



READY TO PRESS POWDER



RTP

混合料

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2016 VERSION



厦门金鹭特种合金有限公司
Xiamen Golden Egret Special Alloy Co., Ltd.

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公司简介 ABOUT GESAC

厦门金鹭特种合金有限公司，成立于1989年，是一家中外合资的高新技术企业，是厦门钨业股份有限公司的骨干成员。公司主要从事钨粉、碳化钨粉、硬质合金、切削工具等钨系列产品的生产和销售；是世界知名的钨粉、碳化钨粉供应商和出口商；是高品质硬质合金及精密切削工具的制造商。

公司拥有一支自强不息、高素质的员工团队，拥有国际一流的工艺技术、生产设备和检测仪器。公司所生产的“金鹭”牌系列产品，以优良的品质和完善的服务，享誉国内外，客户遍布全球四十多个工业发达国家和地区。

公司建立了研发技术中心，独立承担并完成了多项“国家科技支撑计划”项目、“国家科技重大专项”项目、“国家科技公关计划”项目、“国家火炬计划”项目、“国家重点新产品”开发项目及省市重点研究课题，被评为“国家重点高新技术企业”、“先进技术企业”、“出口型企业”。

公司秉承诚信为本的运营理念，坚持不断创新，致力于发展成为“设备一流”、“技术一流”、“管理一流”、“质量一流”、“服务一流”的现代化企业。

Xiamen Golden Egret Special Alloy Co., Ltd. (GESAC) is a Sino-foreign joint venture company established in 1989. It is designated by the State as a high-tech enterprise. GESAC is the largest subsidiary of the Shanghai Stock Exchange listed company: Xiamen Tunsten Co., LTD. It's main products are tungsten metal powder, tungsten carbide powder, cemented carbide, cutting tools and other tungsten related products. GESAC is the largest producer and exporter of tungsten metal powder and tungsten carbide powder in China and also enjoys good reputation in manufacturing high quality cemented carbide and precision cutting tools.

GESAC has a team of talented staff constantly striving to be stronger. GESAC is equipped with the world's most advanced technologies, manufacturing equipment and testing facilities. The "Golden Egret" brand products are renowned for high quality and excellent service. Our clients are spread across more than forty developed countries and regions all over the world.

GESAC owns a national level R&D center, and has undertaken and finished many national and provincial research projects independently, such as National Science and Technology Support Plan project, National major special science and technology project, National Key Technologies R&D Program, National Torch Program, National Important New Products project etc. GESAC has received numerous awards such as "National Standard High-tech Enterprise", "Enterprise with Advanced Technology" and "Export-oriented Enterprise" from the state government.

GESAC adheres to the philosophy of "sincerity and dependability are our essence" and strives to develop into a modern enterprise with "first class equipment, first class technology, first class management, first class quality and first class service".



产品介绍

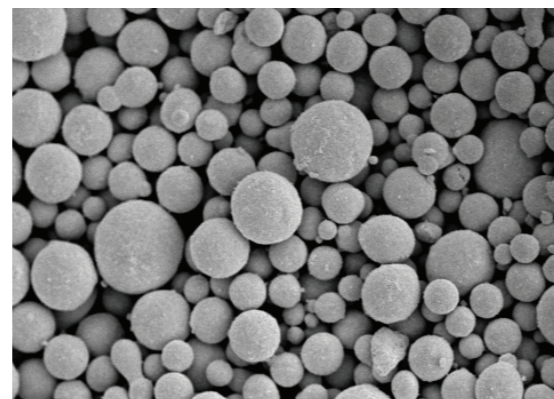
WHAT'S RTP

混合料是生产硬质合金压坯的原料，是将碳化物（WC）和粘结金属（Co/Ni）等粉末按照一定配比，通过球磨、干燥等工序，制备出成分准确、组分均匀的混合物。

可提供多种牌号的混合料，产品广泛应用于切削工具、矿用工具、耐磨零件等硬质合金行业及高比重合金制造领域。

RTP (Ready to Press Powder) is a raw material of cemented carbide, which made from WC and Co/Ni through ball-milling, drying process, to get mixture which has accurate components and uniform distribution.

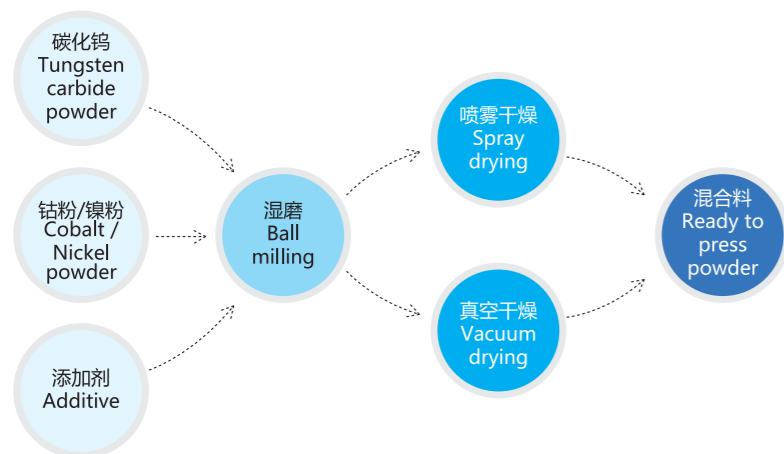
GESAC can provide a variety of grades, which are used in cemented carbide including cutting tools, mining tips, wear parts and tungsten heavy alloys, etc.



- 具有纯度高、杂质含量少，成分控制精确；
- High purity and accurate control of components
- 粒度分布均匀、具有良好的压制成型性；
- Particles with uniform distribution and excellent capabilities in pressing
- 松装密度稳定，单重稳定性好；
- Stable apparent density and unit weight
- 流动性能好，易精确控制合金尺寸
- Good flow ability and easy for precisely size control
- 多种成型剂可供选择
- Various lubricants for choice.
- 烧结性能优越，硬质合金产品具备优异的物理机械性能。
- Excellent sintering properties of powder, excellent physical and mechanical properties of cemented carbides

生产工艺流程

Production Process



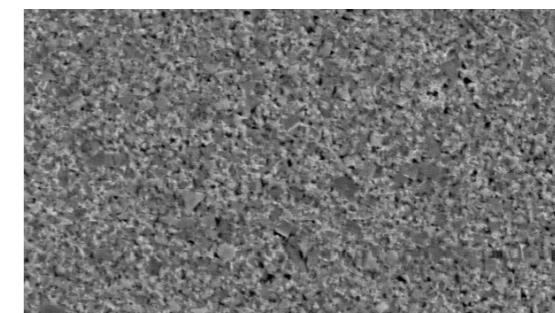
产品系列

PRODUCT SERIES

棒材用混合料
RTP for Carbide Rods

用于生产硬质合金棒材，具有高硬度、高耐磨性及高强度、高韧性的特点，广泛应用于立铣刀、钻头、铰刀等整体合金刀具及PCB工具。

For manufacturing carbide rods with high hardness, high wear-resistance, high strength and high toughness. It is widely used for manufacturing end mills, drills, reamers and PCB tools.



GU15UF

主要性能指标

Main Properties

| 牌号 Grade | ISO Grade | 成分 Composition (% in weight) | | | 烧结后的物理性能 Sintered properties | | | | 推荐用途 Applications |
|-------------|-----------|------------------------------------|------|-------------|----------------------------------|----------------------------------|-------------------------|-----------------------------|---|
| | | WC | Co | 其他 Other | 硬度 Hardness HRA (±0.50) | 密度 Density g/cm3 (±0.1) | 抗弯强度 TRS Mpa(min) | 合金晶粒度 Grain size (μm) | |
| GU10UF | K05-K10 | 93.0 | 6.2 | 0.8 | 94.0 | 14.80 | 3400.0 | 0.4 | PCB微钻 PCB drill |
| GU15UF | K10-K20 | 90.6 | 8.5 | 0.9 | 93.5 | 14.52 | 3800.0 | 0.4 | |
| GU25UF | K20-K40 | 86.7 | 12.0 | 1.3 | 92.6 | 14.10 | 4200.0 | 0.4 | 铣刀、钻头、铰刀等整体刀具 Solid carbide tool such as end mill, drill and reamer etc. |
| GU20F | - | 89.0 | 10.3 | 0.7 | 92.3 | 14.37 | 3800.0 | 0.6 | |
| GU10 | K10-K30 | 93.25 | 6.1 | 0.65 | 93.0 | 14.90 | 2700.0 | 0.8 | |
| GU15 | - | 91.82 | 8.0 | 0.18 | 92.5 | 14.75 | 2720.0 | 0.8 | |
| GU20 | K20-K40 | 89.1 | 10.3 | 0.6 | 91.7 | 14.40 | 3500.0 | 0.8 | |

注：除以上产品外，还能根据客户的不同要求生产各种规格的RTP产品
Remarks: Other Specifications can be defined according to customer's requirements.

耐磨零件用混合料

RTP for Wear Parts

用于耐磨零件的生产，其产品具有高耐磨性、高韧性及高耐腐蚀性的特点，广泛应用于密封环、喷嘴、旋转铰等。

For manufacturing wear parts with high wear resistance, high toughness as well as high corrosion resistance. It is widely used for manufacturing seal rings, nozzles, burrs, etc.



GF10N

主要性能指标

Main Properties

| 牌号 Grade | ISO Grade | 成分 Composition (% in weight) | | | 烧结后的物理性能 Sintered properties | | | | 推荐用途 Applications |
|-------------|--------------|------------------------------------|--------|-------------|----------------------------------|----------------------------------|-------------------------|--------------------------------|---|
| | | WC | Co/Ni | 其他 Other | 硬度 Hardness HRA (±0.50) | 密度 Density g/cm3 (±0.1) | 抗弯强度 TRS Mpa(min) | 合金晶粒度 Grain size (μ m) | |
| GU10 | K10-K30 | 93.25 | 6.1 | 0.65 | 93.0 | 14.90 | 2700 | 0.8 | 密封件、喷嘴等 Seal, nozzle, etc. |
| GU20 | K20-K40 | 89.1 | 10.3 | 0.6 | 91.7 | 14.40 | 3500 | 0.8 | |
| GK05 | K05 | 93.09 | 6 | 0.1 | 92.0 | 14.95 | 2720 | 1.5 | |
| GK10B | - | 94 | 6 | - | 90.5 | 14.95 | 1800 | 2 | 旋转铰 Burr |
| GK40A | - | 91 | 9 | - | 89.5 | 14.65 | 2380 | 2 | 套筒 Flow sleeve |
| GF40 | - | 88.2 | 11.8 | - | 89.0 | 14.30 | 3000 | 1.5-2.5 | 无磁模具、耐蚀 零件 Nonmagnetic die, corrosion resistance part |
| GF05N | - | 95 | 5(Ni) | - | 92.6 | 15.00 | 2070 | 0.8 | |
| GF06N | - | 93.9 | 6(Ni) | 0.1 | 91.0 | 14.95 | 2070 | 1.5 | |
| GF10N | - | 89.85 | 10(Ni) | 0.15 | 90.0 | 14.57 | 2400 | 1.5 | |
| GF12N | - | 87.05 | 12(Ni) | 0.95 | 89.5 | 14.30 | 2720 | 1 | |

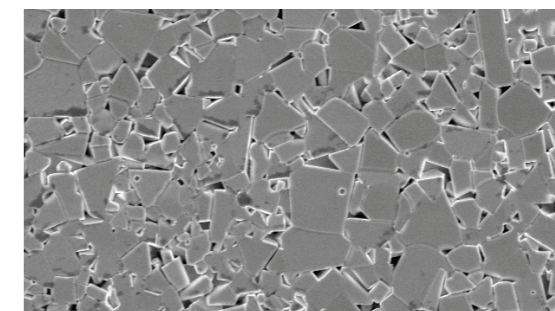
注：除以上产品外，还能根据客户的不同要求生产各种规格RTP产品
Remarks: Other Specifications can be defined according to customer's requirements.

矿用工具用混合料

RTP for Mining Tips

用于矿用工具的生产，其产品兼具高耐磨性和高冲击韧性的特点，广泛应用于工程用齿、矿山开采用齿、油田钻探用齿及煤炭采掘等硬质合金齿。

For manufacturing mining tips with high wear resistance and high impact resistance. It is widely used for manufacturing inserts for construction, mining, coal cutting and Oil & Gas etc.



GD10S

主要性能指标

Main Properties

| 牌号 Grade | 成分 Composition (% in weight) | | 烧结后的物理性能 Sintered properties | | | | 推荐用途 Applications |
|-------------|------------------------------------|------|---------------------------------|-------------------------------|-------------------------|--------------------------------|---------------------------------------|
| | WC | Co | 硬度 Hardness HRA (±0.50) | 密度 Density g/cm3 (±0.1) | 抗弯强度 TRS Mpa(min) | 合金晶粒度 Grain size (μ m) | |
| GD10S | 94 | 6 | 87.9 | 14.95 | 2200 | 6.0-7.0 | 工程用齿 Inserts for construction |
| GD20S | 92 | 8 | 86.0 | 14.65 | 2800 | 7.0-8.0 | |
| GD30C | 89.7 | 10.3 | 86.0 | 14.48 | 2400 | 5.0-7.0 | |
| GF20D | 94 | 6 | 90.2 | 14.95 | 2600 | 2.0-3.5 | 矿山开采用齿 Inserts for mining |
| GD30A | 89 | 11 | 87.7 | 14.38 | 2900 | 2.5-3.0 | |
| GD25 | 90 | 10 | 87.5 | 14.50 | 2850 | 2.5-4.0 | |
| GD15S | 93 | 7 | 87.0 | 14.80 | - | 6.0-8.0 | 煤炭采掘用齿 Inserts for Coal Cutting |
| GD20A | 91 | 9 | 86.5 | 14.60 | 2500 | 6.0-8.0 | |
| GD30C | 89.7 | 10.3 | 86.0 | 14.48 | 2400 | 5.0-7.0 | |
| GD25A | 90 | 10 | 88.5 | 14.50 | 2900 | 2.0-3.0 | 油田牙轮钻用齿 Inserts for Oil & Gas |
| GD60A | 84 | 16 | 86 | 13.90 | 2800 | 2.0-3.0 | |
| GD60C | 84 | 16 | 84.7 | 13.94 | 2700 | 6.0-6.5 | |

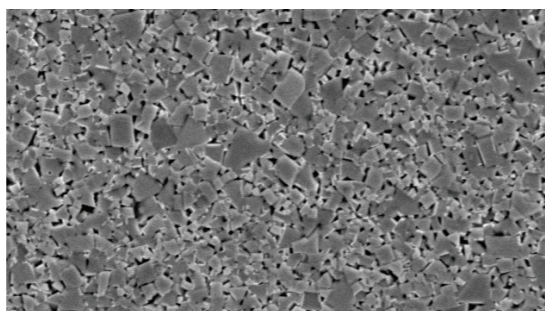
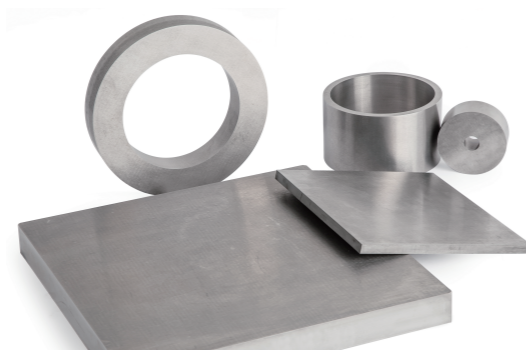
注：除以上产品外，还能根据客户的不同要求生产各种规格RTP产品
Remarks: Other Specifications can be defined according to customer's requirements.

模具材料用混合料

RTP for Dies

用于生产模具材料，具有高耐磨性、高韧性和高耐蚀性的特点，广泛应用于金属拉丝模、冷墩模等。

For manufacturing dies with high wear-resistance and high toughness and high corrosion resistance. It is extensively used in manufacturing all kinds of dies such as wire drawing dies, cold heading dies and etc.



GK30

主要性能指标

Main Properties

| 牌号 Grade | 成分 Composition (% in weight) | | | 烧结后的物理性能 Sintered properties | | | | 推荐用途 Applications |
|-------------|------------------------------------|------|-------------|----------------------------------|----------------------------------|-------------------------|--------------------------------|--------------------------|
| | WC | Co | 其他 Other | 硬度 Hardness HRA (±0.50) | 密度 Density g/cm3 (±0.1) | 抗弯强度 TRS Mpa(min) | 合金晶粒度 Grain size (μ m) | |
| GK20 | 94.0 | 6.0 | - | 91.0 | 14.95 | 2600 | 1.5-2.5 | 拉丝模具 Wire drawing die |
| GK30 | 92.0 | 8.0 | - | 90.0 | 14.75 | 2700 | 2.0-3.0 | |
| GK50 | 90.0 | 10.0 | - | 90.4 | 14.54 | 2800 | 1.5-2.0 | |
| GK60 | 88.0 | 12.0 | - | 88.5 | 14.30 | 2800 | 1.5-2.0 | |
| GD25 | 90.0 | 10.0 | - | 87.5 | 14.50 | 2800 | 2.5-3.5 | |
| GF40A | 88.1 | 11.8 | 0.1 | 89.5 | 14.20 | 2800 | 1.5-2.0 | |
| GF30A | 88.0 | 12.0 | - | 90.0 | 14.30 | 2900 | 1.0-2.0 | |
| GF50A | 84.0 | 15.5 | 0.5 | 88.5 | 13.90 | 3000 | 1.5-2.5 | |
| GF60A | 82.0 | 18.0 | - | 84.5 | 13.65 | 2400 | 5.0-7.0 | |
| GF55H | 82.0 | 18.0 | - | 87.5 | 13.85 | 3100 | 1.5-2.5 | |
| GF60 | 80.0 | 20.0 | - | 84.5 | 13.55 | 2800 | 3.0-4.5 | |
| GF65 | 77.0 | 23.0 | - | 83.5 | 13.35 | 2500 | 3.0-4.0 | |
| GF70 | 75.5 | 24.5 | 4.53 | 13.15 | 83.0 | 2500 | 4.0-6.0 | |

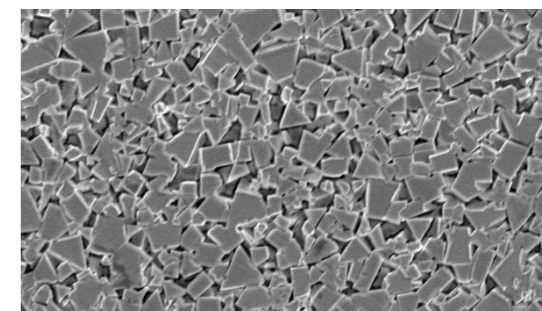
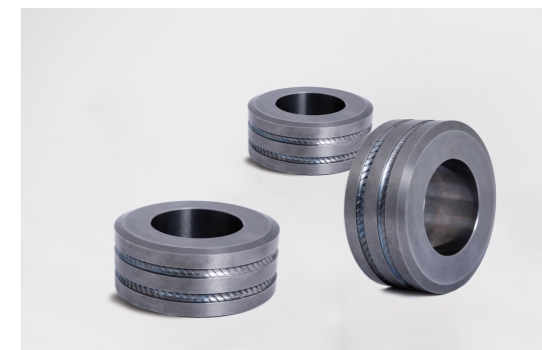
注：除以上产品外，还能根据客户的要求生产各种规格RTP产品
Remarks: Other Specifications can be defined according to customer's requirements.

辊环用混合料

RTP for Rolls

用于生产硬质合金辊环，具有优良的高温耐磨性、高抗热疲劳性能、高耐蚀性特点，主要应用于金属线材、板材、棒材的轧制。

For manufacturing rolls, with good thermal fatigue resistance, good high temperature wear resistance and high corrosion resistance. It is widely used for rolling metal wire rod, bar etc.



GF55

主要性能指标

Main Properties

| 牌号 Grade | 成分 Composition (% in weight) | | | 烧结后的物理性能 Sintered properties | | | | 推荐用途 Applications |
|-------------|------------------------------------|------|-------------|----------------------------------|----------------------------------|-------------------------|--------------------------------|--|
| | WC | Co | 其他 Other | 硬度 Hardness HRA (±0.50) | 密度 Density g/cm3 (±0.1) | 抗弯强度 TRS Mpa(min) | 合金晶粒度 Grain size (μ m) | |
| GD30 | 89.0 | 11.0 | - | 87.0 | 14.45 | 2400 | 3.0-5.0 | 金属线材、板 材、棒材等轧制 用辊环 Rolls for metal wire rod, bar |
| GD50 | 85.0 | 15.0 | - | 85.5 | 14.05 | 2700 | 3.0-5.0 | |
| GF55 | 82.0 | 18.0 | - | 85.0 | 13.75 | 2800 | 2.0-4.0 | |
| GR70 | 74.0 | 20.0 | 6.0 | 82.0 | 12.95 | 2500 | 2.0-4.0 | |
| GR90 | 68.5 | 30.0 | 1.5 | 80.5 | 12.60 | 1600 | 3.5-5.5 | |

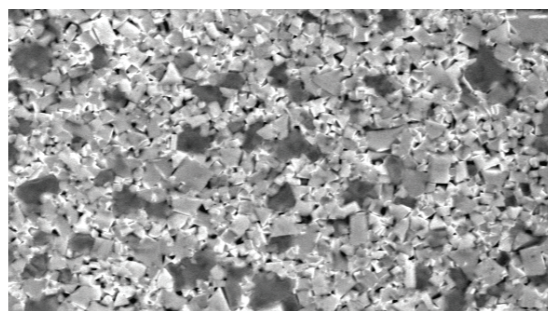
注：除以上产品外，还能根据客户的要求生产各种规格RTP产品
Remarks: Other Specifications can be defined according to customer's requirements.

数控刀片用混合料

RTP for Indexable Inserts

用于数控刀片类产品的生产，具有高耐磨性、高韧性，以及良好的高温红硬性、抗月牙洼磨损及高温抗氧化性，其生产的刀片可用于切削钢、不锈钢、铸铁、有色金属。

For manufacturing indexable inserts with high wear-resistance, high toughness, good red hardness, good resistance crater wear and high temperature oxidation resistance. It is mainly used in machining steel, stainless steel, cast iron and non-ferrous metal.



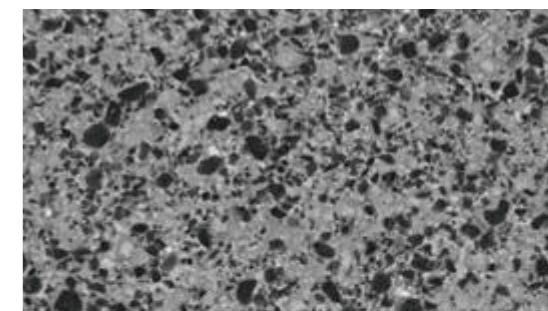
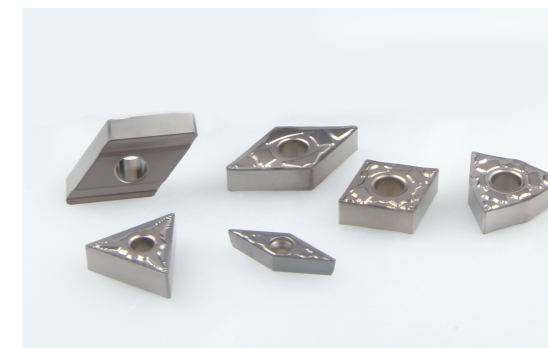
GM10

Ti (C,N)基金属陶瓷用混合料

RTP for Ti (C,N) Based Cermet

用于切削工具的生产，其具有高耐磨性、高韧性以及优良的高温红硬性和抗崩刃性，主要用于钢和铸铁等金属材料的加工。

For manufacturing cutting tools with good wear-resistance, high toughness, good red hardness and good chipping resistance. It is mainly used in machining cast iron and steel.



GN191

主要性能指标

Main Properties

| 牌号 Grade | ISO Grade | 成分 Composition (% in weight) | | | 烧结后的物理性能 Sintered properties | | | | 推荐用途 Applications |
|-------------|--------------|------------------------------------|-------|-------------|----------------------------------|----------------------------------|-------------------------|--------------------------------|--|
| | | WC | Co | 其他 Other | 硬度 Hardness HRA (±0.50) | 密度 Density g/cm3 (±0.1) | 抗弯强度 TRS Mpa(min) | 合金晶粒度 Grain size (μ m) | |
| GP10 | P10 | 86.00 | 6.00 | 8.00 | 91.5 | 13.79 | 2300 | 1.0-5.0 | 钢切削 Steel |
| GP35 | P20 | 73.30 | 11.00 | 15.70 | 91.1 | 12.77 | 2300 | 1.0-2.0 | |
| Gk05 | K10 | 94.00 | 6.00 | 0.10 | 92.0 | 14.95 | 2700 | 1.5 | 铸铁切削 Cast iron |
| GM10 | M01 | 84.00 | 6.00 | 10.00 | 93.0 | 13.00 | 1900 | 1.0-2.0 | 不锈钢切削 Stainless steel |
| GT20 | S01 | 72.00 | 8.00 | 20.00 | 92.2 | 12.30 | 1900 | 1.0-3.0 | 非铁材料、 有色金属切削 Non-ferrous metals |
| GT20A | S10 | 79.30 | 8.00 | 12.70 | 91.8 | 12.40 | 1900 | 1.0-3.0 | |
| GT40 | S30 | 80.00 | 10.00 | 10.00 | 90.5 | 13.10 | 2380 | 1.0-2.0 | |
| GU20 | - | 89.10 | 10.3 | 0.60 | 91.8 | 14.4 | 3500 | 0.8 | 通用系列 General series |

注：除以上产品外，还能根据客户的不同要求生产各种规格RTP产品
Remarks: Other Specifications can be defined according to customer' s requirements.

主要性能指标

Main Properties

| 牌号 Grade | 化学成分 Composition (% in weight) | | | 烧结后的物理性能 Sintered properties | | | | 推荐用途 Applications |
|-------------|--------------------------------------|-------|-------------|----------------------------------|----------------------------------|-------------------------|--------------------------------|----------------------------------|
| | Ti (C,N) | Ni+Co | 其他 Other | 硬度 Hardness HRA (±0.50) | 密度 Density g/cm3 (±0.1) | 抗弯强度 TRS Mpa(min) | 合金晶粒度 Grain size (μ m) | |
| GN191 | 52.00 | 14.00 | 34.00 | 92.8 | 6.62 | 1600.0 | 1.5 | 钢、铸铁切削 Steel and Cast iron |
| GN181 | 45.00 | 17.00 | 38.00 | 92.0 | 7.40 | 1700.0 | 1.5 | |

注：除以上产品外，还能根据客户的不同要求生产各种规格RTP产品
Remarks: Other Specifications can be defined according to customer' s requirements.

产品品质保障体系 QUALITY GUARANTEE SYSTEM

工艺装备 Production Facilities



湿磨 Ball mill

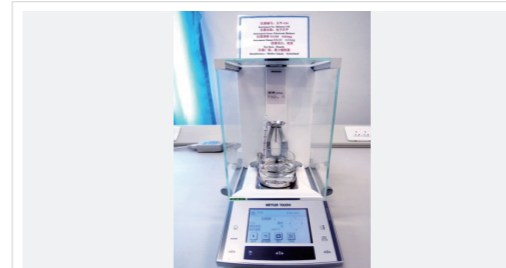


真空干燥机 Vacuum dryer



喷雾干燥塔 Spray drying tower

检测仪器 Inspection Equipments



密度仪
Densimeter



电子抗折试验机
Electronic Universal Testing Machine



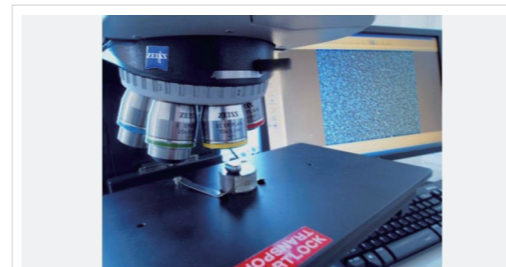
洛氏硬度计
Rockwell Hardness Testing Machine



扫描电子显微镜
Scanning Electron Microscope



磁性能仪
Magnetometer



金相显微镜
Metalloscope



附录 APPENDIX

硬质合金性能名词解释 Cemented Carbide Glossary

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 alloy organization. The finer the grain size of the carbide phase the higher will be the coercive force value.

密度 / Density

材料的密度（比重）是材料质量与其体积的比率，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. Cemented carbide density decreases linearly with increasing Cobalt content for the WC-Co grades.

抗弯强度 / Transverse Rupture Stress

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。

The Transverse Rupture Stress (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 phase

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 phase 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.

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，可以评定合金组份。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'.

断裂韧性 / Fracture Toughness

断裂韧性KIC是含有临界尺寸缺陷的试样的强度测量尺度，它反映材料塑性变形和断裂全过程中吸收能量的能力，是强度和塑性的综合表现，使用维氏压痕法测定。

Fracture toughness KIC is the measurement strength of samples containing critical defect. Fracture toughness reflects the ability of material to absorb energy in the process of plastic deformation and fracture. Fracture toughness is the performance of strength and the plasticity, which is measured by Vickers.

MEMO

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