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MINMETALS | CMT ZIGONG CEMENTED CARBIDE CORP., LTD

ZGCC

Wear-resistant Solutions from Drilling to Extraction

Drilling & Completion
Extraction(Artificial lift) & Well Control
Gathering, Transportation, and Oil Refining

APPLICATION SCENARIO

MINMETALS | CMT ZIGONG CEMENTED CARBIDE CORP., LTD

ZGCC

QUALITY ACCOMPLISHES THE FUTURE

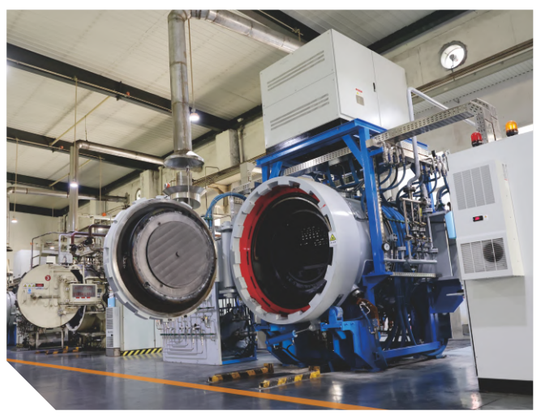
API Spec Q1 Registered

CNAS C001-Q

Zigong Cemented Carbide Corp., Ltd.

ZGCC's Advantages

- We provide a comprehensive range of tungsten carbide wear-resistant products and services, covering everything from raw materials to finished products.
- With over thirty years of dedicated experience in the oil and gas industry.
- ZTC has been recognized as a nationally recognized "Little Giant" enterprise for its specialization and innovation.
- Our HVOF coating preparation and analysis processes have successfully obtained NADCAP certification.



01

DRILLING & COMPLETION

02

EXTRACTION (ARTIFICIAL LIFT) & WELL CONTROL

03

GATHERING AND TRANSPORTATION & OIL REFINING

WEAR-RESISTANT SOLUTIONS FOR OIL & GAS DRILLING AND EXTRACTION

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Cemented Carbide Products | Tungsten Heavy Alloy Parts | Wear-resistant and Corrosion-resistant Hardfacing materials | HVOF Coated Parts | Catalyst

DRILLING & COMPLETION

- Drilling Carbide Inserts
- Substrates of Diamond Compact
- Inserts for Exploration
- Nozzles & Sleeves
- TC Radial Bearings
- Dynamic and Static Valve Parts
- Wear-resistant Components of Centrifuge
- Valve Stems, Seats and Points
- Wear-resistant Components for MWD & LWD
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- Tungsten Heavy Alloy Tubes
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- Cast Tungsten Carbide Powder
- Spherical Cast Tungsten Carbide Powder
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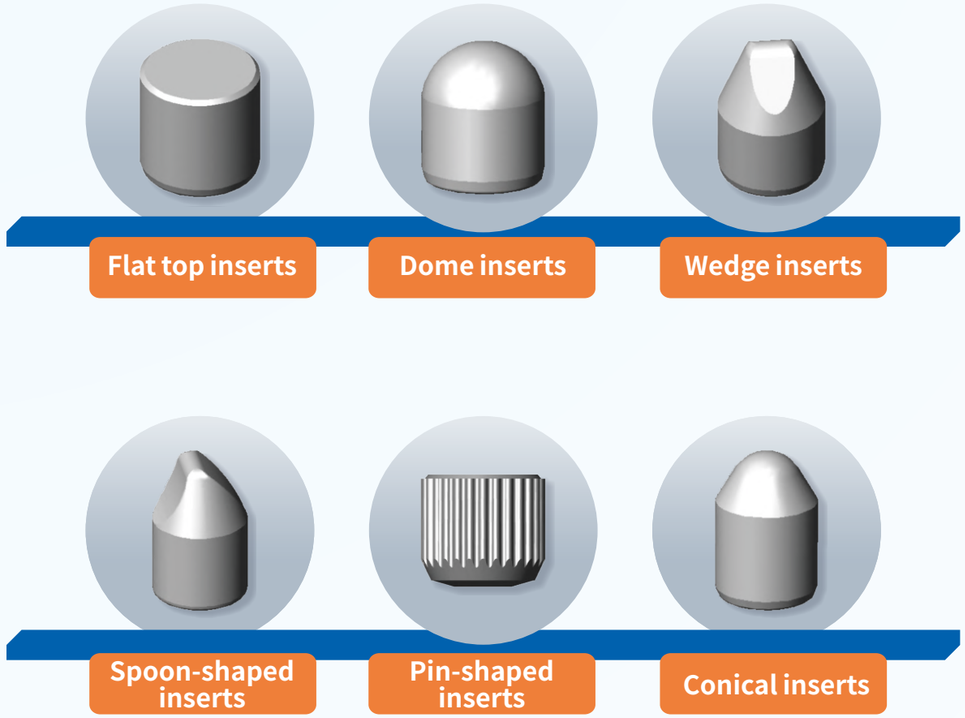
- Premixed Powders for PTA, LC & FS
- Flexible Welding Ropes
- Sintered Welding Rods (Ni-based Tungsten Carbide Welding Rods)
- Wear-resistant Tubular Welding Rods
- Tungsten Carbide Composite Welding Rods
- Tungsten Powder
- Crystalline Tungsten Powder (CTP)

Drilling Carbide Inserts

Application

Used for drilling bits, drilling accessories, trenchless and other fields

- Drilling Carbide inserts are used to make single, triple or multi-cone drill bits.



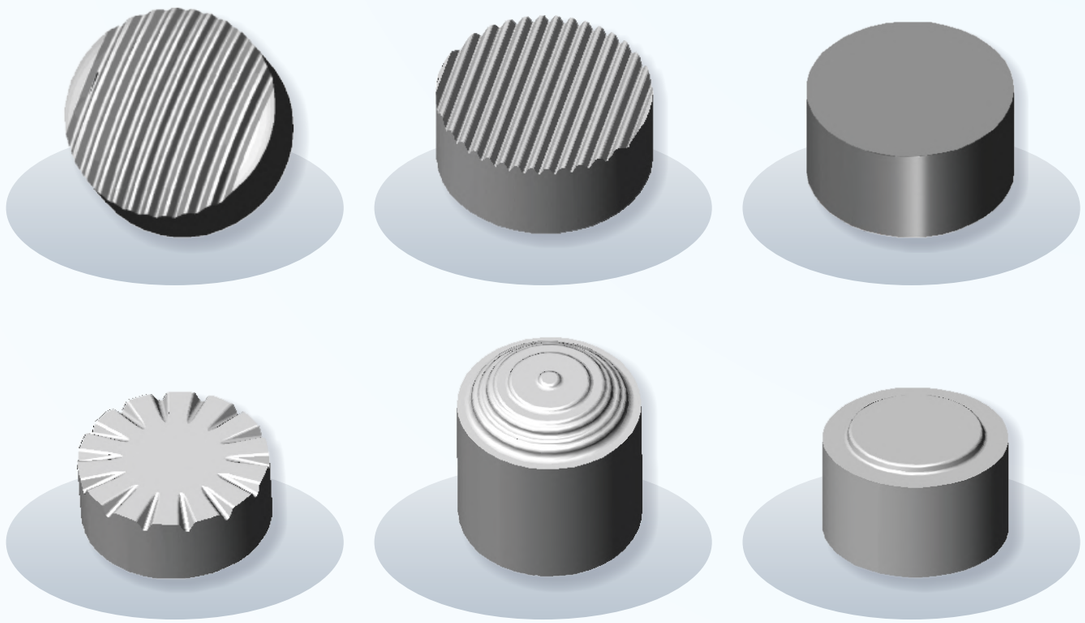
Capability

- We oversee the entire production chain, from raw materials to cemented carbide products.
- Our superior Ready To Press powder is manufactured through high-temperature reduction and carbonization processes, ensuring a fully developed grain microstructure.

Substrates of Diamond Compact

Application

Used to produce diamond compact composite inserts and PDC drill bits to meet the needs of hard rock excavation and drilling.



Substrates of Diamond Compact

Capability

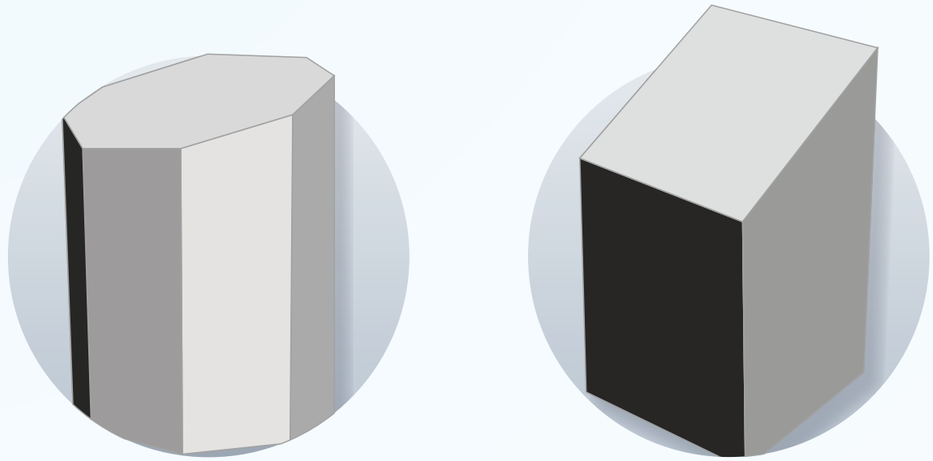
- Integral to PDC drill bits.
- The slots and shapes vary and can be custom-designed.
- A range of materials are available to meet various applications

Inserts for Exploration

Application

Geological exploration & rock core drilling

- Carbide inserts predominantly used in geological exploration drill bits are of the T-type.



T-type inserts

Capability

- We oversee the entire production chain, from raw materials to cemented carbide products.
- Our superior Ready To Press powder is manufactured through high-temperature reduction and carbonization processes, ensuring a fully developed grain microstructure.

Nozzles & Sleeves

- Two types of nozzles are available: threaded nozzles for PDC drill bits and roller cone bit nozzles for roller cone bits.

Application

These nozzles are primarily used with PDC drill bits and roller cone bits. They facilitate the washing, cooling, and lubrication of drill teeth, aid in rock breaking, and clean cuttings at the bottom of wells during drilling.

Nozzles & Sleeves

Capability

- The nozzles and sleeves exhibit high hardness, excellent wear resistance, high-pressure tolerance, and combined resistance to erosion and impact.
- Various types of carbide nozzles are available, including solid carbide nozzles and composite nozzles (brazed or shrink-fitted).
- A variety of models are available and can be customized to suit specific needs.

TC Radial Bearing

- It is manufactured using advanced technology and exhibits characteristics such as high overlay hardness, zero defects, superior wear resistance, and impact resistance.

Application

Tungsten Carbide Radial Bearings serve as antifriction bearings for downhole motors, comprising static and rotating bearings. The rotating bearing is affixed to the transmission shaft, while the static bearing connects to the transmission shaft shell. Both bearings feature tungsten carbide tiling and are hard-surfaced with tungsten carbide powder.

TC Bearings

Capability

- Outstanding wear and corrosion resistance.
- Service life exceeds 300 hours.
- Customized to customers' drawings and specifications.

Dynamic and Static Valve Parts

- Components for both dynamic and static valve parts of hydraulic oscillators.

Application

Primarily employed in drilling tools to enhance drilling speed via hydraulic oscillation.

During operation, the hydraulic oscillator adjusts and modulates the flow and flow area of drilling fluid, generates pulse pressure, drives the drill bit to fracture rock formations, and accelerates drilling speed.

Dynamic and Static Valve Parts

Capability

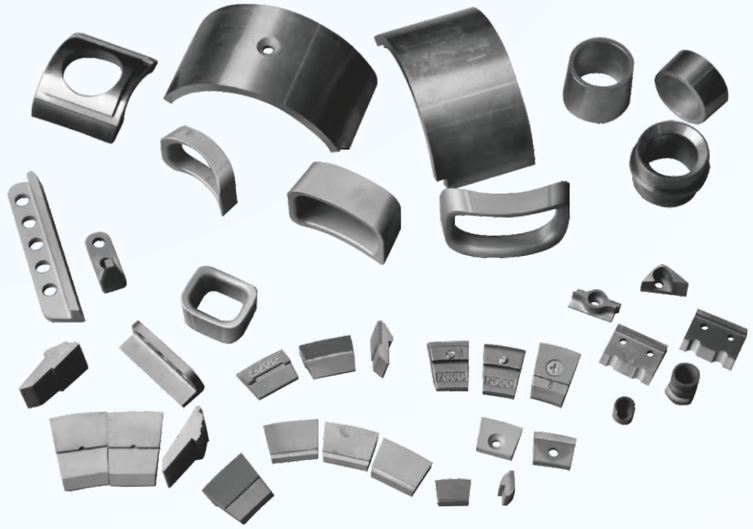
- The tungsten carbide parts exhibit outstanding attributes such as high hardness, superior wear resistance, combined erosion and impact resistance, and high-pressure tolerance.
- In addition to solid carbide parts, we also offer assembled and finished Products.

Wear-resistant Components of Centrifuge

- Our main products include centrifuge tiles, feed and discharge ports, scraper bars and plows, nozzles, and other carbide parts.

Application

A decanter centrifuge continuously separates solid materials from liquids in the slurry, playing a crucial role in industries such as wastewater treatment, chemicals, oil, and food processing. Premature failure and shutdown are often due to wear and corrosion. We offer standard and custom TC wear-resistant parts and components to extend the service life of your centrifuges and enhance production efficiency and reliability.



Wear-resistant Components of Centrifuge

Capability

- Various grades have been developed to suit different working conditions and application fields.
- The product boasts high hardness and excellent mechanical strength, as well as outstanding wear resistance and good corrosion resistance.
- We offer brazed and machine-clipped wear-resistant tiles in various sizes, with options for customization as per your requirements.

Valve Stems, Seats and Points

- Our main products encompass solid and soldered carbide valve points, seats, gates, trims, stems, sleeves, and liners.

Application

Primarily employed in choke valves within wellhead manifolds to regulate well pressure, carbide needle valve cores, sleeves, and seats are frequently utilized.

Valve Stems, Seats and Points

Capability

- Carbide parts exhibit outstanding properties such as exceptional wear, erosion, and corrosion resistance, making them suitable for high-pressure applications.
- These parts undergo precise grinding and demonstrate excellent sealing performance.
- We offer a variety of Ready To Press powders to cater to different application needs.

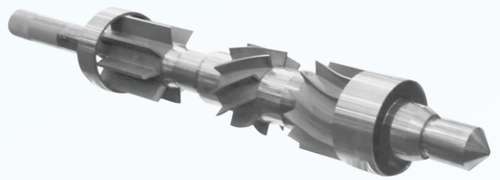
Wear-resistant Components for MWD & LWD

- The primary wear components are assembled on the pulse generator and flow cylinder assembly of MWD and LWD tools. The pulse generator includes components such as the head (valve core), upper and lower bearing sleeves, nose caps, diverters, support sleeves, spacers, rotor bearings, rotary valve rotors, stators, and other parts. The flow cylinder assembly features wear-resistant sleeves, diversion bushings, restrictor rings, gasket rings, and more.

Application

These components are primarily utilized in directional drilling for oil and gas, especially in shale gas and shale oil formations, within MWD and LWD measurement while drilling . They facilitate diversion, flushing, sealing, and pulse signal feedback of drilling mud, operating under challenging conditions such as high pressure, high-speed mud erosion, high temperature, vibration, impact, and gas-liquid corrosion.

Carbide Parts for MWD & LWD



Capability

- The parts exhibit outstanding performance characteristics including high hardness, superior wear resistance, combined erosion and impact resistance, and high-pressure tolerance.
- These components are intricately manufactured with precision.
- We offer a range of Ready To Press powders to accommodate various applications.
- We customize parts according to customer drawings and specifications.

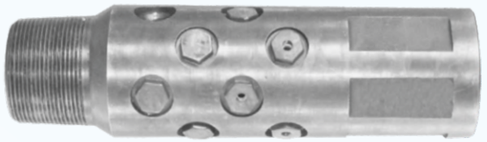
Fracturing Valve Seats and Nozzles

- Our main products include frac valves and seats for fluid ends, jet nozzles, and sleeves.

Application

These products are primarily used in well completion and hydraulic fracturing operations in the oil and natural gas industry, particularly in shale gas and shale oil formations. The frac seat is crucial for pressurizing and depressurizing frac pumps, with wear being a significant challenge during the fracturing process.
Fracturing nozzles are essential components in hydraulic jet fracturing equipment, used for sandblasting and perforating horizontal wells.

Fracturing Nozzles / Fracturing Valve Seats



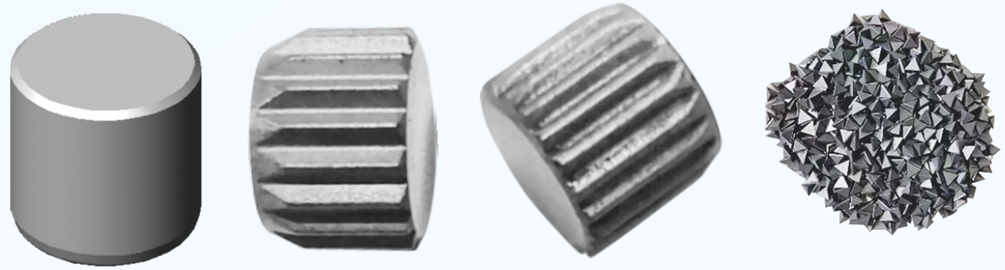
Capability

- We offer proprietary carbide materials designed to optimize wear resistance, thereby extending the service life of frac seats and reducing maintenance intervals to enhance efficiency and lower costs for our customers.
- Solid carbide frac seats have a service life exceeding 500 hours.
- We specialize in custom manufacturing parts according to customer drawings and specifications.
- The service life of the fracturing valve seat exceeds 500 hours, and the fracturing nozzle provides a sand flow rate greater than 50 m^3/hour.

Carbide Buttons & Inserts

Application

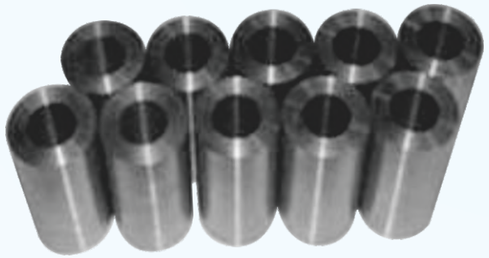
Carbide buttons and inserts find extensive use in oil drilling, downhole tools, and fishing tools. They are commonly employed in stabilizers and reamer shoes for various applications.



Carbide Buttons & Inserts

Tungsten Heavy Alloy Tubes

- The finished tube displays a bright silver appearance with a metallic luster.



Tungsten Heavy Alloy Tubes for Counterweight

Application

High-density tungsten alloy tubes are widely utilized in manufacturing nuclear radiation shielding parts, military products, and counterweight components for oil drilling.

Capability

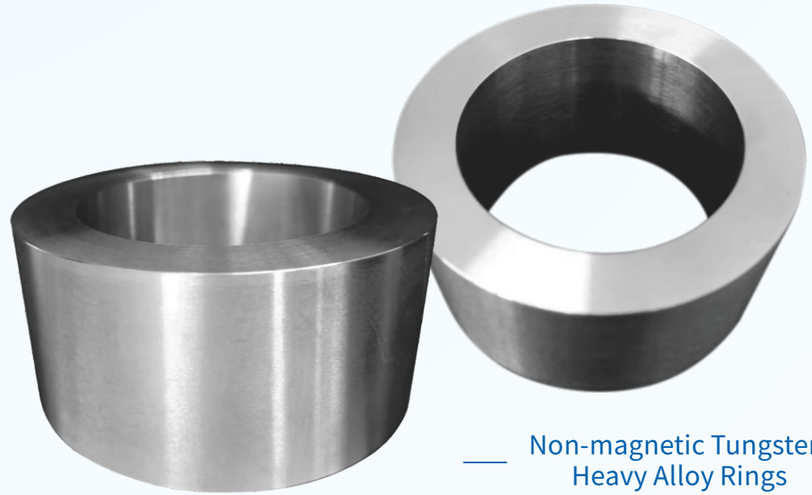
- Precision in dimensions;
- With a density greater than 18g/cm³, it can be used in confined spaces;
- Exhibits high tensile strength and hardness, maintaining shape over extended periods;
- Demonstrates exceptional resistance to corrosion, impact, and cracking.

Non-magnetic Tungsten Heavy Alloy Rings

- The finished non-magnetic carbide ring exhibits a bright silver appearance with a metallic luster.

Application

Tungsten Heavy Alloy is suitable for high-temperature environments and effectively shields various types of radiation. It finds extensive use in mining, measurement, and detection equipment.



Non-magnetic Tungsten Heavy Alloy Rings

Capability

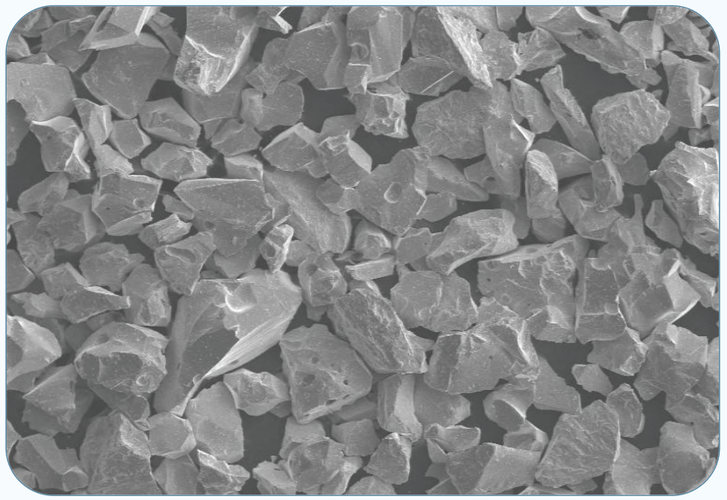
- The carbide ring is precision-engineered with a tolerance of ±0.05mm and boasts a high density ranging from 18.2 to 19.6g/cm³.
- The ring possesses excellent mechanical properties, with a tensile strength exceeding 750 Mpa.
- It also features low relative magnetic permeability (≤1.005) and demonstrates effective shielding capabilities against various types of radiation.
- It offers a long lifespan of radiation resistance.

PDC Matrix Powders

Application

Raw materials for manufacturing PDC drill bit

- PDC matrix powder is essential for manufacturing PDC matrix bits, containing a blend of cast tungsten carbide powder, macrocrystalline tungsten carbide, and spherical cast tungsten carbide powder mixed with nickel powder or other infiltration binders. Drawing on more than 20 years of expertise in PDC matrix powder production, we have developed diverse grades tailored to various applications:



Morphology of PDC Matrix Powder

Capability

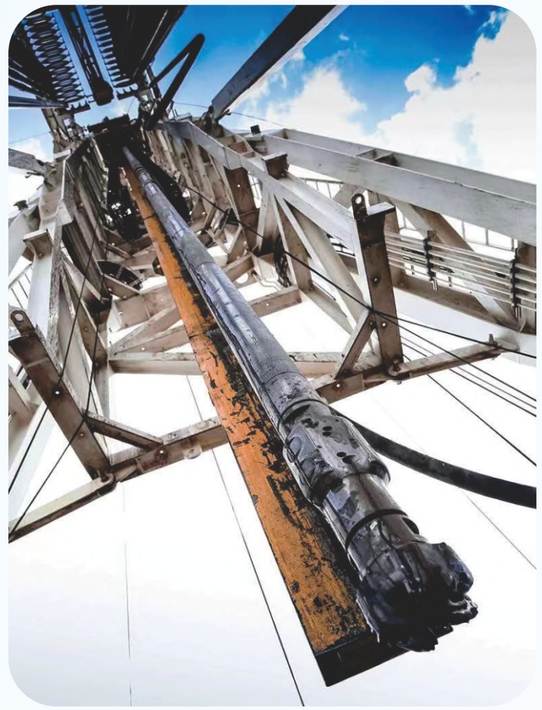
- Demonstrates exceptional infiltration performance.
- Enables high-speed drilling in shale, limestone, and sandstone formations.
- Offers outstanding resistance to erosion, wear, and impact, providing superior durability.

Cast Tungsten Carbide Powder

Application

Cast tungsten carbide serves as the primary material for producing PDC matrix powder, premixed powders for flame spray, Plasma Transferred Arc (PTA) surfacing, and laser cladding. It is also extensively utilized in the manufacture of tubular welding wires and rods.

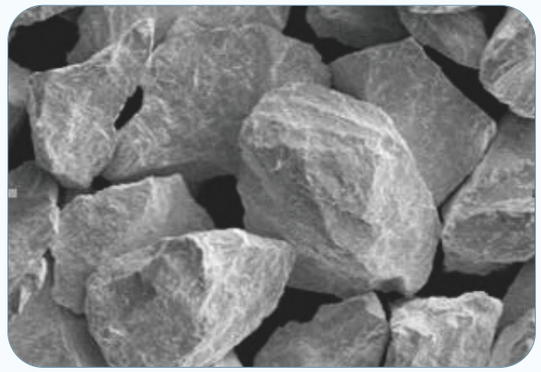
- As high as 95% feather–like microstructure
- High Melting Point (2525℃)
- High Hardness: 2200 HV0.1



Morphology of Cast Tungsten Carbide Powder

Capability

- High purity with superior wear and abrasion resistance.
- Excellent compatibility and wettability with nickel-based, iron-based, and cobalt-based alloys.
- Offers a wide range of particle sizes to choose from (20-2360 μm).

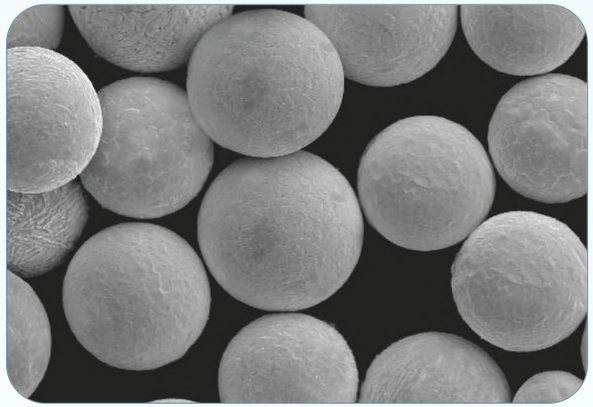


Spherical Cast Tungsten Carbide Powder

- Spherical Cast Tungsten Carbide (SCTC) Powder is a dark gray powder produced through ultra-high temperature spheroidization or atomization. SCTC forms dendritic crystals composed of WC and W_2C, with a feather-like microstructure comprising ≥ 90%. It boasts excellent chemical stability and a high melting point of 2525°C. Its high hardness (≥2700 HV0.1), rapid flowability, and enhanced resistance to wear and corrosion have made it highly popular for hardfacing overlays.

Application

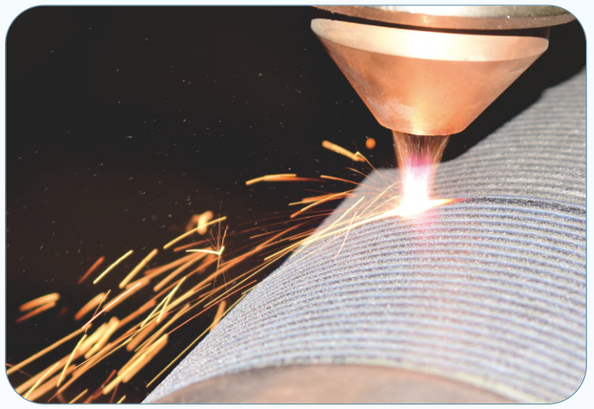
This powder serves as a raw material for producing PDC Matrix powder, premixed powder for flame spraying, Plasma Transferred Arc (PTA) surfacing, and laser cladding. It is also extensively utilized in the production of tubular welding wires and rods.



Morphology of Spherical Cast Tungsten Carbide Powder

Capability

- High purity and ultra resistance to wear and abrasion in harsh environments.
- Excellent flowability that significantly extends the lifespan of overlays.
- Exceptional wettability with nickel-based, iron-based, and cobalt-based alloys.
- Wide range of particle sizes (38-355 μm) to suit various applications.

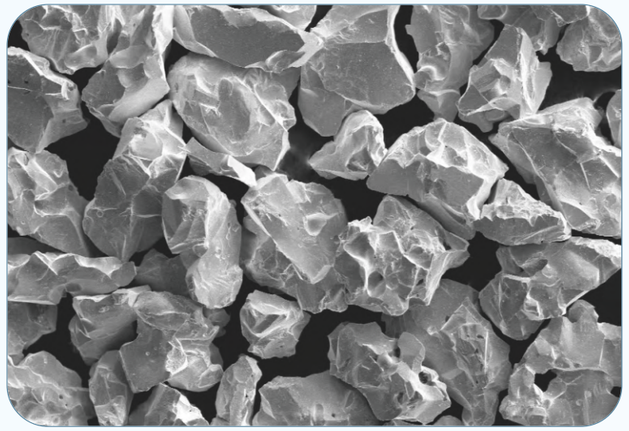


Macrocrystalline Tungsten Carbide Powder

- Macrocrystalline Tungsten Carbide (MTC) Powder is derived from high-quality raw materials, presenting as fully carbonized, dense, and light gray crystals with a uniform microstructure and exceptional thermal stability. It boasts a high hardness (≥ 1600 HV0.1), a high melting point of 2700°C, and outstanding resistance to wear and impact.

Application

This powder serves as a key ingredient in the production of PDC Matrix powder, premixed powder for flame spraying, Plasma Transferred Arc (PTA) surfacing, and laser cladding. Additionally, it is extensively utilized in the manufacture of tubular welding wires and rods.



Morphology of Macrocrystalline Tungsten Carbide Powder

Capability

- Exceptional combined resistance to abrasion and impact in challenging environments.
- Excellent thermal shock resistance.
- Wide selection of particle sizes ranging from 850 to 2360 μm to meet diverse application needs.

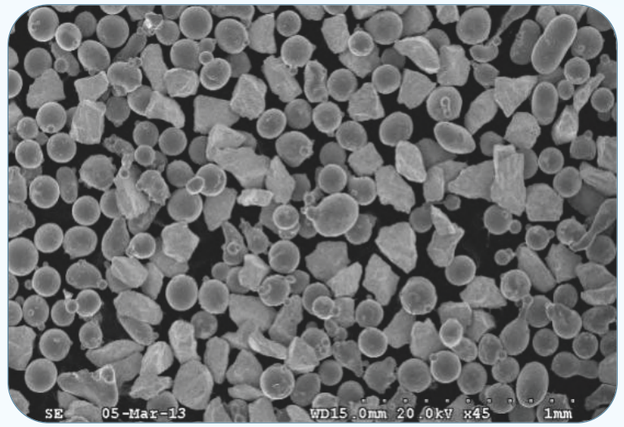
DRILLING & COMPLETION

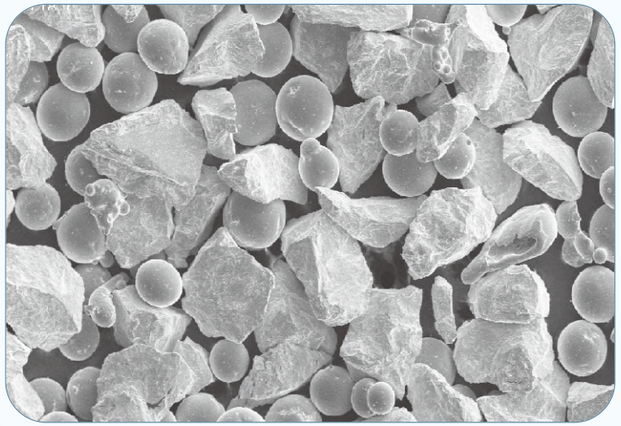
Premixed Powders for PTA, LC & FS

Application

Premixed powder for PTA, LS & FS serves as a surfacing welding material for PDC steel drill bits, widely employed for reinforcing wear-resistant and impact-resistant surfaces or for wear repairs.

- This premixed powder consists of a blend of tungsten carbide hardfacing materials and nickel-based alloy powders, commonly utilized in Plasma Transferred Arc (PTA) welding, Laser Cladding, and Flame Spray applications. Tungsten carbide hardfacing materials include cast tungsten carbide powder, macrocrystalline tungsten carbide powder, spherical cast tungsten carbide powder, and crushed tungsten carbide cobalt grit, incorporating one or more tungsten carbides as hard phases. Nickel-based alloys are available in various chemistries, hardness levels, and particle .





Morphology of a Premixed Powder

Capability

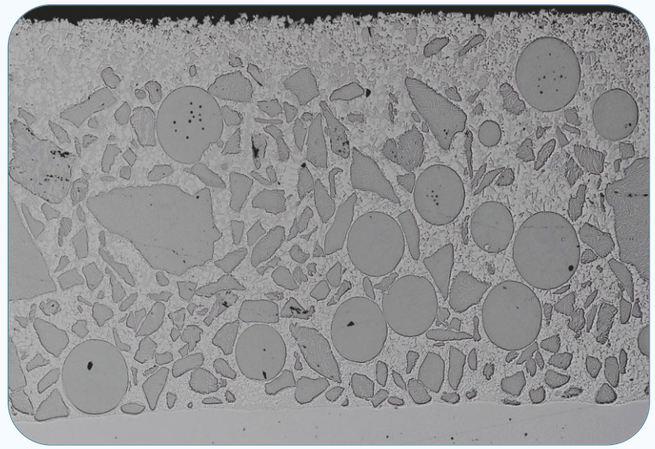
- Outstanding combined resistance to wear, abrasion, and impact in severe environments.
- Customizable blends of premixed powders tailored to specific customer specifications and applications.

Flexible Welding Ropes

Application

Flexible welding rope finds widespread application in overlaying oxygen-acetylene on the surfaces of steel-body bits, mixer blades, and scrapers to combat wear.

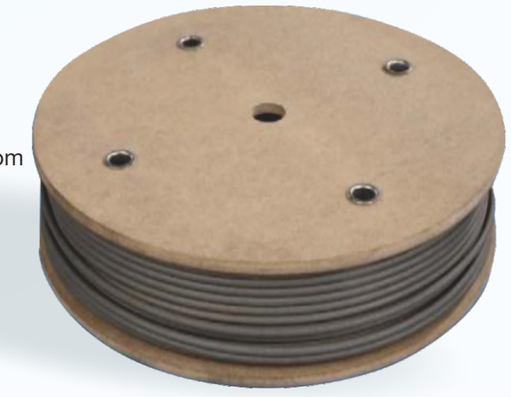
- This rope consists of a nickel wire core surrounded by a thick layer of tungsten carbide powder mixed with nickel-based alloy.
  Each coil weighs 15 kg.



Morphology of a typical cross-sectional overlay

Capability

- Excellent wettability, facilitating easy deposition on various steel surfaces.
- Capability to achieve deposition thickness ranging from 1.5 mm to 10 mm using single or multiple layers.
- Exceptional resistance to wear and abrasion.
- Available in diameters of 4 mm, 6 mm, and 8 mm.



Sintered Welding Rods (Ni-based Tungsten Carbide Welding Rods)

- The sintered rod is fabricated using carbide pellets, or (spherical) cast tungsten carbide powder and Ni-based alloy powder through the process of sintering.

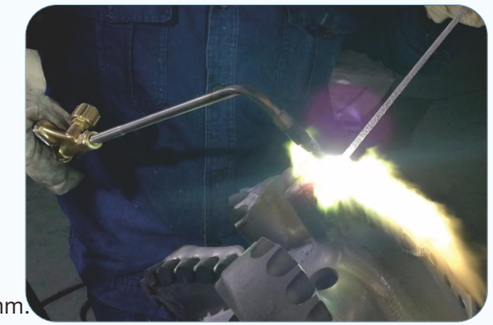
Application

It finds extensive application in overlaying oxygen-acetylene on the surfaces of steel-body bits, mixer blades, and scrapers to combat wear.

Sintered Welding Rods

Capability

- Excellent wettability, facilitating easy deposition on various steel surfaces.
- Capability to achieve deposition thickness ranging from 1.0 mm to 10 mm using single or multiple layers.
- Outstanding wear and abrasion resistance.
- Non-magnetic sintered rods are available.
- Available in diameters of 3.2 mm, 4 mm, 5 mm, and 6 mm.



Tubular Welding Rods

Application

Tubular welding rods are extensively used for overlaying oxygen-acetylene on the surfaces of hammer blades, steel-body bits, mixer blades, and scrapers to mitigate wear.

Tubular Welding Rods

Capability

- These rods are manufactured by filling mild steel tubes with one or more of the following: (spherical) cast tungsten carbide powder, macrocrystalline tungsten carbide powder, and carbide.
- Excellent wettability, facilitating easy deposition on various steel surfaces.
- Capability to achieve deposition thickness ranging from 0.5 mm to 10 mm using single or multiple layers.
- Exceptional wear and abrasion resistance.
- Cost-effective materials for deposition.
- Available in diameters of 3.2 mm, 4 mm, 5 mm, and 6 mm.

Tungsten Carbide Composite Welding Rods

Application

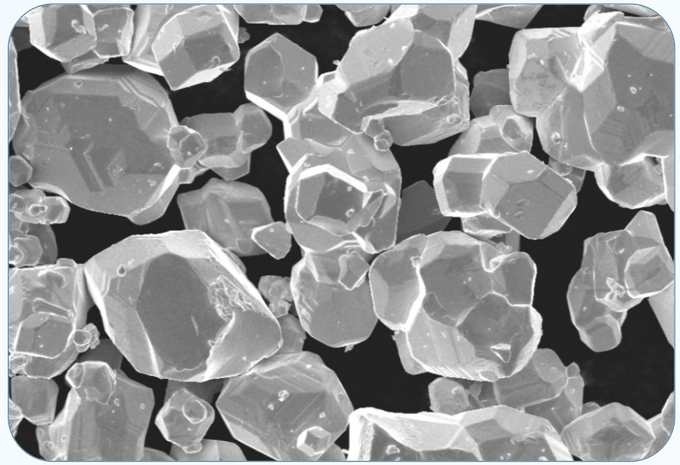
Composite rods can be manufactured using either carbide inserts or cemented carbide grits. These rods find extensive application in downhole tools such as hole openers, milling tools, and fishing tools.

Tungsten Carbide Composite Welding Rods

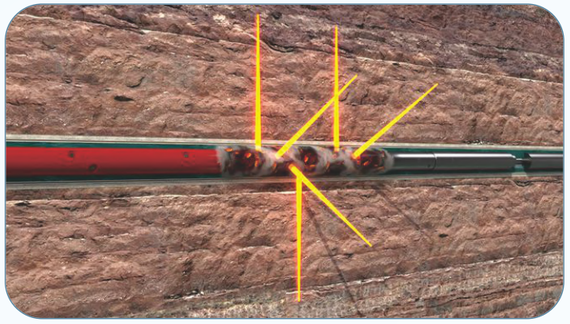
Tungsten Powder

Application

Tungsten powder is utilized in the production of perforating-shaped charges.



SEM Photo for tungsten powder



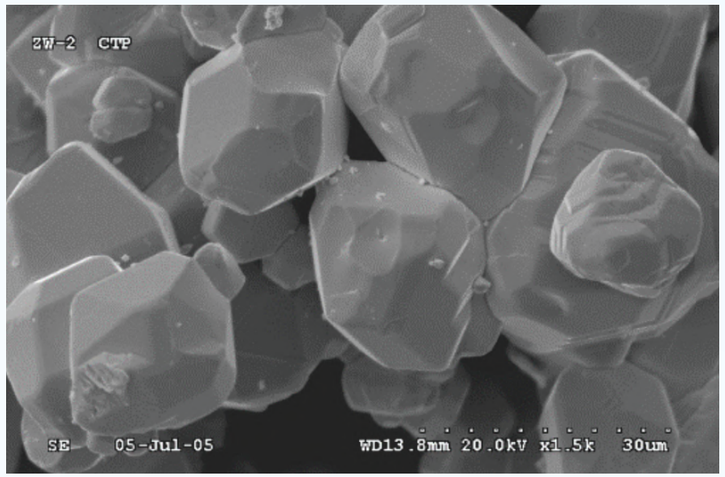
Capability

- Demonstrates excellent flowability.
- Easily blends and presses with Copper Lead alloys to ensure consistent penetration depth.
- Offers a wide range of particle sizes (45-325 μm) to accommodate various requirements.

Crystalline Tungsten Powder (CTP)

Application

CTP is primarily employed in the production of shoulder powder for PDC drill bits.



CTP Morphology 1500X

Capability

- Features a coarse grain size coupled with excellent flowability.
- Demonstrates exceptional machining performance.
- Available in various sizes (45-250 μm, 45-180 μm, 45-75 μm, and - 45 μm) to suit different needs.

EXTRACTION (ARTIFICIAL LIFT) & WELL CONTROL

- Cemented Carbide Bushings & Sleeves for ESP
- API Valve Balls & Seats
- HVOF Coated Hard Sealing Valve Gates and Seats

Cemented Carbide Bushings & Sleeves for ESP

- The Electrical Submersible Pump, known as ESP, is a highly efficient and reliable artificial-lift method used.
  for extracting moderate to high volumes of fluids from wellbores. We manufacture both straight-wall and flanged carbide bushings and sleeves, optionally featuring oil grooves, keyways, and flanges.

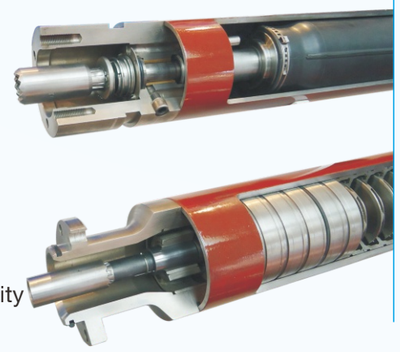
Application

Carbide bushings and sleeves serve crucial roles in supporting shaft rotation, centering, thrust management, and sealing within centrifugal pumps, protectors, motors, and separators of ESP systems. These components, such as sliding bearing sleeves, motor shaft sleeves, centralizing bearing sleeves, thrust bearing sleeves, and sealing sleeves, operate under harsh conditions including high-speed rotation, erosion, and exposure to corrosive gases.

Carbide Bushings and Sleeves for ESP

Capability

- Availability in various tungsten carbide cobalt and tungsten carbide nickel grades tailored for specific applications.
- Outstanding performance attributes such as high hardness, exceptional strength, superior wear, and corrosion resistance.
- These parts maintain high precision over extended operational periods, minimizing downtime.
- Service life expectancy of up to 20,000 hours.
- As the largest manufacturer globally, we have a production capacity exceeding 4 million pieces.

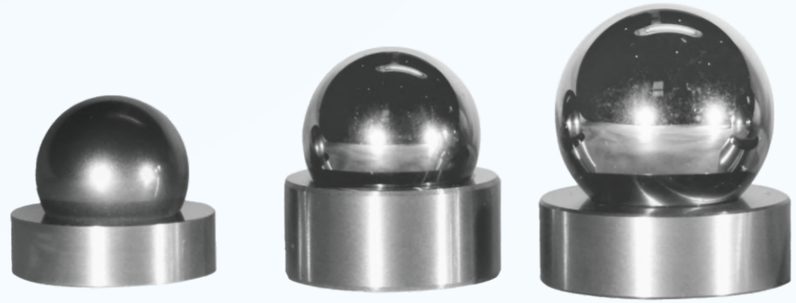


API Valve Balls & Seats

- API Specification 11AX carbide balls and seats.

Application

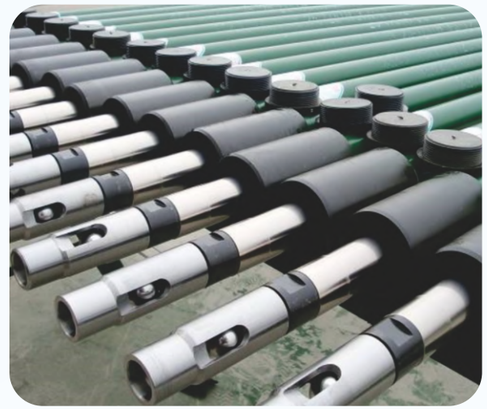
The cemented carbide valve ball and seat are extensively utilized in stationary and moving unidirectional valves across various tube-type and rod-type oil suction pumps. They are valued for their high hardness, exceptional wear and corrosion resistance, as well as excellent resistance to compression and thermal shock. These properties contribute to high pumping efficiency and extended pump check cycles, particularly in the extraction of thick oil containing sand, gas, and wax from inclined wells.



Valve Balls and Seats

Capability

- Certified to API Specification Q1.
- We offer a selection of balls and seats made from stainless steel, cobalt carbide, nickel carbide, and titanium carbide.
- These balls and seats are meticulously machined to achieve a roundness of 0.4 μm and a surface roughness of Ra 0.05 μm.
- They deliver outstanding sealing performance, capable of withstanding 85 MPa vacuum without leaking for up to 5 seconds.



HVOF Coated Hard Sealing Valve Gates and Seats

- Tungsten carbide hardfaced valve gates and seats exhibit exceptional wear and corrosion resistance in high-pressure operational environments.

Application

These critical components, integral to gate valves used in demanding applications such as choke-and-kill manifolds and Christmas trees, utilize the latest proven technologies to ensure optimal sealing performance.

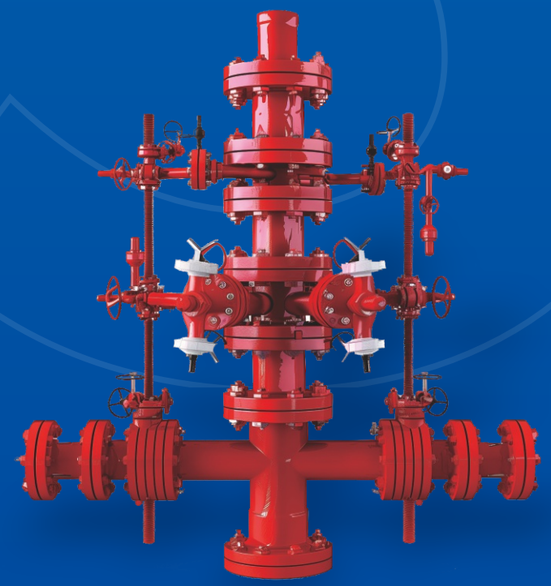
HVOF Coated Hard Sealing Valve Gate and Seat

Capability

- As a leading manufacturer of HVOF powders, we offer several proprietary grades specifically designed for valve gates and seats.
- Our HVOF coatings feature ultra-low porosity, high hardness, excellent flatness, and can withstand high pressures up to 15,000 psi.

GATHERING, TRANSPORTATION, AND OIL REFINING

- Valve Stem Balls & Seats
- HVOF Coated Valve Balls & Seats
- Catalyst-Ammonium Metatungstate

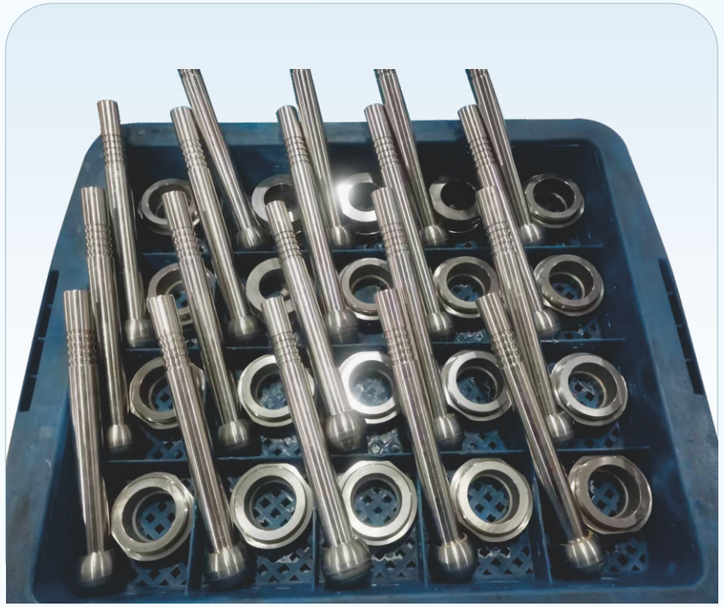


GATHERING AND TRANSPORTATION & OIL REFINING

Valve Stem Balls & Seats

Application

Valve stem balls and seats are utilized in intelligent regulating valves, enabling remote adjustment and control of oil and gas production and transportation.



Valve Stem Balls & Seats

Capability

- Key material properties include high hardness and excellent resistance to wear, corrosion, and impact.
- They exhibit exceptional sealing performance, maintaining zero leaks for 5 seconds under 85 MPa pressure.
- Various carbide materials are available for selection.

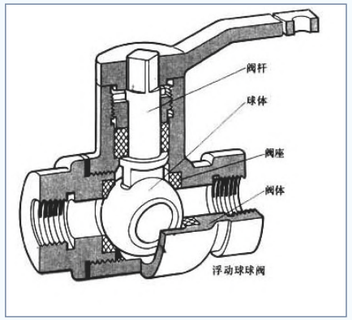
HVOF Coated Valve Balls & Seats

Application

HVOF-coated hard sealing valve balls and seats are primarily used for cutting, distributing, and changing flow direction.

- These components are critical inside ball valves, especially in severe operating conditions.

We provide proprietary thermal spray coating processes to apply high-quality coatings on valves, preventing galling, high temperatures, and corrosion.



HVOF Coated Hard Sealing Valve Balls & Seats

Capability

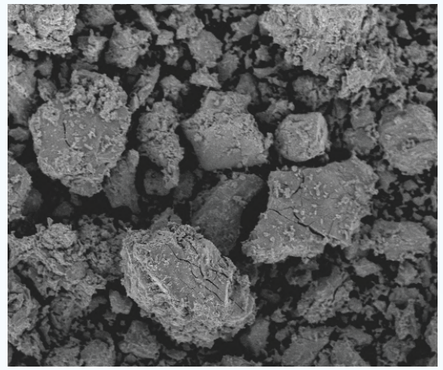
- As a leading manufacturer of HVOF powders, we offer several proprietary grades tailored for valve balls and seats.
- Our HVOF coatings feature ultra-low porosity, high hardness, excellent flatness, and high-pressure bearing capacity.

Catalyst-Ammonium Metatungstate

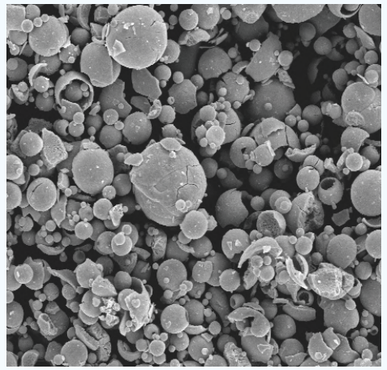
Application

Manufacturing W-containing catalysts.

- AMT is a white or light yellow crystalline powder.



—— Crystallized AMT ——



—— Spraying AMT——

Capability

- It is produced through two processes: crystallization and spraying.
- It possesses "Three High" characteristics—high purity, high content of WO_3, and high solubility. This material meets the specific requirements of various users.

Houston Facility

- Zigong International Marketing LLC (ZIM) is a subsidiary of Zigong Cemented Carbide Co., Ltd (ZGCC), based in the United States. Established in 2002, ZIM is strategically located in Houston, Texas, a prominent hub for the oil and gas industry.
- Our dedicated sales and technical teams collaborate closely with customers across North and South America to address their needs for wear, abrasion, and corrosion resistance.
- We support our customers by maintaining ample inventory to ensure timely deliveries.
- Our professional sales and technical teams work closely with our customers in North America and South America to meet wear, abrasion, and corrosion requirements.
- We help our customers by stocking sufficient inventory to ensure quick deliveries.