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股票代码 厦门钨业 600549  
STOCK CODE OF XTC 600549

2023 Version



# CARBIDE ANVIL

## 硬质合金顶锤

 洛阳金鹭硬质合金工具有限公司  
Luoyang Golden Egret Geotools Co.,Ltd.



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## 厦门钨业 OVERVIEWS

厦门钨业是在上海证券交易所上市的集团型股份公司，中国上市公司500强、国家重点高新技术企业、国家火炬计划钨材料产业基地、国家首批发展循环经济示范企业。

厦门钨业主要从事钨精矿、钨钼中间制品、粉末产品、丝材板材、硬质合金、切削工具等各种钨系列产品；稀土氧化物、稀土金属、稀土发光材料、磁性材料和稀土贮氢、系列锂电池材料等各种稀土材料和能源新材料的生产、销售与研发。公司拥有从钨钼矿山→冶炼→深加工→钨钼二次资源回收的完整的钨产业链，以及稀土矿山开发、冶炼加工、稀土新材料、科研应用等完整的稀土产业体系。依托厦钨设有“国家钨材料工程技术研究中心”和“能源新材料研究中心”。厦钨以“让员工实现自我价值，使用户得到满意服务，为股东取得丰厚回报，与社会共谋和谐发展”为宗旨，将继续发展资金、技术、设备和人才等优势，持续创新，占领技术制高点，为打造最具竞争实力的国际性一流公司而不懈奋斗。

Xiamen Tungsten Company (XTC), a group corporation went public in Shanghai, is one of the top 500 listed companies in China. It is also the key Hi-Tech enterprise of China, Tungsten Material Industrial Base of National Torch Program, and the first batch of national model enterprise in developing circular economy.

Having a complete tungsten industrial chain and a complete rare earth industrial system, XTC is committed to doing R&D, producing and selling different series of tungsten products and diverse rare earth materials as well as new energy materials. The tungsten fruits include tungsten concentrates, tungsten and molybdenum intermediate products, powder products, wires, plates, cemented carbide products, cutting tools and others. The fruits of the rare earth materials and new energy materials are rare earth oxides, rare earth metals, rare earth luminescent materials, magnetic materials, rare earth hydrogen storage materials and lithium battery materials. With the aim of 'achieving self-value of employees, satisfying customers by service, cheering up stockholders by profits, building up harmony society by enterprise development', XTC always managed to be the most competitive international enterprise with sustainable innovation, sufficient capital, advanced equipment and talented employees.





## 洛阳金鹭 XTC LUOYANG

洛阳金鹭硬质合金工具有限公司，成立于2012年，是国有上市公司厦门钨业股份有限公司100%投资的“金鹭”系硬质合金骨干企业。公司注册资金10.5亿元人民币，一期投资13亿元人民币。主要从事钨粉末产品、硬面材料产品、硬质合金顶锤、凿岩工具及工程工具等钨系列产品的生产与销售。

自公司成立以来，公司坚持走专业化、精细化发展道路，生产的“金鹭”系列产品以安全可靠的品质、以及完善的售后服务体系迅速赢得市场；客户遍布全球二十多个工业发达国家和地区。公司以“同一个团队，同一个梦想，创建共好”为企业愿景，始终秉承“人无我有，人有我精”为经营宗旨，坚持以“用户至上，诚信服务”为经营理念，本着“高效、务实、专业”的企业精神作风，坚持不懈地为客户提供优质的产品与真诚、专业的服务。

Founded in 2012 with a registered capital of 1.05 billion RMB, Luoyang Golden Egret Geotools Company, as one of the cemented carbide backbones of 'Golden Egret' and wholly-owned by its parent company XTC, is dedicated to the production and marketing of the high quality tungsten products including tungsten powders, hard-facing materials, carbide anvils, mining and earth work drilling tools. 1.3 billion RMB was invested into the first phase of its construction.

Since the establishment of XTC Luoyang, the company has adhered to the path of professional and refined development. The 'Golden Egret' series of products have quickly won the market with its safe and reliable quality and complete after-sales service system, obtaining customers all over the world in more than 20 industrial developed countries and areas. We take 'to realize staff's self-worth, to satisfy the users, to achieve win-win development' as our mission. Being guided by the innovations of technology and management, we focus on solving industrial problems such as wear resistance, crushing and pressing, striving to build a world-class manufacturer and service provider in the fields of mining and earth work drilling tools, carbide alloys and hard-facing materials.



## 产业链 INDUSTRY CHAIN

厦钨集团拥有从矿石开采到硬质合金深加工产品的一体化钨产业链:

- 从钨源头上控制原材料, 保证原料供应及成品品质的稳定;
- 有效整合资源, 降低生产成本, 维持价格稳定, 增强下游行业的竞争力;
- 厦钨掌控全球约30%高品位钨资源, 年产超3万吨钨冶炼产品, 为世界一流的钨品生产商和供应商。



XTC has an integrated industrial chain from ore to deep processing on cemented carbide:

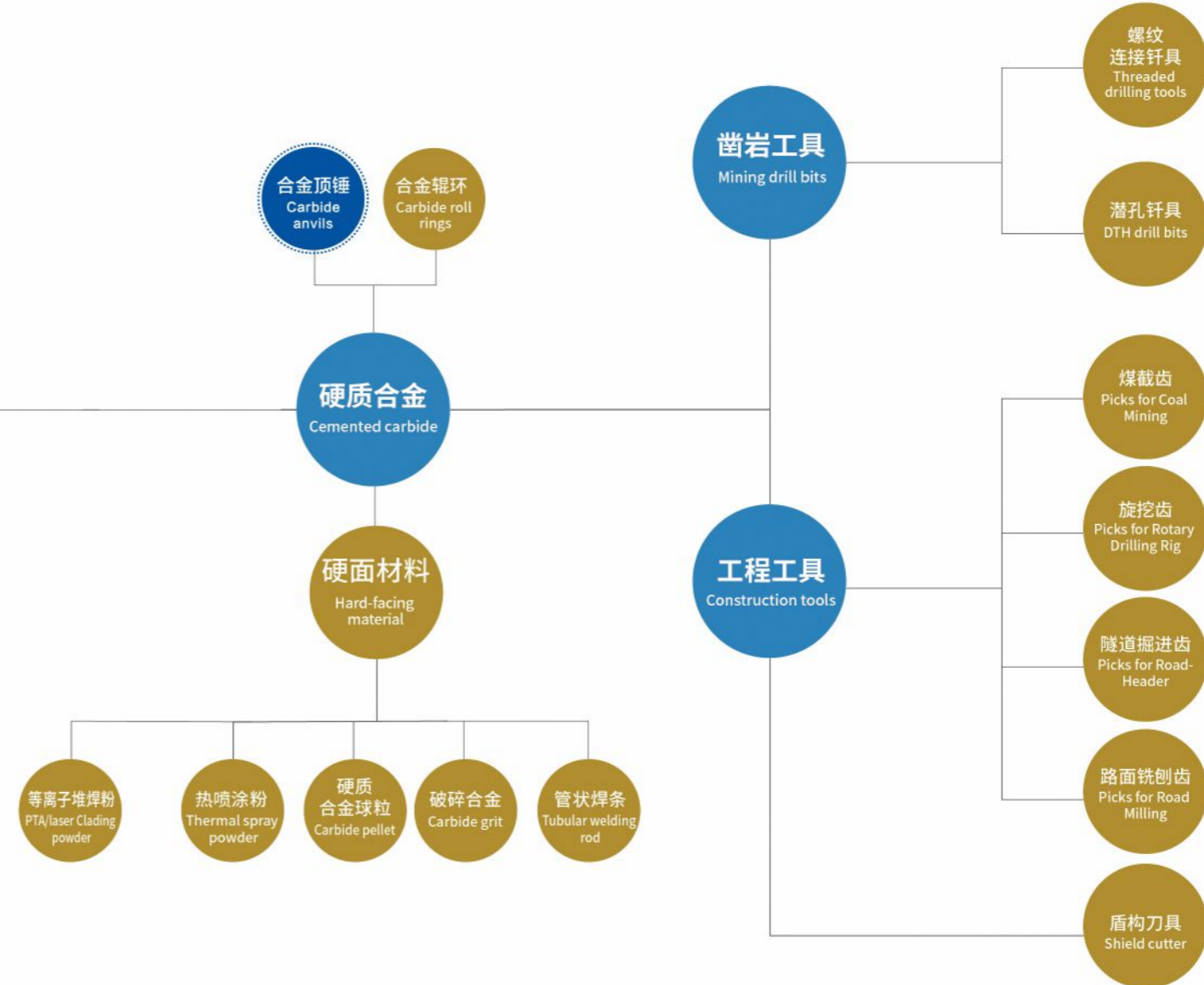
- We can ensure adequate raw materials and stable product quality from controlling the very beginning raw materials.
- Our price can be kept stable and enhance competitiveness for the downstream industry by effectively integrating resources and lowering the cost.
- XTC is the biggest tungsten production and supply base. It controls almost 30% high grade of tungsten resource in the world and produces more than 30,000 tons tungsten products annually.

钨矿: 拥有全球32%钨矿, 全球占比第一。

钨粉: 市场占有率20%, 全球排名第一。

碳化钨粉: 市场占有率28%, 全球排名第一。

厦钨是世界最大的钨粉、碳化钨粉、棒材和矿用合金供应商,也致力于成为世界级凿岩工程工具供应商。



制粉车间

Powder Process Workshop



RTP车间

RTP Workshop



合金制品车间

Alloy Products Workshop



六面顶压机

Cubic Press



## ▶ 技术特性 TECHNICAL CHARACTERISTICS

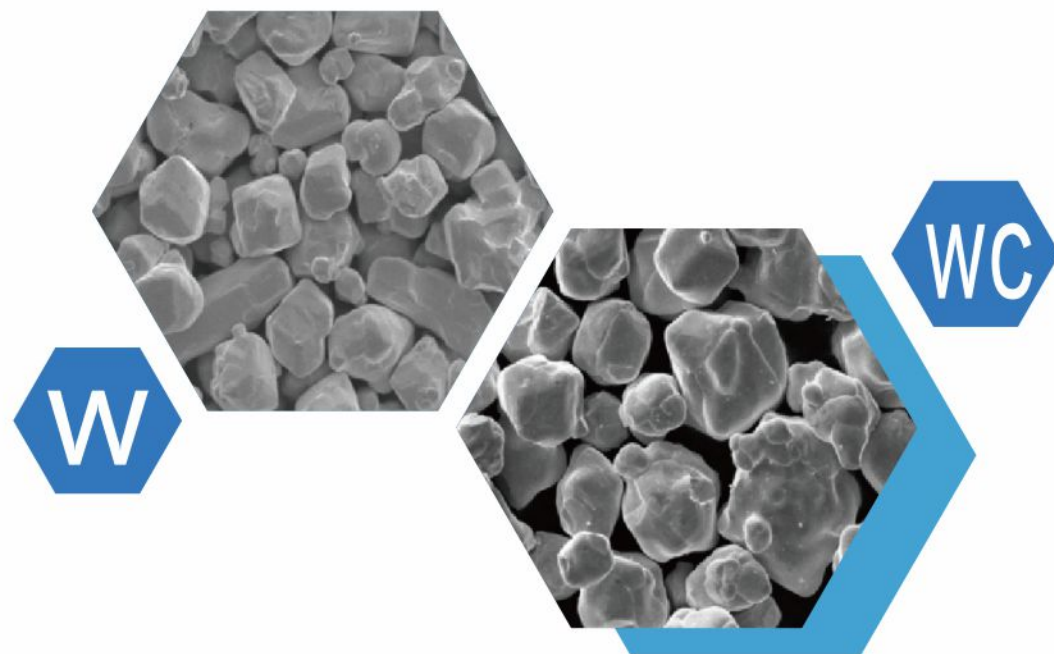
### ▶▶ 金鹭WC原料的技术特性

TECHNICAL CHARACTERISTICS OF XTC TUNGSTEN CARBIDE RAW MATERIAL

钨粉末制造处于国际先进水平，自主生产的钨粉、碳化钨粉，颗粒均匀性好，单晶强度、硬度高。

Our tungsten powder production and control level is leading in the world. Tungsten carbide powder that produced by XTC have better grain size, higher crystal strength and higher hardness.

- 洛阳金鹭采用优质WC粉为原料。
- 金鹭牌优质WC粉的生产采用一流的自动化还原和碳化设备，同时采用先进的还原、碳化工艺，制备出的WC粉末具有纯度高，碳化完全，游离碳低，亚晶尺寸均匀，单晶强度和硬度高，晶型完整等优异特点。
- 金鹭顶锤产品采用优质WC粉末为原料，能够有效提高顶锤的抗压强度和韧性，提高合金组织的抗热疲劳，适用于金刚石合成过程中高温高压的工作环境，大幅度提高了产品的使用寿命。
- Our carbide anvil use high-quality tungsten carbide powder as raw material.
- XTC high-quality tungsten carbide powder is produced by the best equipment of automatic reduction and carbonization. Because of advanced reduction and carbonization process, the WC powder own high purity, completely carbonization, low free carbon, the uniform crystal size, high single crystal strength and high hardness, crystalline integrity and other excellent features.
- This high quality tungsten carbide powder applied to anvil manufacturing can effectively improve the compressive and bending strength of the anvil, improve the thermal resistance of crystal microstructure. Anvils will be more suitable for high temperature and high pressure working environment in the process of diamond synthesis, which means anvils own longer service life.



### ▶▶ 混合料的技术特性 TECHNICAL CHARACTERISTICS OF RTP

洛阳金鹭自主生产的混合料以优质WC粉为原料，采用先进的球磨工艺和一体化喷雾干燥技术，所生产的混合料具有粒子分布均匀，质量稳定性高，成型性能好等特点。

The mixture produced by XTC independently, have used high-quality WC powder as raw material. Adopting advanced ball milling technology and integrated spray drying technology, the production of the mixture has the characteristics of uniform particle distribution, high quality stability, excellent molding performance and so on.

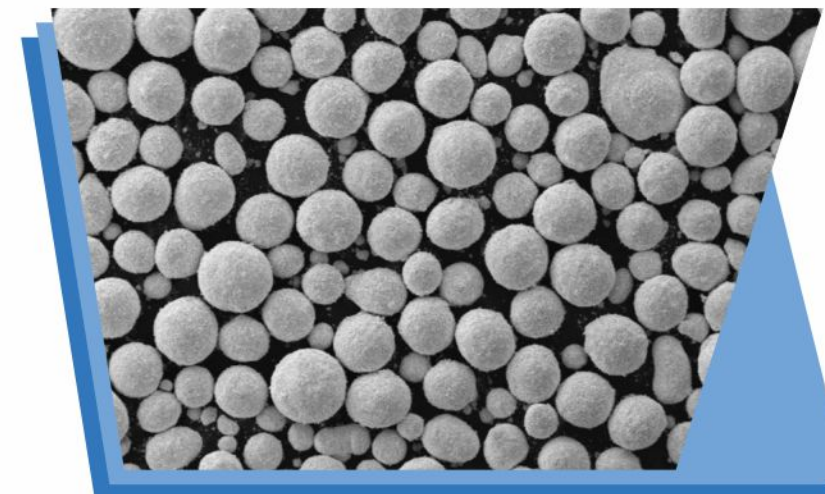
### 混合料制备主要设备

EQUIPMENT FOR RTP



自动球磨机  
Milling machine

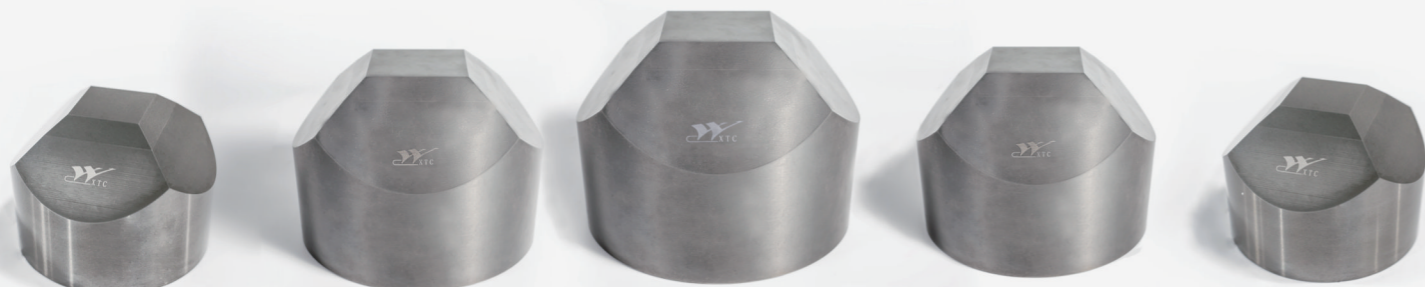
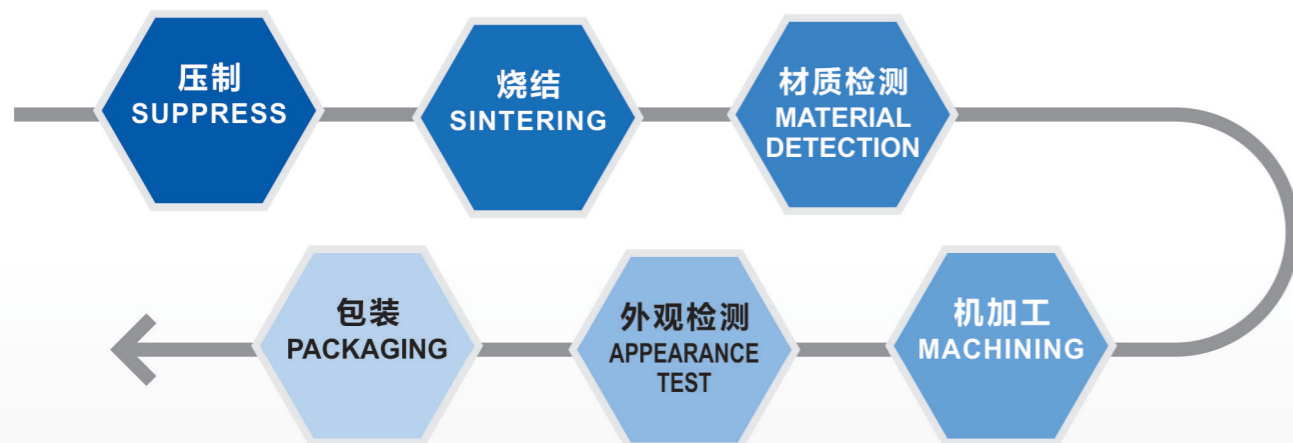
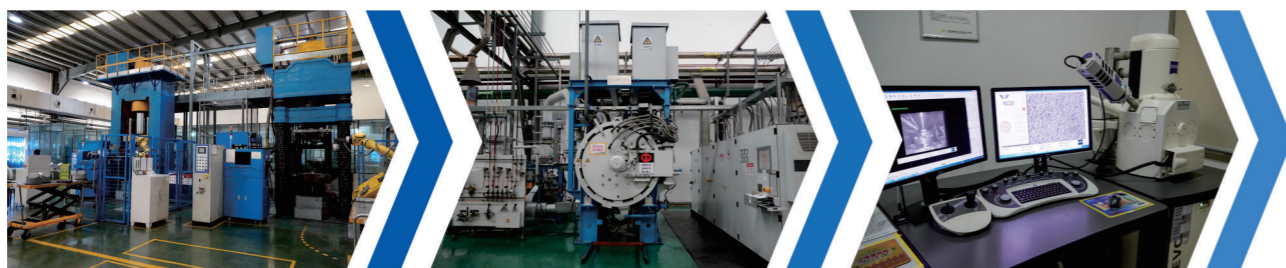
喷雾干燥塔  
Spray-drying



混合料颗粒形貌  
Morphology of RTP



## 生产流程 THE PROCESS FLOW



## 压制成型 PRESS FORMING

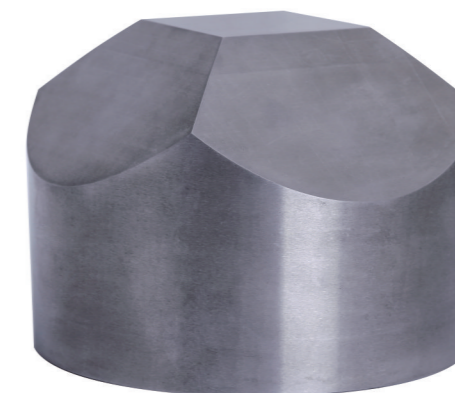
### 全自动粉末液压成型机 Automatic Hydraulic Press Machine



### 压坯的特征:

#### CHARACTERISTICS OF BLANK:

- (1) 自动化压制技术使产品各部位密度均匀一致。
  - (2) 预加载功能保证压坯无裂纹、分层等缺陷，质量稳定性高。
- (1) Automatic pressing ensures uniform density of the final products.
  - (2) The preloading function ensures the stable quality by avoiding cracks and delamination of the pressing.





## >> 烧结 SINTERING

### 德国PVA进口低压炉

PVA HIP FURNACE

#### 工艺特点

自主开发的集脱蜡和加压烧结于一体的“一体化烧结工艺”，使产品质量更加稳定可靠。

#### TECHNOLOGICAL CHARACTERISTICS

Our sintering process developed independently by ourselves, integrating de-waxing and pressing, makes the products quality more stable and reliable.



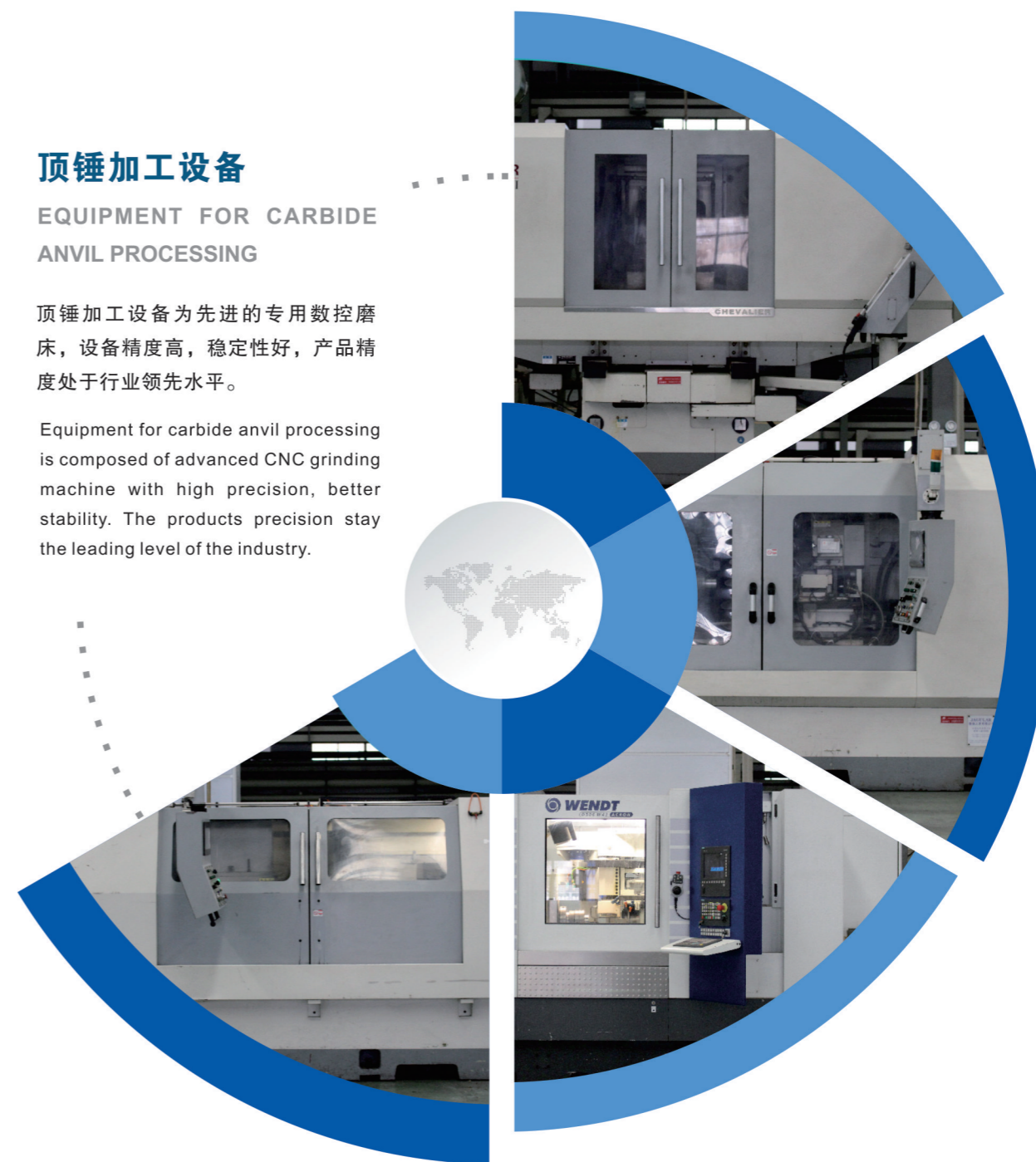
## >> 顶锤加工 CARBIDE ANVIL PROCESSING

### 顶锤加工设备

EQUIPMENT FOR CARBIDE ANVIL PROCESSING

顶锤加工设备为先进的专用数控磨床，设备精度高，稳定性好，产品精度处于行业领先水平。

Equipment for carbide anvil processing is composed of advanced CNC grinding machine with high precision, better stability. The products precision stay the leading level of the industry.





## 洛阳金鹭顶锤具有超高的尺寸精度

Luoyang Golden carbide anvil has the highest dimensional accuracy.

洛阳金鹭顶锤尺寸及形位公差控制标准 The control standard on dimensional tolerance of XTC anvil				
尺寸公差标准 Dimensional tolerance range				
D (mm)	E (mm)	H (mm)	F (mm)	β (°)
±0.05	±0.05	±0.2	±0.1	±0.08
形位公差范围 Geometrical tolerance				
顶面与圆锥轴线垂直度 (mm) Perpendicularity of top face and axis	圆锥圆柱度 (mm) Cylindricity of circular cone	锥面直线度 (mm) Straightness of conical surface	上、下顶面平面度 (mm) Flatness of upper and lower face	上、下顶面平行度 (mm) Parallelisms of upper and lower face
0.02	0.02	0.02	0.02	0.02

顶锤的合理使用对顶锤的使用寿命影响极大，在使用过程中需注意：

- (1) 顶锤为脆性材料，应小心搬运，搬运过程中顶锤之间不能发生碰撞；
- (2) 对于出厂前没有经过时效处理的顶锤，在使用前客户应通过时效处理消除其内部应力；
- (3) 在顶锤的装配、转移、上机过程中，应注意人身安全，小心被碰伤或砸伤。

**CORRECT USING GREATLY INFLUENCES THE ANVIL'S SERVICE LIFE, PLEASE NOTES:**

- (1) Carbide anvil is a kind of fragile material which should be carried carefully. Avoid any collision during transport;
- (2) Aging treatment shall be undertaken before using to eliminate inner-stress;
- (3) Avoid any personal injury during assembly, transfer and operation of carbide anvils.

## 最大化的顶锤寿命

Longest anvil life



## 顶锤产品介绍 PRODUCT INTRODUCTION FOR CARBIDE ANVIL

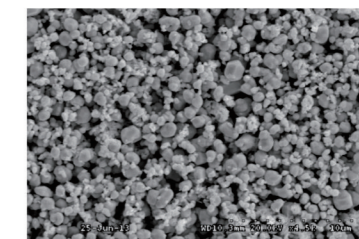
### 顶锤牌号介绍 PRODUCT INTRODUCTION

洛阳金鹭顶锤现在所用的两个主要牌号为GF35H、GU20。采用洛阳金鹭优质WC原料，利用自主开发的高效精密压制成型技术、低压烧结工艺和高精度的机加工工艺，生产的合金顶锤组织均匀，具有稳定的抗压强度和抗弯强度，抗热疲劳、抗热冲击性能优良。我们的生产工艺非常适合制造φ160及其以上的大规格顶锤。

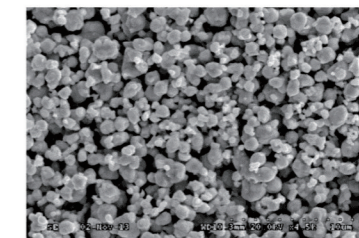
洛阳金鹭顶锤经过超声探伤及磁性能无损检测，可按客户需求提供高效的时效处理消除顶锤内部应力。

GF35H and GU20 are the two main grades for XTC carbide anvil, which is produced by excellent tungsten carbide raw material of XTC itself, high efficiency precision pressing technology developed by ourselves, low pressure sintering process and high precision machining technology. The uniform structure endows the XTC anvil stable compressive strength, bending strength, thermal fatigue resistance, thermal impact resistance, which is especially suitable for large-size of φ160 and over.

XTC carbide anvil has undergone ultrasonic inspection and magnetic non-destructive testing. We can provide efficient aging treatment to eliminate inner-stress of carbide anvil according to the request of customer.



优质W粉扫描电镜照片4500×  
SEM of tungsten powder 4500X



优质WC扫描电镜照片4500×  
SEM of tungsten carbide powder 4500X

### 顶锤牌号适用范围简介

APPLICATION INTRODUCTION OF XTC CARBIDE ANVIL

顶锤牌号适用范围简介 APPLICATION INTRODUCTION OF XTC CARBIDE ANVIL					
金鹭牌号 XTC Grade	密度 /(g/cm <sup>3</sup> ) Density	Hv30	HRA	TRS/MPa	适用范围 Application
GF35H	14.65±0.05	1520±50	91.2±0.5	≥3600	通用牌号，抗压强度高，综合性能好，适合大部分工况下的超硬材料合成，比如金刚石、立方氮化硼等产品。 General grade, high compressive strength, durable combination property, suitable for synthesis of super-hard material, like diamond, CBN.
GU20	14.45±0.05	1630±50	91.6±0.5	≥3800	特定牌号，抗压强度高，抗弯强度高，适合特殊工况下复合片等产品的合成。 Special grade, high compressive strength, bending strength, suitable for synthesis of diamond compact (PDC/PCBN).



## 顶锤规格型号 SPECIFICATION

顶锤规格型号 SPECIFICATION						
系列 Series	规格型号 Identifications	尺寸Size ( mm )				
		D	E	$\beta$ ( ° )	F	H
Φ103	DCΦ103.5×31.2×41.5×12×76	103.5	31.2	41.5	12.0	76.0
Φ122	DCΦ122×44×41.5×13×90	122.0	44.0	41.5	13.0	90.0
Φ128	DCΦ128×46×41.5×13×95	128.0	46.0	41.5	13.0	95.0
Φ136	DCΦ136×43×41.5×13×97	136.0	43.0	41.5	13.0	97.0
Φ142	DCΦ142×49×41×15×102	142.0	49.0	41.0	15.0	102.0
Φ150	DCΦ150×51×41.5×15×109	150.0	51.0	41.5	15.0	109.0
Φ160	DCΦ160×57×41.5×15×115	160.0	57.0	41.5	15.0	115.0
Φ165	DCΦ165×61×41.5×16×124	165.0	61.0	41.5	16.0	124.0
Φ175	DCΦ175×62.5×41.5×15×120	175.0	62.5	41.5	15.0	120.0
Φ185	DCΦ185×64×41.5×18×135	185.0	64.0	41.5	18.0	135.0
Φ190	DCΦ190×71×41.5×22×142	190.0	71.0	41.5	22.0	142.0
Φ195	DCΦ195×74×41.5×16×145	195.0	74.0	41.5	16.0	145.0
Φ199	DCΦ199×76×41.5×16×142	199.0	76.0	41.5	16.0	142.0
Φ205	DCΦ205×79×41.5×18×155	205.0	79.0	41.5	18.0	155.0
Φ210	DCΦ210×74×41.5×18×150	210.0	74.0	41.5	18.0	150.0
Φ220	DCΦ220×75×41.5×15×160	220.0	75.0	41.5	15.0	160.0
Φ230	DCΦ230×81.5×41.5×19×150	230.0	81.5	41.5	19.0	150.0
Φ240	DCΦ240×87×41.5×20×170	240.0	87.0	41.5	20.0	170.0
Φ260	DCΦ260×92×41.5×18×190	260.0	92.0	41.5	18.0	190.0

注：除上述产品型号外，可根据客户需求开发和生产其他规格型号。  
Note: Besides the above sizes, XTC is able to develop and produce customized products.

## 产品规格介绍 INTRODUCTION

### 顶锤编号规则

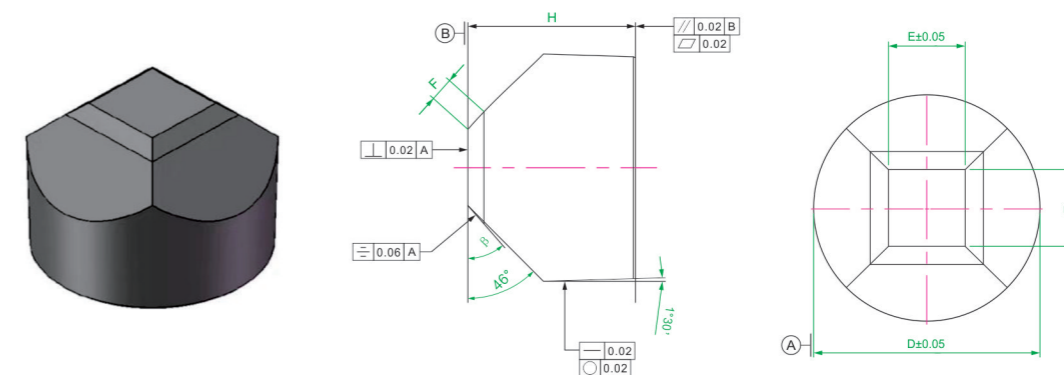
每一个洛阳金鹭顶锤都具有独一无二的编号，便于对其进行从生产到使用的全程跟踪。

以240顶锤为例，其编号含义如下：

- ① “φ 240” 指顶锤外缘46面最低点圆弧直径，单位为mm；
- ② “87” 指小顶面宽度，单位为mm；
- ③ “41.5” 指小顶面与小斜面的夹角为41.5° ；
- ④ “19.5” 指小斜面宽度，单位为mm；
- ⑤ “172” 为小顶面到底面高度，单位为mm；
- ⑥ “\*\*\*\*\*” 前两位代表生产年份,后四位为产品序列号。

注：未做特别说明的顶锤大斜面角度均为46°，外圆锥度为1.5°。

φ 240 × 87 × 41.5 × 19.5 × 172  
① ② ③ ④ ⑤  
\*\*\*\*\*  
⑥



### Numbering rule of Carbide Anvil

Every Luoyang Golden Egret Anvil has unique number to trace completely from manufacturing to use.

Take 240 Carbide Anvil as example, the meaning of number as below:

- ①: 'φ 240' means outer diameter of 46 sides corresponding to the lowest point, unit in mm;
- ②: '87' means smaller top surface width, unit in mm;
- ③: '41.5' means angle between small top surface and smaller slope;
- ④: '19.5' means smaller slope width, unit in mm;
- ⑤: '172' means height from small top surface to bottom, unit in mm;
- ⑥: '\*\*\*\*\*' serial number of carbide anvil.

Note: Generally angle of bigger slope is 46°, outer taper is 1.5°.

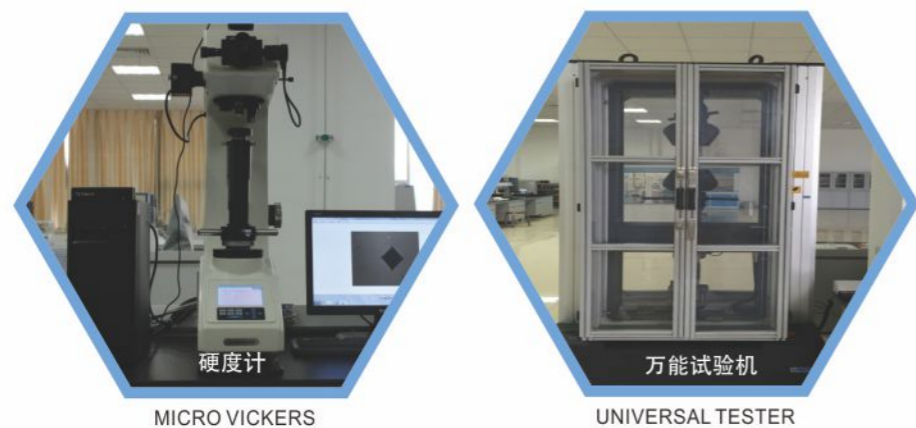


## ▶ 产品检测系统 INSPECTION SYSTEM

### 材质方面检测: MATERIAL INSPECTION



### 性能检测: FUNCTIONAL INSPECTION:



硬度计万能试验机作用：主要用于检测合金硬度及抗弯强度、抗压强度等性能。  
Hardness meter: test hardness, bending strength, compressive strength.

### 磁力仪 MAGNETOMETER



磁力仪  
MAGNETOMETER



磁饱和检测仪  
MAGNETIC SATURATION DETECTOR

★ 磁力仪磁饱和检测仪作用：主要通过检测材质磁性来反馈合金内部晶粒大小及渗、脱碳现象。  
Magnetometer: feedback grain size, carburization and de-carburization by test the magnetism of the material.

### 内部缺陷的检测 INNER DEFAULT DETECTOR



数字式超声波探伤仪  
ULTRASONIC FAULT DETECTOR

数字式超声波探伤仪内部缺陷的检测作用：主要用于检测顶锤成品中的裂纹、孔洞等缺陷。  
Ultrasonic Defect Detection:  
test cracks, holes inside the alloy.

三坐标检测仪尺寸及形位公差检测作用：主要用于检测成品尺寸及形位公差。  
CMM (Coordinate measuring machine):  
test the final size and tolerance of the final product.

### 尺寸及形位公差检测 SIZE AND SHAPE TESTER



三坐标检测仪  
CMM three coordinates measuring instrument



## ▶ 质量控制 QUALITY CONTROL

质量是产品生存的根本，是企业发展的立足点。洛阳金鹭是厦门金鹭一脉相承的全新开始，有多年粉末及钨系列生产经验和完备的质量控制体系。发展之初就将优异的产品质量作为起点，稳定的产品质量为发展的保证。洛阳金鹭拥有先进完善的检测设备，完善的过程质量体系（监控）及最终质量检测控制体系，保证了出厂产品品质。

Quality is the life of product and foothold of the enterprise development. GEOTOOLS, as the successive & new beginning GESAC which depending on years of powder and tungsten series producing experience and complete quality control system, also take excellent and steady product quality as assurance of development. GEOTOOLS utilizes the state of advanced testing equipment and thorough process control system and final quality control system to ensure the quality of finished goods.

## ▶▶ 资质证书 QUALIFICATION CERTIFICATE





## 荣誉证书 CERTIFICATE OF HONOR



## 专利证书 PATENT CERTIFICATE

公司成立至今获得发明专利证书7项,实用新型专利证书等其它专利证书30余项。  
Since its establishment, the company has obtained 7 patents for invention and more than 30 other patents for utility model.



## 企业文化 CORPORATE CULTURE



### 愿景 VISION

世界一流的凿岩工程工具、硬质合金、硬面材料制造商和服务商。  
World-class manufacturer and service provider of cemented carbide and hard facing materials and rock drilling tools.



### 使命 MISSION

让员工实现价值, 让用户满意, 实现共赢发展。  
Make employees realize value, make users satisfied and realize win-win development.



### 远景目标 LONG-RANGE TARGET

以凿岩工程工具为引擎, 以硬质合金和硬面材料为两翼实现产业腾飞。  
Take drilling engineering tool as engine, take cemented carbide and hard surfacematerial as two wings to realize industry take-off.



### 研究与发展 RESEARCH AND DEVELOPMENT

自公司成立以来, 致力于钨粉末、硬面材料及硬质合金工具、矿山工具等钨系列产品的研发、生产, 以及行业专业解决方案的提供。公司坚持走专业化, 精细化发展道路, 生产的“金鹭”系列产品以安全可靠的品质, 完善的售后服务体系迅速赢得市场; 客户遍布全球二十多个工业发达国家和地区。

Since its inception, the company is committed to tungsten powder, hard surface materials and cemented carbide tools, mining tools and other tungsten products R&D, production, and professional solutions to the industry. The company insists on the development of specialization and refinement, and produces 'Jinlu' series products with safe and reliable quality and perfect after-sales service system to win the market rapidly.



## 营销网络 SALES DISTRIBUTION NETWORK

