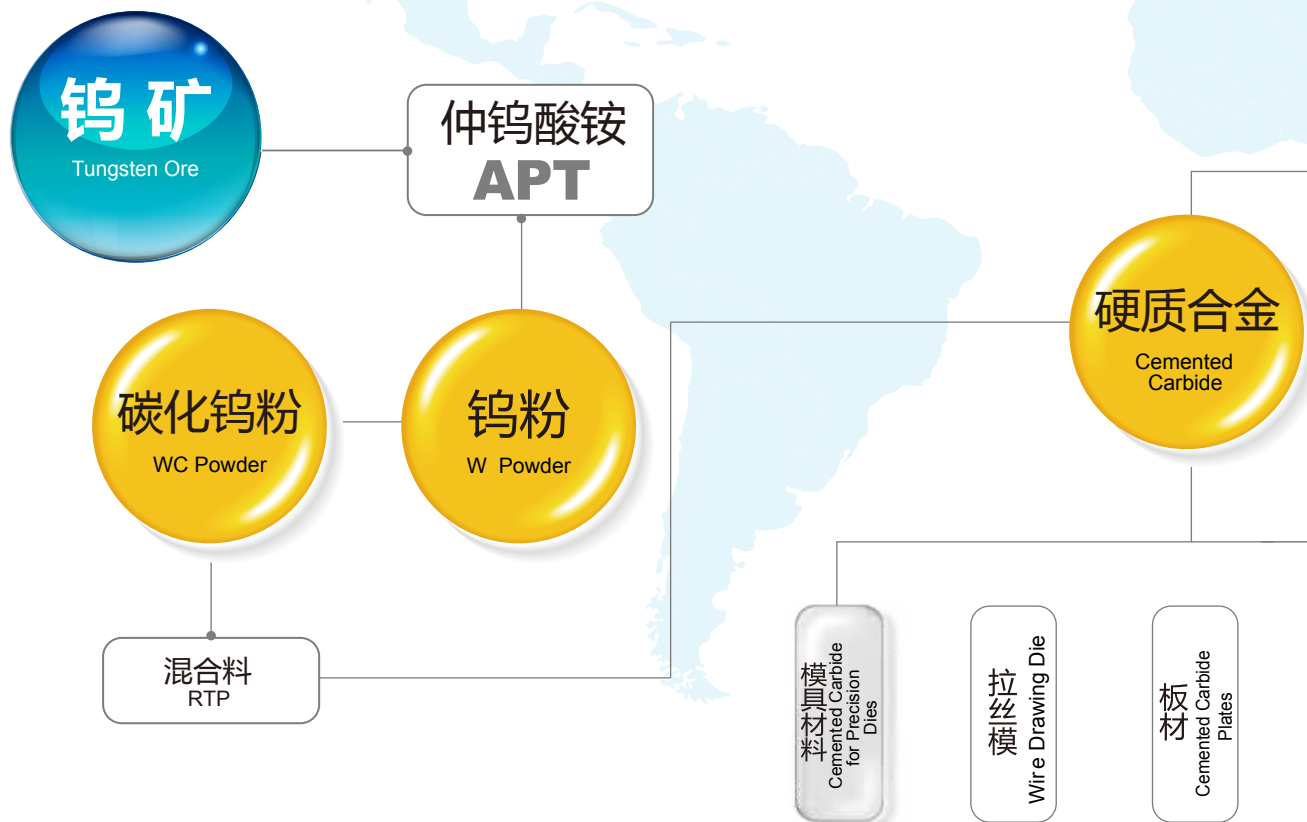
厦门钨业是中国重要的钨粉末和硬质合金出口商，硬质合金占全国出口量的1/3，产品质量达到国际先进水平。

九江金鹭硬质合金有限公司是由厦门钨业与五矿有色共同出资组建的，成立于2011年。公司拥有一支高素质的员工队伍，运用先进的管理理念，专注于开发和生产应用于工业、工程等领域的硬质合金耐磨零件，致力于为广大用户提供高效、耐用、稳定的产品，为客户创造更大的价值。

Jiujiang Golden Egret Hard Material Co., Ltd(GEHM) is one of the core enterprises of Xiamen Tungsten Co.,Ltd (XTC Group).XTC is a key national High-tech corporation, playing the role as the industrial base for China National Torch Program of Tungsten Material. It is one of the top 500 listed companies in China and the largest company with a complete tungsten industry chain in the world.XTC built National Enterprise Technology Center and National Tungsten Material Engineering & Technology Center.

XTC is a leading exporter for tungsten powder and cemented carbide products in China , occupying 1/3 of the cemented carbide exporting volumes in China, the quality of the products reaches the word advanced level.

Jiujiang Golden Egret Hard Material Co., Ltd (GEHM) was founded in 2011 as a joint venture by Xiamen Tungsten Co., Ltd(XTC) and China Minerals Non-ferrous Co., Ltd. With the creative staff and the advanced management concept, GEHM specializes in developing & producing the cemented carbide wear parts that apply to the fields of industry, engineering, construction, etc. dedicating itself to creating more values for the worldwide customers by providing efficient , durable and reliable products.



# 产业链

## Industrial Chain

厦门钨业具有从矿石开采到钨粉末、硬质合金制品及耐磨零件的完整钨产业链。

XTC has a complete tungsten industrial chain which is from tungsten ore to tungsten powder, tungsten carbide powder, cemented carbide and precision wear parts.



钨粉末工厂  
Tungsten Powder Plant



硬质合金工厂  
Cemented Carbide Plant



精密耐磨零件工厂  
Precision Wear Parts Plant



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## 精密冲压硬质合金材料

Carbide For Precision Stamping

九江金鹭作为一家全球硬质合金供应商，我们为客户提供高品质的精密冲压硬质合金材料。通过先进的材料科技和制造技术，我们为客户提供一系列的关于金属精密冲压的产品及服务。

As an international tungsten carbide products supplier, Jiujiang Golden Egret Hard Materials Co., Ltd keeps providing high precision stamping materials for various industries. With the foundation of advanced materials technologies and manufacturing technology, our products and services always meet and surpass the customers' demand.

### ○ 基于不同应用条件的合金材质选择

- GF系列——电机铁芯冲压材料
- GA系列——引线框架、电子连接件冲压材料

### ○ 200个标准尺寸规格以及按需求的定制规格

- 标准板材
- 标准圆环
- 定制预型规格

### ○ 提供专业的产品应用指导及制造工艺改善

- 更长的模具寿命
- 更好的产品稳定性
- 更高的生产效率

### ○ Carbide material solutions for different applications

- GF Series—Materials for Stamping Motor Core
- GA Series—Materials for Stamping Lead Frame And Electronic Connector

### ○ 200 standard specifications and other customized specifications

- Standard EDM Blocks
- Standard carbide rings
- Customized carbide preforms

### ○ Provide professional suggestion to products application and manufacturing process improvement

- Longer life
- Better stability
- Higher efficiency



## 牌号总览

Grade List

系列 Series	牌号 Grade	钴含量 Cobalt content Co%	密度 Density (g/cm <sup>3</sup> )	洛氏硬度 Hardness (HRA)	抗弯强度 TRS (MPa)	抗压强度 Compression Strength (MPa)	杨氏模量 Young's modulus (GPa)	晶粒度 Grain Size (μm)
GF 系列	<b>NEW</b> GF30P	12	14.15	90.2	3600	4900	580	1.0~2.0
	GF40H	12.5	14.20	89.5	3700	4700	570	1.0~2.0
	GF50H	14.0	14.00	88.5	3800	4600	550	1.5~3.0
	GF55HH	16.5	13.80	87.4	3500	4200	540	1.0~4.0
GA 系列	GA10H	6.0	14.85	90.5	3000	5200	620	0.5~5.0
	GA18	12.0	14.17	89.5	3600	5500	580	1.0~2.0
	GA20	13.5	14.05	90.0	3700	5300	560	0.5~1.5
GU 系列	GU20	10.3	14.40	91.5	3800	5600	600	0.8
	GU40	15.0	13.90	90.5	4000	5300	540	0.8
UF 系列	GU25UF	12.0	14.05	92.2	4400	6000	570	0.5

## 第四代硬质合金——抗腐蚀硬质合金

The 4th Generation Tungsten Carbide – Anticorrosive Carbide

九江金鹭继承了厦门钨业在模具材料方面的研究成果，为了解决硬质合金在电加工及磨削加工中的缺陷，九江金鹭研发了第四代抗腐蚀硬质合金，大幅度的提升了产品抗腐蚀性。当材料遭遇外界侵蚀时，合金自动激发抗腐蚀机制，在表面形成保护层，抵抗腐蚀，大大提高了模具的使用寿命。

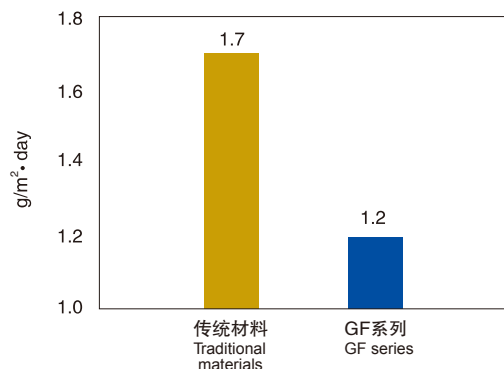
Based on the researching achievement of XTC, GEHM successfully developed the 4th generation carbide which has higher performance in resistance against corrosion. When facing erosion from outside, the carbide's anti-corrosion mechanism will start work, it creates a protective layer on the surface which extends the carbide's application life greatly.

### 抗腐蚀实验

Corrosion Resistance Test

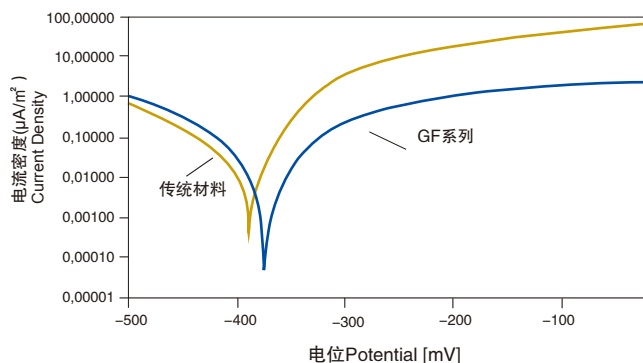
#### 失重法腐蚀试验结果 ( 10% HCl )

Result of corrosion resistance test in 10% HCl solution



#### 电化学腐蚀实验

Result of electrochemical corrosion test



两者腐蚀结果表明，第四代合金抗腐蚀能力有明显的提高。在粘结剂钴被分解前，抗腐蚀材质会自我持续产生保护层，从而使腐蚀速率大大降低。

The two test results show that the 4th generation carbide has much higher anti-corrosion ability. Before the binder cobalt was broken down, the anti-corrosion element is creating protective layer consistently, thus the corrosion rate is decreased obviously.

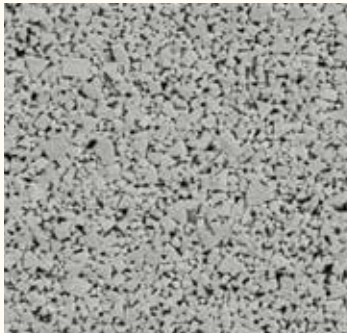
## GF系列-电机铁芯冲压材料

GF Series — Materials for Stamping Motor Core

GF系列是为了具有重载冲击条件下冲压模所研究设计的，与传统材料相比GF系列配以中钴、混晶配方，有着优越的冲击韧性、抗震性和抗腐蚀性，有效改善加工过程材质表面耐腐蚀问题及减少裂纹的产生。

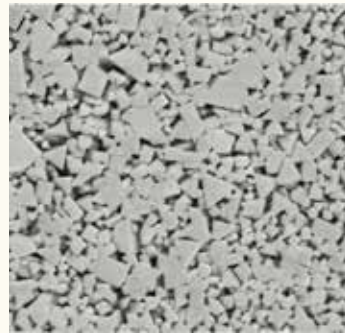
Designed for stamping molds under heavy-duty, GF series are featured in medium cobalt content and mixed tungsten carbide powder grain sizes which make them gain much better anti-impaction ability, higher anti-shock resistance and corrosion resistance. This reduces corrosion and fraction on the surface of finished carbide products.

### GF30P NEW



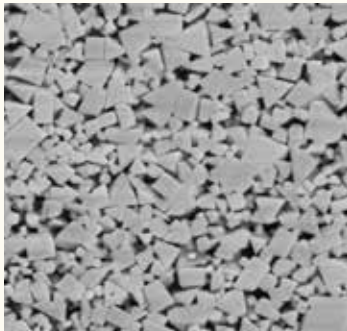
有良好的耐磨性同时兼有较高的韧性，适用于微型马达和伺服电机硬度较高的硅钢片 ( $\leq 0.35\text{mm}$ ) 冲压制作。  
Has high hardness and fine toughness, suitable for stamping of silicon steel sheet ( $\leq 0.35\text{mm}$ ) with high hardness of micro motor and servo motor.

### GF40H



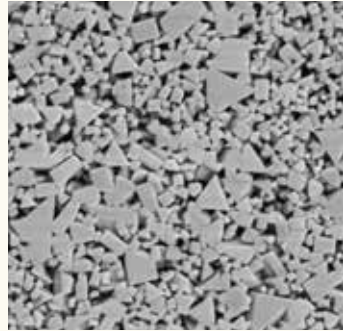
硬度高，耐磨性和韧性方面都表现优越。主要用于传统Y系列电机铁芯制作。  
Has high abrasive resistance and toughness as well as high hardness. It's mainly used to producing conventional y series iron core of motor rotor.

### GF50H



有着良好的韧性，抗震性能好。可用于结构复杂的无刷电机、伺服电机铁芯的制造。  
With good toughness and anti-shock resistance is suitable for producing complex iron core of brushless motor rotor and sevor motor rotor. Mini-size iron core of motor rotor.

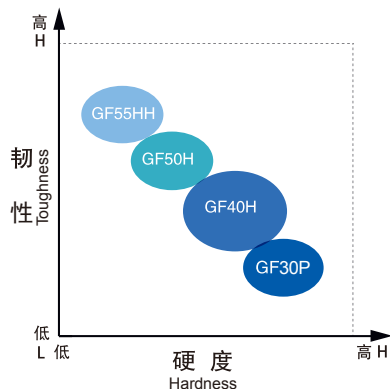
### GF55HH



具有极好的抗震性，能应对厚度较大的材料冲压及低速模具冲压。  
Has excellent anti-shock resistance which can make it suitable for stamping very thick mold at low speed.

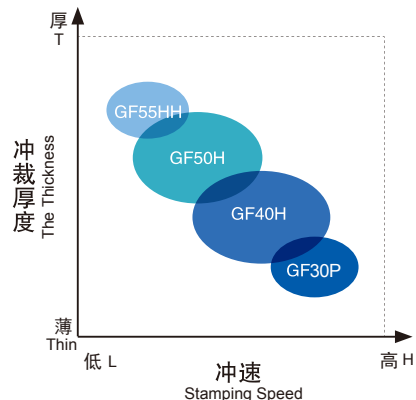
GF系列牌号关系图

Comparison of GF series Grades



GF系列牌号适用范围

Application of GF series Grades





## GA系列-引线框架、电子连接件冲压材料

GA Series—Materials For Stamping Lead Frame And Electronic Connector

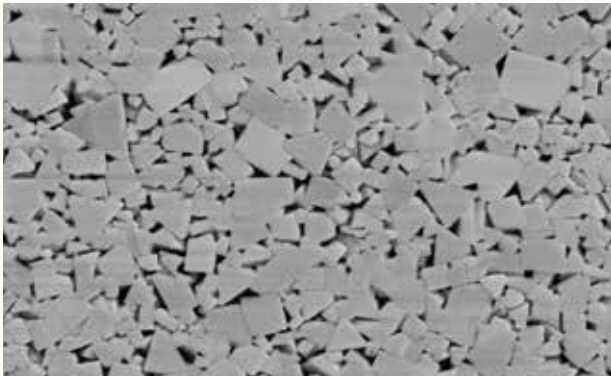
针对SPCC、铁带、铍铜带、304不锈钢等电子零件的高速冲压制造，提供优质方案。在引线框架、接插件及连接器行业备受好评，并获得PG零件加工一致推荐。

GA series provides the best solution for high speed stamping SPCC, steel belt, beryllium copper belt and 304 stainless electronic components, etc. This series is widely recommended by PG components manufacturing field because of its high reputation in lead frame and connector industry.

### GA10H

降低了合金与加工材料的亲和性，改善了粘模的问题。适合纯铁、纯铜、SPCC等软质金属的高速冲压。

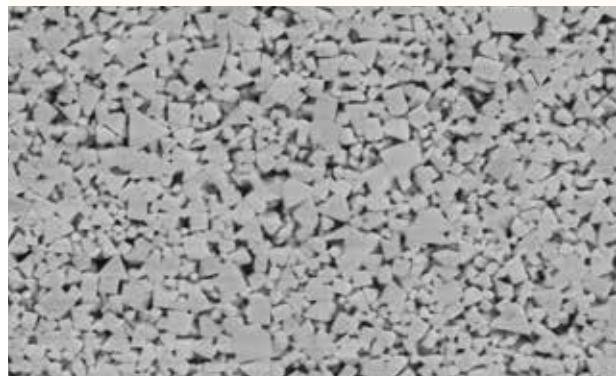
Increases the incompatibility between the carbide mold and the materials, which prevent the material to retain on the mold. This grade is suitable for stamping soft materials like pure steel, pure copper and spcc at high speed.



### GA20

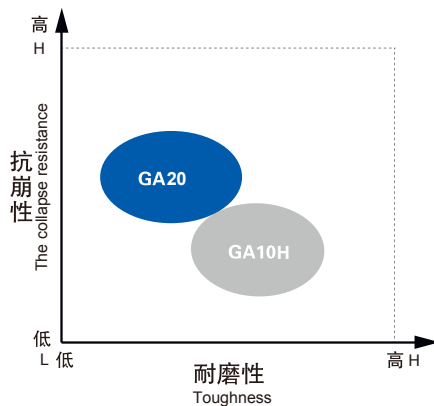
通用性强，韧性极好，适合不锈钢薄片、铜片等材质的高速冲压。

Has good universal performance and toughness, is used to stamping thin stainless steel plate and copper plate.



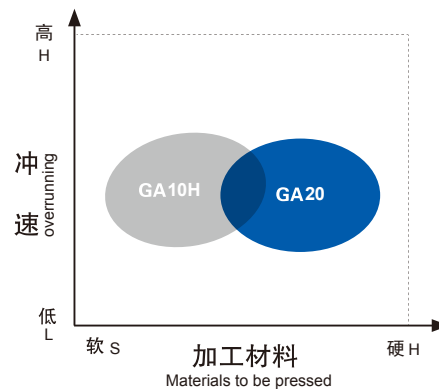
GA系列牌号关系图

Comparison of GA series Grades



GA系列牌号适用范围

Application of GA series Grades

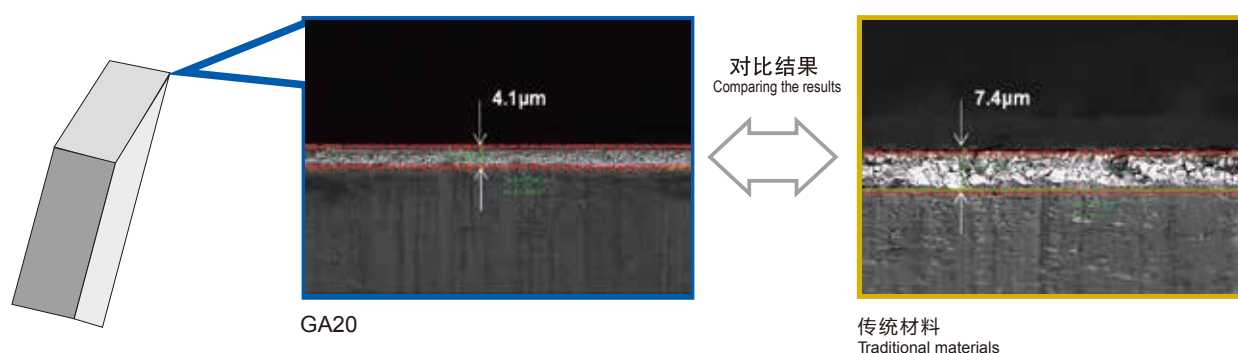


## 耐崩刃实验

### Tipping Resistance Test

试验证明采用细晶粒牌号GA20与传统材料对比，可以将刃尖厚度缩小46%，刃口锋利性大幅提高。GA20产品利用强化技术，对WC粒度分布进行特殊控制，相比传统材料，即可维持硬度，又能保证韧性，在耐腐蚀性和抗崩性能方面有所提高。

The tests proves that comparing with conventional grades, the GA20 with fine grain size WC can make the knife-edge 46% thinner which make the knife blade much sharper and keener. Strengthening the cobalt phrase in GA20 to spread the WC grain specially, this technology make the carbide contains good hardness and toughness. More than that, the carbide will have stronger corrosion resistance and tipping resistance.

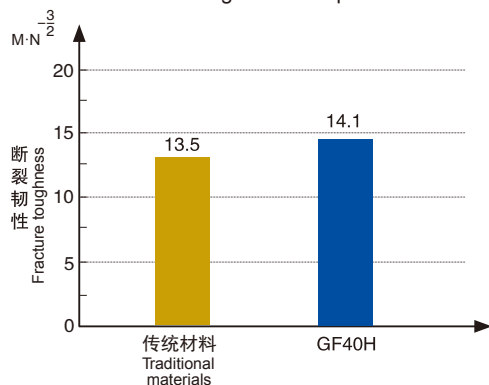


## 韧性、耐磨性对比

### Properties Test

#### 断裂韧性对比结果

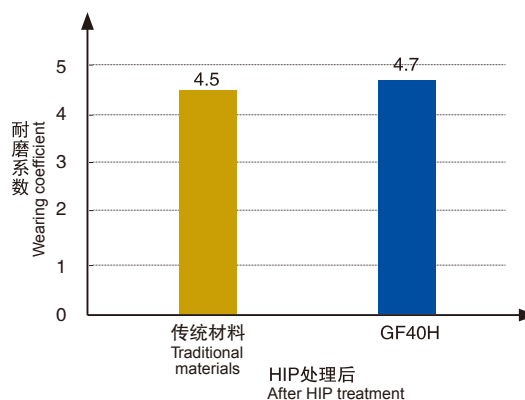
Fracture toughness comparison



与传统材料相比，GF系列的韧性明显提高  
Comparing with the conventional carbide, the 4th generation carbide GF series has much higher toughness

#### 耐磨系数对比结果

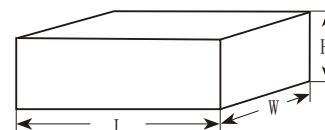
Wearing coefficient comparison



与传统材料相比，GF系列的耐磨性有一定提高  
Comparing with the conventional carbide, the 4th generation carbide GF series has better abrasive resistance

# GF系列规格表

GF Series EDM Blocks



规格 Type	尺寸Dimensions(mm) 公差Tol.(mm)			牌号 Grade		
	长度L (+0.6~+2)	宽度W (+0.6~+2)	高度H (+0.2~+0.4)	GF30P	GF40H	GF50H
MF10506	105	105	6	O	O	O
MF10507	105	105	7	O	O	O
MF10508	105	105	8	O	O	O
MF10509	105	105	9	O	O	O
MF10510	105	105	10	O	△	O
MF10515	105	105	15	O	O	O
MF10516	105	105	16	O	O	O
MF10517	105	105	17	O	O	O
MF10518	105	105	18	O	O	O
MF10519	105	105	19	O	O	O
MF10520	105	105	20	O	O	O
MF10521	105	105	21	O	O	O
MF10522	105	105	22	O	O	O
MF10523	105	105	23	O	O	O
MF10524	105	105	24	O	O	O
MF10525	105	105	25	O	O	O
MF10527	105	105	27	O	O	O
MF10528	105	105	28	O	O	O
MF10529	105	105	29	O	O	O
MF10530	105	105	30	O	O	O
MF10535	105	105	35	O	O	O
MF10540	105	105	40	O	O	O
MF10545	105	105	45	O	O	O
MF10550	105	105	50	O	O	O
MF10555	105	105	55	O	O	O
MF10560	105	105	60	O	O	O
MF10565	105	105	65	O	O	O
MF10570	105	105	70	O	O	O

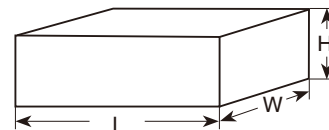
规格 Type	尺寸Dimensions(mm) 公差Tol.(mm)			牌号 Grade		
	长度L (0 ~ +5)	宽度W (0 ~ +5)	高度H (+0.5~+0.6)	GF30P	GF40H	GF50H
MF16520	165	165	20	O	O	O
MF16521	165	165	21	O	O	O
MF16522	165	165	22	O	O	O
MF16523	165	165	23	O	O	O
MF16524	165	165	24	O	O	O
MF16525	165	165	25	O	O	O
MF16527	165	165	27	O	O	O
MF16528	165	165	28	O	O	O
MF16529	165	165	29	O	O	O
MF16530	165	165	30	O	O	O
MF16535	165	165	35	O	O	O
MF16540	165	165	40	O	O	O
MF16545	165	165	45	O	O	O
MF16550	165	165	50	O	△	O
MF16555	165	165	55	O	△	△
MF16560	165	165	60	O	△	△
MF16565	165	165	65	O	O	△
MF16570	165	165	70	O	O	O

供货态 Product status
上下平磨，HIP及去应力处理 Top and bottom ground, stress released, HIP treated
库存量可能因出货情况而产生不足， 订购前请先咨询 Inventory quantity may not be sufficient due to shipment, please consult before ordering.

( △ : 常备库存; O: 可制作 )  
( △ : Inventory; O: Available )

## GF系列规格表

GF Series EDM Blocks



规格 Type	尺寸Dimensions(mm) 公差Tol.(mm)			牌号 Grade		
	长度L (0~+5)	宽度W (0~+5)	高度H (+0.5~+0.6)	GF30P	GF40H	GF50H
MF205150	205	205	15	O	O	O
MF205160	205	205	16	O	O	O
MF205170	205	205	17	O	O	O
MF205180	205	205	18	O	O	O
MF205190	205	205	19	O	O	O
MF205200	205	205	20	O	O	O
MF205210	205	205	21	O	O	O
MF205220	205	205	22	O	O	O
MF205230	205	205	23	O	O	
MF205240	205	205	24	O	O	O
MF205250	205	205	25	O		O
MF205270	205	205	27	O	O	O
MF205280	205	205	28	O	O	O
MF205290	205	205	29	O	O	O
MF205300	205	205	30	O	O	O
MF205350	205	205	35	O	O	O

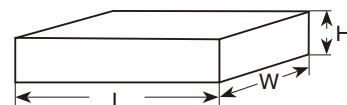
规格 Type	尺寸Dimensions(mm) 公差Tol.(mm)			牌号 Grade		
	长度L (0~+7)	宽度W (0~+7)	高度H (+0.5~+0.6)	GF30P	GF40H	GF50H
MF255150	255	255	15	O	O	O
MF255160	255	255	16	O	O	O
MF255170	255	255	17	O	O	O
MF255180	255	255	18	O	O	O
MF255190	255	255	19	O	O	O
MF255200	255	255	20	O		△
MF255210	255	255	21	O	O	O
MF255220	255	255	22	O	O	O
MF255230	255	255	23	O	O	
MF255240	255	255	24	O	O	O
MF255250	255	255	25	O		
MF255270	255	255	27	O	O	O
MF255280	255	255	28	O	O	O
MF255290	255	255	29	O	O	O
MF255300	255	255	30	O	O	O
MF255350	255	255	35	O	O	O

( △ : 常备库存; O : 可制作 )  
( △ : Inventory; O : Available )

供货态 Product status
上下平磨, HIP及去应力处理 Top and bottom ground, stress released, HIP treated
库存量可能因出货情况而产生不足, 订购前请先咨询 Inventory quantity may not be sufficient due to shipment, please consult before ordering.

# GA系列规格表

GA Series EDM Blocks



规格 Type	尺寸Dimensions(mm) 公差Tol.(mm)			牌号 Grade	
	长度L (+0.6~+2)	宽度W (+0.6~+2)	高度H (+0.2~+0.4)	GA10H	GA20
MA125015	125	112.5	1.5	△	△
MA125020	125	112.5	2.0	△	△
MA125025	125	112.5	2.5	△	△
MA125030	125	112.5	3.0	△	△
MA125035	125	112.5	3.5	△	△
MA125040	125	112.5	4.0	△	△
MA125045	125	112.5	4.5	△	△
MA125050	125	112.5	5.0	△	△
MA125055	125	112.5	5.5	△	△
MA125060	125	112.5	6.0	△	△
MA125065	125	112.5	6.5	△	△
MA125070	125	112.5	7.0	△	△
MA125075	125	112.5	7.5	△	△
MA125080	125	112.5	8.0	△	△
MA125085	125	112.5	8.5	△	△
MA125090	125	112.5	9.0	△	△
MA125095	125	112.5	9.5	△	△
MA125100	125	112.5	10.0	△	△
MA125105	125	112.5	10.5	△	△
MA110110	110	110	11.0	△	△
MA110115	110	110	11.5	△	△
MA110120	110	110	12.0	△	△
MA110125	110	110	12.5	△	△
MA110130	110	110	13.0	△	△
MA110135	110	110	13.5	△	△
MA110140	110	110	14.0	△	△
MA110145	110	110	14.5	△	△
MA110150	110	110	15.0	△	△

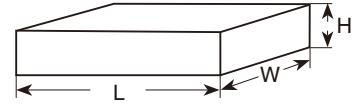
规格 Type	尺寸Dimensions(mm) 公差Tol.(mm)			牌号 Grade	
	长度L (+0.6~+2)	宽度W (+0.6~+2)	高度H (+0.2~+0.4)	GA10H	GA20
MA110155	110	110	15.5	O	△
MA110160	110	110	16	O	△
MA110165	110	110	16.5	O	△
MA110170	110	110	17	O	△
MA110175	110	110	17.5	O	△
MA110180	110	110	18	O	△
MA110190	110	110	19	O	△
MA105195	105	105	19.5	O	△
MA105205	105	105	20.5	O	△
MA105215	105	105	21.5	O	△
MA105225	105	105	22.5	O	△
MA105235	105	105	23.5	O	△
MA105245	105	105	24.5	O	△
MA105255	105	105	25.5	O	△
MA105265	105	105	26.5	O	△
MA105305	105	105	30.5	O	△
MA105325	105	105	32.5	O	△
MA105355	105	105	35.5	O	△
MA105405	105	105	40.5	O	△
MA105455	105	105	45.5	O	△
MA105505	105	105	50.5	O	△
MA105555	105	105	55.5	O	△
MA105605	105	105	60.5	O	△
MA105655	105	105	65.5	O	△
MA105705	105	105	70.5	O	△
MA105755	105	105	75.5	O	△
MA105805	105	105	80.5	O	△

( △ : 常备库存; O : 可制作 )  
( △ : Inventory; O : Available )

供货态 Product status	库存量可能因出货情况而产生不足, 订购前请先询问
上下平磨, HIP及去应力处理 Top and bottom ground, stress released, HIP treated	Inventory quantity may not be sufficient due to shipment, please consult before ordering.

# GA系列规格表

GA Series EDM Blocks



规格 Type	尺寸Dimensions(mm) 公差Tol.(mm)			牌号 Grade	
	长度L (0~+5)	宽度W (0~+5)	高度H (+0.5~+0.6)	GA10H	GA20
MA150060	150	150	6.0	O	O
MA150065	150	150	6.5	O	O
MA150070	150	150	7.0	O	O
MA150075	150	150	7.5	O	O
MA150080	150	150	8.0	O	O
MA150085	150	150	8.5	O	O
MA150090	150	150	9.0	O	△
MA150095	150	150	9.5	O	O
MA150100	150	150	10.0	O	O
MA150105	150	150	10.5	O	O
MA150110	150	150	11.0	O	O
MA150115	150	150	11.5	O	O
MA150120	150	150	12.0	O	O
MA150125	150	150	12.5	O	O
MA150130	150	150	13.0	O	O
MA150135	150	150	13.5	O	O
MA150140	150	150	14.0	O	O
MA150145	150	150	14.5	O	O
MA150150	150	150	15.0	O	O
MA150160	150	150	16	O	O
MA150180	150	150	18	O	O
MA150200	150	150	20	O	O
MA150220	150	150	22	O	O
MA150240	150	150	24	O	O
MA150260	150	150	26	O	O
MA150280	150	150	28	O	O
MA150300	150	150	30	O	O
MA150320	150	150	32	O	O

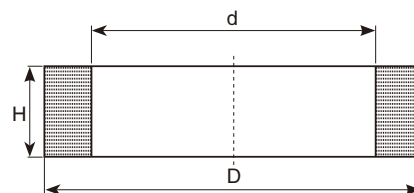
(△: 常备库存; O: 可制作)  
(△: Inventory; O: Available)

规格 Type	尺寸Dimensions(mm) 公差Tol.(mm)			牌号 Grade	
	长度L (0~+5)	宽度W (0~+5)	高度H (+0.5~+0.6)	GA10H	GA20
MA150340	150	150	34	O	O
MA150360	150	150	36	O	O
MA150380	150	150	38	O	O
MA150400	150	150	40	O	O
MA150420	150	150	42	O	O
MA150440	150	150	44	O	O
MA150460	150	150	46	O	O
MA150480	150	150	48	O	O
MA150500	150	150	50	O	O
MA150520	150	150	52	O	O
MA150540	150	150	54	O	O
MA150560	150	150	56	O	O

供货态 Product status
上下平磨, HIP及去应力处理 Top and bottom ground, stress released, HIP treated
库存量可能因出货情况而产生不足, 订购前请先询问 Inventory quantity may not be sufficient due to shipment, please consult before ordering.

# 合金圆环规格表

Carbide Ring Series



规格 Type	尺寸Dimensions(mm) (毛坯公差: mm) (Blank tolerance: mm) (半精公差: mm) (Semi-finished tolerance: mm)			牌号 Grade		
	外径D (+0.6~+3.0) (+0.4~+0.6)	内径d (-3.0~-0.6) (-0.5~-0.3)	高度H (+0.3~+0.6) (+0.3~+0.6)	GF30P	GF40H	GF50H
MH05010	50	10	50	○	○	○
MH05020	50	20	50	○	○	○
MH14010	140	10	20	○	○	○
MH14020	140	20	20	○	○	○
MH14030	140	30	20	○	○	○
MH14040	140	40	20	○	○	○
MH14050	140	50	20	○	○	○
MH16025	160	110	25	○	○	○
MH16030	160	110	30	○	○	○
MH16060	160	110	60	○	○	○
MH18040	180	130	40	○	○	○
MH18050	180	130	50	○	○	○
MH18060	180	130	60	○	○	○
MH200110	200	110	25	○	○	○
MH200120	200	120	25	○	○	○
MH200130	200	130	25	○	○	○
MH22040	220	110	40	○	○	○
MH22050	220	110	50	○	○	○

(△: 常备库存; ○: 可制作)  
(△: Inventory; ○: Available)

供货态 Product status
毛坯圆环—端面平磨 Blank rings-top and bottom ground
半精圆环—端面平磨、内外圆磨削 Semi-finished rings-Top and bottom flat ground, OD&ID ground
精品圆环—根据客户需求定制 Finished rings-Produced based on customer's requirement
备注: 圆环定制最大外直径为400mm Note: Max. OD of Ring is 400mm

## 预型件

Preform

可为客户提供冲压模具配套的异形预成型件，减少加工量及加工难度，为用户降低加工成本。

可提供通孔、盲孔、台阶孔、螺纹孔及各类台阶和槽型。

We can manufacture customized preforms of stamping mold and die. It can reduce grinding tolerance and processing difficulty. It will cost save for user.

We have ability to manufacture through hole, blind hole, step hole, threaded hole, various steps and groove types.





## 硬度换算表

Hardness Conversion

布氏硬度10mm球 荷重3000kg			洛氏硬度				维氏硬度 HV 荷重 30kg
标准球	Hult Green 球	碳化钨球	HRA 荷重60kg 金刚石	HRB 荷重100kg 1/6"球	HRC 荷重150kg 金刚石	HRD 荷重100kg 金刚石	
-	-	-	92.5	-	80.5	-	1700
-	-	-	92.0	-	80.0	-	1600
-	-	-	91.5	-	79.0	-	1550
-	-	-	91.0	-	78.0	-	1500
-	-	-	90.5	-	77.0	-	1450
-	-	-	90.0	-	76.0	-	1400
-	-	-	89.5	-	75.0	-	1350
-	-	-	89.0	-	74.0	-	1300
-	-	-	88.5	-	73.0	-	1250
-	-	-	88.0	-	72.0	-	1200
-	-	-	87.5	-	71.5	-	1150
-	-	-	87.0	-	71.0	-	1140
-	-	-	86.5	-	70.0	-	1076
-	-	-	86.0	-	69.0	-	1004
-	-	-	85.6	-	68.0	76.9	940
-	-	-	85.3	-	67.5	76.5	920
-	-	-	85.0	-	67.0	76.1	900
-	-	767	84.7	-	66.4	75.7	880
-	-	757	84.4	-	65.9	75.3	860
-	-	745	84.1	-	65.3	74.8	840
-	-	733	83.8	-	64.7	74.3	820
-	-	722	83.4	-	64.0	73.8	800
-	-	710	83.0	-	63.3	73.3	780
-	-	698	82.6	-	62.5	72.6	760
-	-	684	82.2	-	61.8	72.1	740
-	-	670	81.8	-	61.0	71.5	720
-	615	656	81.3	-	60.1	70.8	700
-	610	647	81.1	-	59.7	70.5	690
-	603	638	80.8	-	59.2	70.1	680
-	597	630	80.6	-	58.8	69.8	670
-	590	620	80.3	-	58.3	69.4	660
-	585	611	80.0	-	57.8	69.0	650
-	578	601	79.8	-	57.3	68.7	640
-	571	591	79.5	-	56.8	68.3	630

## 注意事项

Attention

### 作业常识 Common Sense

1. 因硬质合金的硬度极高且具有脆性，受外力冲击容易断裂，在安装使用各种硬质合金材料时禁止敲打、抛掷硬质合金材料；操作时请充分注意安全，以免砸伤手脚。

Because of the high hardness and brittleness, the tungsten carbide is easily broken by the external force. Please do not beat or throw the tungsten carbide products while using and please pay full attention to avoid injuring by falling carbides.

2. 硬质合金在加工中可能会发生破损，因此，请务必在使用机械设备上加装安全装置及安全防护罩，操作人员务必戴好防护眼镜及安全靴。

The carbide might be broken during your procession, therefore please do add protection device and security equipment to your machines when working. And please do wear protective glasses and boots.

3. 作业时请戴手套操作，以防有与硬质合金接触后而引起过敏的人；粉尘也会对人体造成影响，请戴用防尘口罩。

Please wear gloves to avoid allergy caused by touching tungsten carbide during your work; please wear anti-dust mask because the dust caused during your operation might be harmful to human body.

4. 硬质合金中包含铁系的金属(钴和镍)，在酸性环境中会发生腐蚀(生锈)，因此，在辅助加工液的使用上请选择弱碱性。

Please choose alkaline lubricating liquid for your processing because the carbides which contain cobalt and nickel are easily to be corroded.

### 放电加工 Electrical discharge machining

1. 硬质合金在线切割放电加工时可能产生开裂，因此，请在线切割加工后确认有无裂纹，再进行后续加工。

The carbide might be broken down during the electrical discharge machining. Before you go on the next processing step, please make sure there is no crack on the carbide.

2. 硬质合金的强度在放电加工后会降低，容易产生开裂等的破损，请根据具体用途设定加工条件和加工方法。

The carbides' hardness going down after EDM, please choose reasonable processing methods based on your application to avoid cracks.

### 焊接加工 The welding processing

1. 硬质合金在焊接加工时，可能会发生开裂，请在焊接加工后确认有无开裂情况，并对产品进行保温处理。

The carbide might be broken down during the welding processing. Please carefully check out whether there are cracks on the carbide and do heat preservation for the products.

2. 在大气中加热后，硬质合金表面会发生氧化，请在焊接加工后去除氧化部分。

Heating in the air, the surface of the carbide will be oxidized. Please remove the oxidized part of the products after the welding process.

## ● 废弃处理时的注意事项

### Attentions to disposing carbide waste

1. 虽不含有Rosh对应物质等的有害物，但废弃的硬质合金会对自然界造成影响，因此，请与专业处理部门协商处理。

Though our carbide products are free of harmful substances listed in ROSH standards, but the waste carbide will affect the environment, too. If you need dispose carbide waste, please contact the professional persons.



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