



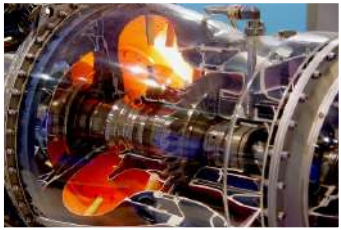
**AGESCAN INTERNATIONAL**

**"A Specialty Material Company"**



[www.agescantungsten.com](http://www.agescantungsten.com)





**Agescan International Inc** is well established with extensive experience and capability in supplying rare metal-based alloy materials and parts. We offer premium-quality metal products for global customers.

At Agescan, we keep striving for successive progress while expanding to support various industries such as outdoor sports, nuclear energy, electronics, and petrochemical, with our high-quality special alloy product line. We own 40 invention and appearance patents, our solid R & D capabilities, advanced manufacturing technologies and strict quality control keep us in the leading position in our industry domain.

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# QUALITY ASSURANCE



As an ISO certified company, Agescan International strictly enforced the ISO 9001 and ASTM B777 (High Density Tungsten Alloy Line) requirements to the complete life cycle of our products, from technical specification review, engineering design, project management, machining and fabrication, quality control until aftersales service.

We are actively engaging and networking at world-famous exhibitions and with industrial associations all-year-round from North America to Europe and Asia-Pacific.





**AGESCAN  
TUNGSTEN**

## Industries & Applications

### — Outdoor Sports —

#### Hunting Cartridge Pellets

*\*Tungsten, Nickle, Iron Alloy*

*\*Bismuth, Tin Alloy*

*\*Steel*

High performance cartridge pellets designed for various hunting applications. Agescan is a strategic supplier for global hunting cartridge manufacturers with Tungsten Super Shot (TSS), Tungsten Shot, Bismuth Shot, Steel Shot. Our comprehensive hunting solutions are based on different materials cover density range from 7.8 – 19.3g/cc with ultimate shooting performance and eco-friendly compound.



# Tungsten Super Shot ("TSS") and Tungsten Shot

Thanks to its extreme density, nowadays tungsten super Shot ("TSS") is widely recognized and accepted as the most deadliest shotshell metal among all shot types in the hunting ammo industry. It is simple physics...

**Agescan** and its Chinese plant have always been the reliable producer and supplier of tungsten alloy parts for defense, aerospace and nuclear industries since 2003. By maintaining military-level production methods based on high-density Tungsten-based alloy ASTM B777 standard, Agescan has supported the major shotgun shell ammo manufacturers in North America with the finest tungsten shots to bring TSS loads to the masses from 2017 till present.

*Our capacity for Supplying tungsten shots includes but not limited to:*

Density: 18g/cc ("TSS"), 15g/cc, 13g/cc, 11g/cc

Size: 10s' (.07") to 0000s' (.38")

Shot size Tol.: +/- .002"

Pellet count (per oz): avg. #7: 188 ; avg. #9: 362

Monthly Capacity: 62,000 -75,000 lbs



## Bismuth Shot

Bismuth alloy is one of the softest metals, and it is around 25% denser than steel and with similar density of lead. It means our bismuth shots ensure ideal ballistic performance and penetration to targets while minimizing wear on your shotguns and prolonging their lifetime.



Agescan's bismuth shot products were proudly manufactured under ASTM B774-00 and ISO9001 standards. With a compound of 94% bismuth and 6% tin, we achieve a density range of 9.58-9.67 g/cm<sup>3</sup>, ultra-high purity, small grain size and outstanding pellet integrity.

Size: 7s' (.10" ) to Ts' (.20" )

Surface: zinc, copper, nickel plating available

Monthly Capacity: 22,000 to 28,000 lbs

## Steel Shot

Our high-performance Steel Shots were made with optimal velocities and consistent patterns, the materials were softened by annealing process, and plated by zinc and nickel anti-corrosion protections.

Our steel shots were alloyed with carbon, silicon and manganese to produce unsurpassed quality pellets, built in quality status that exceed U.S. and European standards and suitable for use in all types of shotguns.





# Tungsten Fishing Weights

*\* Tungsten, Nickle, Iron Alloy*

The key advantage tungsten alloys have over lead for fishing is that it is much denser than lead. This characteristic brings much greater sensitivity over different bottom types, which allow anglers to feel bottom structure way easier. The high density of tungsten alloys maximizes the underwater performance through optimizations in descending speed and sinking depth. Moreover, environmental threats from lead can be long-lasting to waterfowls, fishes, and plants. Tungsten has become an ideal substitute for lead in fishing weights.



# Archery Broad-heads

*Tungsten, Nickle, Iron Alloy*

Tungsten is a brilliant material used for archery broadheads (points) with extreme hardness, density, and consistency. Comparing to stainless steel broadheads, tungsten alloy broadheads are shorter in size, heavier in weight and greater in strength, hence result in lower arrow side area, more arrow weight and less likely to bend. In the arrow ballistic trajectory, tungsten alloy broadheads travel more steadily and drift less (about 3% less). Furthermore, tungsten points are much easier to pull from a wooden target.



## Golf Club Counterweights

*\*ungsten, Nickle, Iron Alloy*

A golf head consists of the head body and the bottom that provided with a welding port and a dual-gravity tungsten alloy counterweight body. To increase performance, people find ways to increase the weight of the golf club heads. Traditional golf clubs are generally made of titanium or steel, casted, or forged. Owing to the unique properties, tungsten alloys are well suited for use as weights for sports equipment. Tungsten heavy alloys have a density twice of steel, it is the best material to manufacture into golf club head counterweight.



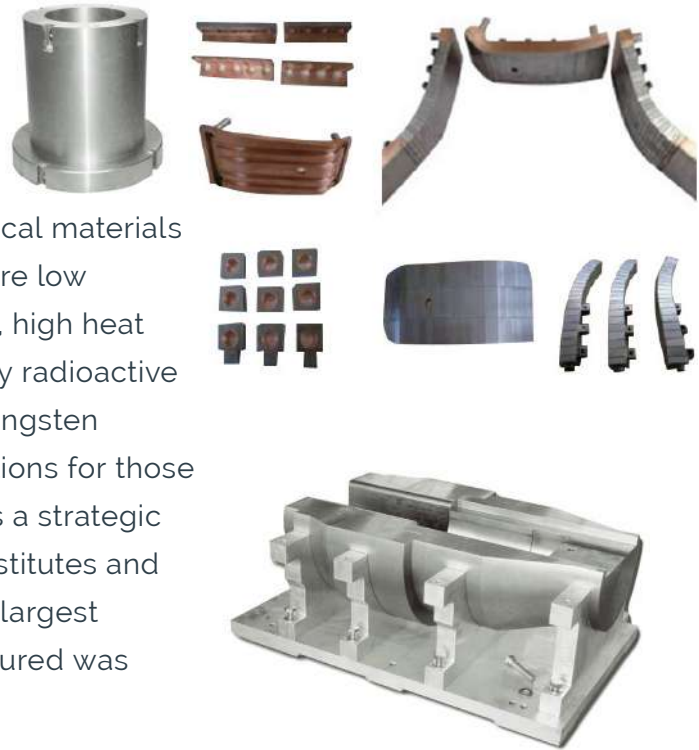
# Industrial Nuclear Components

**\*Tungsten, Nickle, Iron Alloy**

**\*Tungsten, Copper Alloy**

**\*Titanium, Zirconium, Molybdenum Alloy**

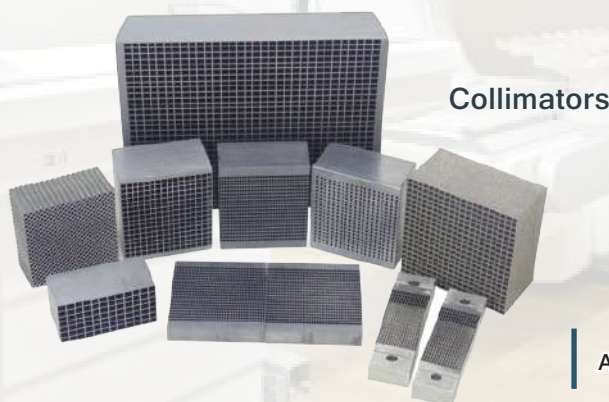
Plasma-facing material is one of the most critical materials in the fusion reactor. The main requirements are low sputtering rate, high thermal shock resistance, high heat load capacity, low tritium retention, low activity radioactive and low decay heat. Tungsten heavy alloys, tungsten copper alloys and TZM materials are ideal options for those application scenarios. Agescan International is a strategic partner and supplier of special materials to institutes and laboratories in nuclear fusion and fission. The largest components we have designed and manufactured was weighed 1.3 ton (about 2,900 lbs).



## Nuclear Medicine

**\*Tungsten, Nickle, Iron Alloy**

Medical equipment is only as good as the materials that comprise it. For businesses that manufacture medical equipment, it is vital they have a reliable medical grade alloy supplier. Our products were used for a wide array of purposes, including but not limited to syringe shields, vial containers, dose pig, and customized components for radioactive imaging devices.



Collimators

# Radiography

*\*Tungsten, Nickle, Iron Alloy*

Industrial radiography is a modality of non-destructive testing that uses ionizing radiation to inspect materials and components with the objective of locating and quantifying defects and degradation in material properties that would lead to the failure of engineering structures. Tungsten alloy plays an important role in radiography imaging performance, user's safety, and device endurance.



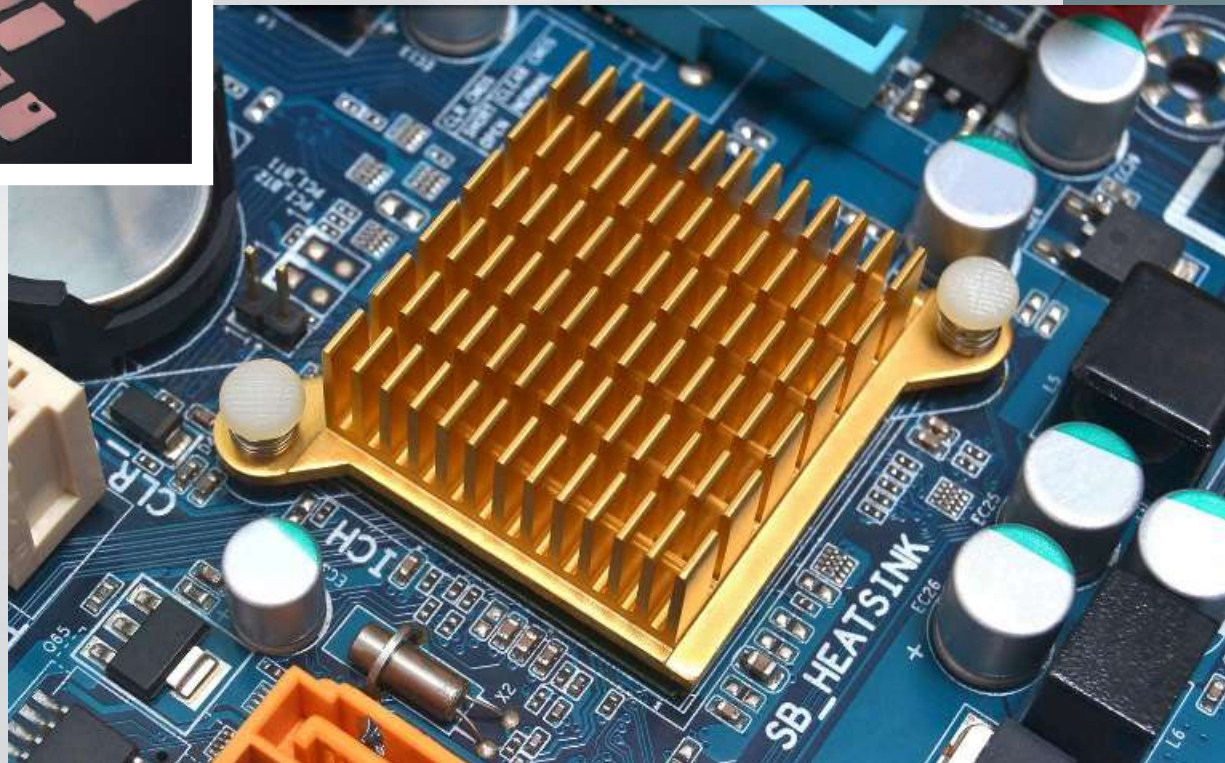
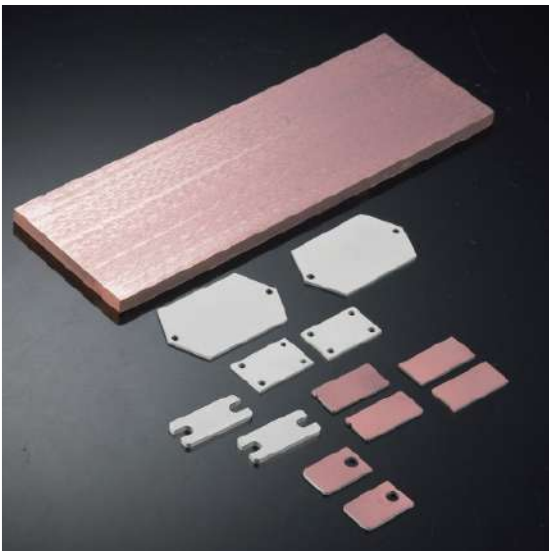


# Heat Sink

*\*Tungsten, Copper Alloy*

*\*Molybdenum, Copper Alloy*

In the power electronic devices and circuits, heat dissipation is a significant by-product. By transferring heat to the air, heat sink materials contribute reducing the temperature of chip. Molybdenum copper and tungsten copper alloy have inherited the low thermal expansion properties from molybdenum and tungsten, and the outstanding conductivity from copper. Heat sinks help cooling IGBT module, RF power amplifier, LED chips and other electronic components.



## Molybdenum Boat

***\*Pure Molybdenum***

***\*Molybdenum, Lanthanum Alloy***

Molybdenum and molybdenum alloy boats are widely used in electronic industry, nuclear fuel sintering, vacuum evaporation, coating technology, etc. Molybdenum boats have extremely high melting points, low vapor pressures, slow evaporate rate and corrosive resistance. Molybdenum's low vapor pressure makes sure no molybdenum enters the vapor or contaminates the evaporation materials during this process.

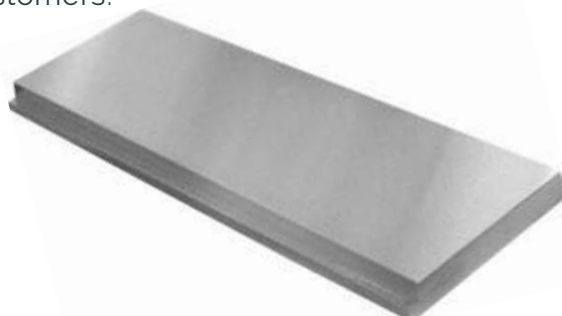


## Target Materials

***\*Pure Molybdenum***

***\*Molybdenum, Niobium Alloy***

Molybdenum coatings are crucial components for TFT-LCD screens, they provide instantaneous control of pixels thus help presenting high quality images. Molybdenum and niobium (MoNb) targets were used as corrosion resistance wirings of ITO sensor in touch screens. Our HIP process ensures our materials to meet the most demanding specifications from our customers.





## Electrodes

***\*Pure Tungsten***

***\*Tungsten, Copper Alloys***

***\*Tungsten, Rare Earth Alloys***

In cutting, TIG, arc and plasma welding, metal or ceramic powder was melted in arc or projected to the workpiece surface at high speed. When dealing with welding or plasma spraying, the electrodes have to undertake extreme temperatures over 12,000 °C . The low deformation and high melting point properties from tungsten achieved the reliability of our electrode products.



Cermet materials are normally the composites of ceramic and metal. A cermet can combine attractive properties of both ceramic and metals, such as high temperature resistance, extreme hardness, plastic deformation resistance. Cermets are used in the manufacture of resistors (especially potentiometers), capacitors, and other electronic components which may experience high temperature. Some types of cermets are also being considered for use as spacecraft shielding as they resist the high velocity impacts of micro-meteoroids and orbital debris much more effectively than more traditional spacecraft materials such as aluminum and other metals.

## Cermet Extrusion Die

***Nickle, Molybdenum, Cobalt, and Ceramic compound***



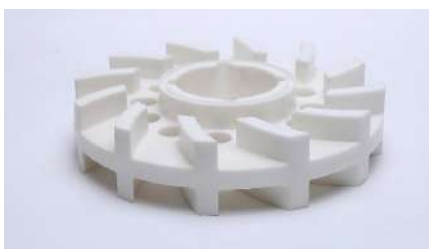
# High Temperature Furnace

**Sintered Tungsten**

**Sintered Molybdenum**

**Other Alloys Containing Rhenium,  
Titanium, Tantalum, Niobium, etc.**

When industrial asked for higher mechanical properties on metal products, special processes such as hardening, annealing, and sintering came into use. In the high temperature furnaces, tungsten & molybdenum products are widely used as containers, heat insulation shields, heating components, sticks and trays. Agescan supplied our customers with machined die-plate, furnace supporter, tungsten mesh heater, molybdenum tube, mandrel shafts and many more products according to specifications and customized specifications.

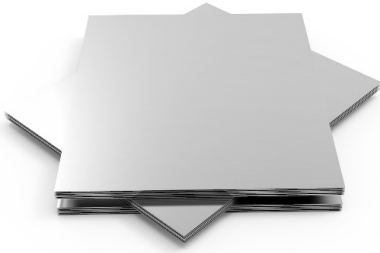


## Grinding and Milling Agents

**Zirconia (ZrO<sub>2</sub>)**

Through special moulding and sintering technologies, our high purity zirconia beads have become the best material for grinding and milling. Low abrasion, high compression resistance, good sphericity, chemical stability, corrosive resistance are the main features of zirconia. Zirconia components have wide application in ultra fine powder grinding and dispersion of non-metal mineral, paint, printing ink, papermaking, electronic materials, magnetic materials, and pharmaceutical industries. Zirconia is also a perfect material for high performance valves.





# High Performance Pre-Shaped Materials

***Tungsten***

***Tungsten, Nickle, Iron Alloy***

***Tungsten, Copper Alloy***

***Tantalum***

***Niobium***



When you are looking for durable, high quality and resilient alloys that will function seamlessly despite the unique demands of the aerospace industry. Between various weather conditions and being at altitude, it's essential to have the right industrial metals. Agescan provides huge selections for pre-shaped special materials in sheet, strip, plate, rod, tube and so much more.



## Counterweights

***Tungsten, Nickle, Iron Alloy***



Counterweights made of tungsten alloy could significantly improve the balance and handling performance of aeroplanes. The precise machinability is the reason why tungsten alloy is one of the most favorable materials in aerospace applications such as counterweights and ballast of body parts, counterweights for rudders, ailerons, and propellers balance block. Furthermore, we also supply counterweights for crankshafts of automobile, golf club heads, flywheels of nuclear reactor, oil and gas drilling tools.



# Oil Drill Bits

*Tungsten, Carbon (Tungsten Carbide)  
Tungsten, Nickle, Iron Alloy*

In the oil and gas industry, deep drilling into the earth's thick crust is a requirement. Tungsten carbide is one of the hardest compounds on the planet, making it commonly recruited in this endeavour. The extreme hardness around 1600HV making tungsten carbide oil drill bits capable of drilling through almost all materials without bending. Its brittleness also makes them more durable and precise during cutting, tungsten carbide drill bits cut materials into smaller scales in diameters as tiny as 1.5mm or less. On the other hand, tungsten alloys were also used on tubing and piping in petrochemical to resist acid and rust.

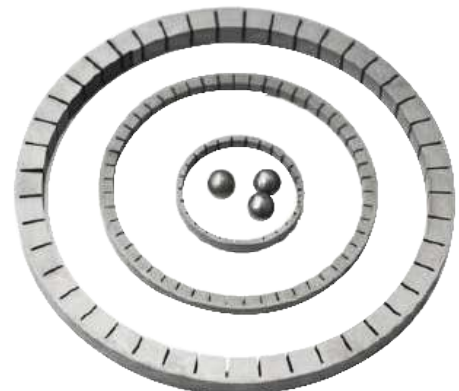


## Pre-Shaped and Customized Products

*Tungsten and Other Alloys*



Our tungsten and other special materials are used as kinetic energy materials for all sorts of purposes. Regardless of whether you manufacture jet engines, rotor shafts, casings, or some other important piece of equipment for harsh application scenarios, Agescan can always be your reliable partner. More than pre-shaped materials, we design, produce and test products based on your specifications.







# Industry Standards and Material Properties

## High Density Tungsten Based Alloy - ASTM B 777 Standard

| Characteristics           |                         | Standard Grades   |                   |                   |                   |
|---------------------------|-------------------------|-------------------|-------------------|-------------------|-------------------|
| Density Classification    | MIL-T-21014D            | Class 1           | Class 2           | Class 3           | Class 4           |
|                           | AMS-T-21014             | Class 1           | Class 2           | Class 3           | Class 4           |
|                           | AMS-7725E               | Class 1<br>Type 2 | Class 2<br>Type 2 | Class 3<br>Type 2 | Class 4<br>Type 2 |
|                           | ASTM B777-15            | Class 1           | Class 2           | Class 3           | Class 4           |
| Tensile Properties (typ.) | UTS (ksi)               | 125               | 125               | 125               | 130               |
|                           | 0.2% OYS (ksi)          | 83                | 85                | 90                | 95                |
|                           | EL, min. (%)* @ 1"      | 5                 | 5                 | 3                 | 2                 |
| Mag. Perm.                | per ASTM A342           | >1.05             | >1.05             | >1.05             | >1.05             |
| Density, nom.             | (g/cc)                  | 17.0              | 17.5              | 18.0              | 18.5              |
|                           | (lb/in <sup>3</sup> )   | 0.61              | 0.63              | 0.65              | 0.67              |
| Hardness, typ.            | (HRC)                   | 28                | 28                | 29                | 30                |
| W Content, nom.           | (wt. %)                 | 90                | 92.5              | 95                | 97                |
| Modulus, nom.             | (x 10 <sup>6</sup> psi) | 50                | 52                | 54                | 56                |
| Binder Elements           |                         | Ni + Fe           | Ni + Fe           | Ni + Fe           | Ni + Fe           |

\*High-density tungsten alloy with Ni+Cu binder (nonmagnetic) is also available upon request.

## Tungsten Copper Alloy- ASTM B 702 Standard

| Tungsten Material Grades          | Class A                | Class B                | Class C                | Class D                | Class E                |
|-----------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Copper (Cu) Contents (%)          | 48-52                  | 38-42                  | 28-32                  | 23-27                  | 18-22                  |
| Tungsten (W) Contents (%)         | Balance                | Balance                | Balance                | Balance                | Balance                |
| Additives (%)                     | ≤ 1                    | ≤ 1                    | ≤ 1                    | ≤ 1                    | ≤ 1                    |
| Density (mg/m <sup>3</sup> )      | 11.7                   | 12.7                   | 13.7                   | 14.3                   | 15.0                   |
| Electrical Conductivity % IACS    | 56-64                  | 49-57                  | 44-52                  | 41-48                  | 38-45                  |
| Electrical Conductivity % IACS    | 38-56                  | 34-49                  | 29-43                  | 27-41                  | 25-37                  |
| UTS (MPa)                         | 344-413                | 379-448                | 516-585                | 585-654                | 620-689                |
| Modulus of Rapture (MPa)          | 517-586                | 758-827                | 896-965                | 965-1,034              | 1,034-1,103            |
| Coefficient of Expansion (in./in) | 7.2 * 10 <sup>-6</sup> | 6.6 * 10 <sup>-6</sup> | 5.7 * 10 <sup>-6</sup> | 5.3 * 10 <sup>-6</sup> | 4.9 * 10 <sup>-6</sup> |
| Hardness (Rockwell B)             | 69-83                  | 77-90                  | 85-98                  | 89-102                 | 94-106                 |

## Tungsten Copper Alloy

|                                            |             |
|--------------------------------------------|-------------|
| Chemical Compound                          | W, Cu       |
| Density (gram/cc)                          | 11.85-16.75 |
| Hardness (HB kgf/mm <sup>2</sup> )         | 115-260     |
| Resistivity (Ω.cm)                         | 3.2-6.5     |
| International Annealed Copper Standard (%) | 27-54       |
| Tensile Strength (Mpa)                     | 434-662     |
| Thermal Conductivity (W/(cm K))            | 1.4-2.4     |

## Tungsten Carbide

| Industry Code                     | C1              | C2              | C3        | C10     |
|-----------------------------------|-----------------|-----------------|-----------|---------|
| Binder Content & Type             | 7.5-15% Co      | 6-10% Co        | 6% Co     | 9% Co   |
| Hardness (HV30)                   | 91              | 92              | 93        | 90      |
| Density (g/cm <sup>3</sup> )      | 14.0-14.7       | 14.5-14.95      | 14.95     | 14.6    |
| Transverse Rapture Strength (psi) | 330,000-530,000 | 320,000-450,000 | 450,000   | 360,000 |
| Grain Size                        | Fine            | Submicron, Fine | Submicron | Medium  |

| Industry Code                     | C11             | C12             | C13     | C14     |
|-----------------------------------|-----------------|-----------------|---------|---------|
| Binder Content & Type             | 10-12% Co       | 10-15% Co       | 20% Co  | 25% Co  |
| Hardness (HV30)                   | 89.5            | 88              | 85      | 83.2    |
| Density (g/cm <sup>3</sup> )      | 14.3-14.5       | 14.0-14.5       | 13.6    | 13.15   |
| Transverse Rapture Strength (psi) | 390,000-400,000 | 420,000-425,000 | 450,000 | 435,000 |
| Grain Size                        | Medium          | Medium, Coarse  | Medium  | Medium  |



## ■ Molybdenum

|                                                  |                      |
|--------------------------------------------------|----------------------|
| Chemical Compound                                | Mo                   |
| Density (gram/cc)                                | 10.22                |
| Melting Point (°C)                               | 2620                 |
| Coefficient of Linear Thermal Expansion (m/(mk)) | $5.2 \times 10^{-6}$ |
| Thermal Conductivity (W/(mk))                    | 142                  |
| Electrical Conductivity (S/m)                    | $17.9 \times 10^6$   |

## ■ Bismuth Tin Alloy

|                                         |           |
|-----------------------------------------|-----------|
| Chemical Compound                       | Bi, Sn    |
| Density (gram/cc)                       | 8.12-8.56 |
| Melting Point (°C)                      | 138-170   |
| Tensile Strength (kgf/cm <sup>3</sup> ) | 525-565   |
| Thermal Conductivity (W/mk)             | 19-30     |

## ■ Zirconia

|                             |                  |
|-----------------------------|------------------|
| Chemical Compound           | ZrO <sub>2</sub> |
| Density (gram/cc)           | 5.0-6.2          |
| Compression Strength (MPa)  | 1200-5200        |
| Ductility                   | 0.00066-0.0035   |
| Hardness (MPa)              | 5,500-15,750     |
| Loss Coefficient            | 0.0005-0.001     |
| Tensile Strength (MPa)      | 115-711          |
| Thermal Conductivity (W/mk) | 1.7-2.7          |

## ■ Niobium

|                             |          |
|-----------------------------|----------|
| Chemical Compound           | Nb       |
| Density (gram/cc)           | 8.57     |
| Melting Point (°C)          | 2477     |
| Hardness (Vickers)          | 870-1320 |
| Thermal Conductivity (W/mk) | 53.7     |



  
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