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TUNGSTEN HEAVY ALLOY



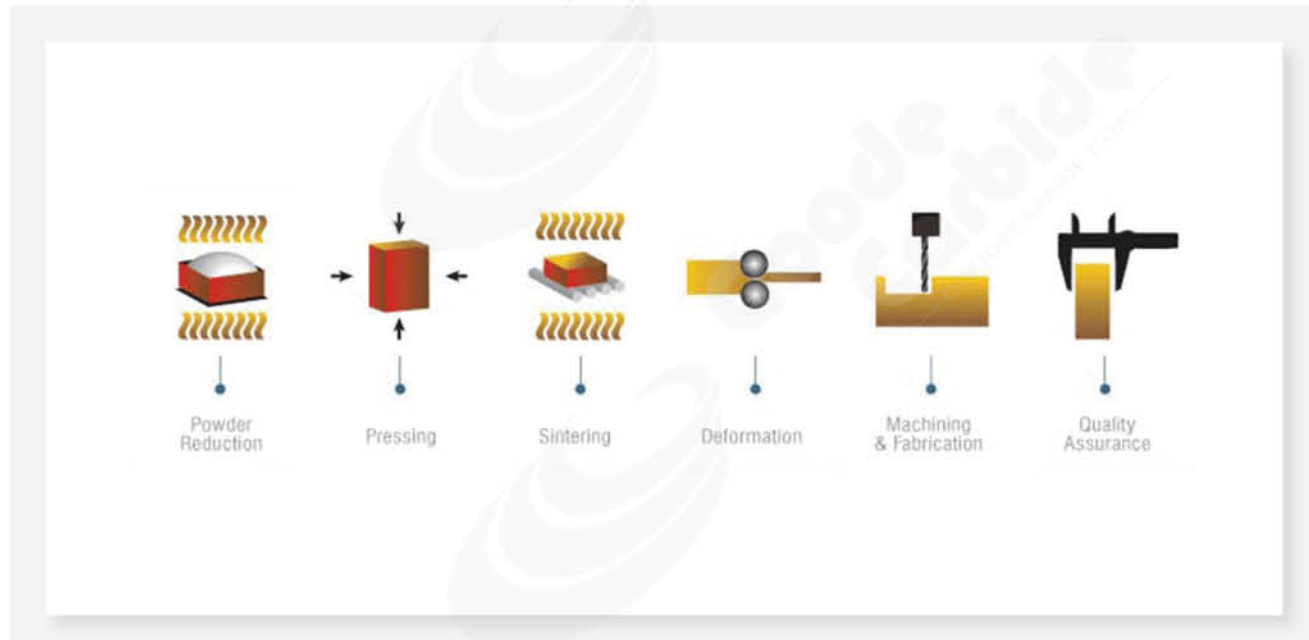
TUNGSTEN HEAVY ALLOY

CHINA Made Tungsten Heavy Alloy (WHA). GOODE CARBIDE is a 100% CHINA owned, fully integrated, leading producer of high-quality tungsten heavy alloy material and finished parts. GOODE CARBIDE is ISO, AS9100, registered and a qualified supplier to many Tier 1/2 aerospace and defense contractors that leverage our specialty tungsten material as balance weights, flight hardware, and munition subcomponents. Our tungsten heavy alloy meets all ASTM B-777, AMS 7725E, requirements.

GOODE CARBIDE Technologies presses and sinters high-quality tungsten heavy alloy (WHA) blocks, rods, and shaped parts. Sintered WHA blanks can be further rolled or swaged by GOODE CARBIDE to produce plates, sheets, and rods with ultimate tensile strengths exceeding 180 ksi (1240 MPa) and elongations exceeding 5%. GOODE CARBIDE also precision machines WHA parts for use as ballast weights, radiation shields, boring bars, ordnance components, and other components that require high density and good ductility.

GOODE CARBIDE produces its own pure tungsten powder at its facility in ZHUZHOU, HUNAN and has large blending and alloying capabilities.

OUR POWDER METALLURGY PROCESS



APPLICATIONS FOR TUNGSTEN HEAVY ALLOY (WHA):

Balance Weights for turbines, crankshafts, and helicopter rotors

Inertial damping weights for aircraft control surfaces

Weights for aircraft, missiles, boats, and race cars

Kinetic energy penetrators

Radiation Shielding, radioisotope containers, and collimators for high energy x-ray systems in scientific, industrial, medical, and homeland security applications

Low chatter, high stiffness boring bars and tool holder for metalworking

High-density instrument casings for downhole formation logging in oil/gas wells

Vibration Dampening Weights

WHAT BENEFITS ARE ASSOCIATED WITH WHA?

Strength proportionate to many medium carbon steels

Machinable with routine shop tools and techniques

High elastic stiffness

Low CTE in combination with relatively high thermal conductivity

Low toxicity, low reactivity surface character

Can be manufactured in a wide range of sizes and shapes

Environmentally friendly

Chemical Composition and As-sintered Mechanical Properties

STANDARD GRADES

Grade	ET90	ET90NM	ET92.5	ET92.5NM	ET93
ASTM B-777	Class 1	Class 1	Class 2	Class 2	–
AMS 7725E	Class 1 Type 2	Class 1 Type 1	Class 2 Type 2	Class 2 Type 1	–
MIL-T-21014D	Class 1	Class 1	Class 2	Class 2	–
W content, wt.%	90	90	92.5	92.5	93
Ni content, wt.%	7.0	8.9	5.3	6.7	5.6
Fe content, wt.%	3.0	1.1	2.2	0.8	1.4
Density, g/cm ³	17.0	17.0	17.5	17.5	17.7
UTS, ksi	≥ 110	≥ 110	≥ 110	≥ 110	≥ 110
UTS, MPa	≥ 758	≥ 758	≥ 758	≥ 758	≥ 758
YS, ksi	≥ 75	≥ 75	≥ 75	≥ 75	≥ 75
YS, MPa	≥ 648	≥ 648	≥ 648	≥ 648	≥ 648
Elongation, %	≥ 5	≥ 5	≥ 5	≥ 5	≥ 5
Hardness, HRC	≤ 32	≤ 32	≤ 33	≤ 33	≤ 33
Mag. perm.	> 1.05	≤ 1.05	> 1.05	≤ 1.05	> 1.05

PRODUCTS SPECIFICATIONS:

Tungsten Heavy Alloy Rods	Dia.3.0 to Dia.400 mm Length: 20-2000mm	They are used for the counterweights, radiation shieldings, military industry, dart rod, welding rod, mould etc.
Tungsten Heavy Alloy Slugs		They are used for automobile and vehicle weight balance, oil drilling machine counterweights, helicopter weights, ship weights and tank counterweights
Tungsten Heavy Alloy Bars	Width:2.0-100.00 mm Length: 2.0-100.00mm Hight: 50-1000mm	They are used as counterweights on aircraft surfaces control, propeller, navigation station, the engine and engine crankshaft
Tungsten Heavy Alloy Blocks	Length: 810mm(max) Width: 400mm(max) Thickness:400mm(max)	They can be made into weapon parts, molds and counterweights, also widely used in the medical field, such as shielding wall, shielding block on the CT device
Tungsten Heavy Alloy Plates		They can be used as counterweights in various fields, such as mechanical hammer, fly weight, oil drilling platform counterweight, and shockproof tool holder. also they can be used for the X ray target, collimator, nuclear fuel container, the needle shielding etc.
Tungsten Heavy Alloy ring		They can be used as counterweights in various fields
Tungsten Heavy Alloy Pipes	Qutter Dia.6~150mm Inner Dia.3~120mm Length:20~600mm	They are the best material for radiation shielding, which can also be used for the pendulum for the clock and automatic watch balances, shockproof knife tools, flywheel weight etc.
Tungsten Heavy Alloy Balls	Dia.2.0 -160 mm	

*Other sizes and properties available as special order

PRESSED AND SINTERED PARTS:

Goode Carbide has industry-leading expertise and experience in pressing and sintering ASTM B-777 material. We offer both round and rectangle parts in the pressed and sintered state – which helps reduce cost to our customers.

Leading companies purchase Goode Carbide-made tungsten heavy alloy material for applications such as ballast weights, radiation shields, boring bars, ordnance components and other components requiring high density and good ductility.

PRESSED AND SINTERED MACHINED PARTS:

Goode Carbide has industry-leading expertise and experience in pressing, sintering, and machining ASTM B-777 material. We can supply material finished to your drawing requirements. Goode Carbide produces finished parts for medical equipment manufacturers, balance weights for aircraft, Vibration dampening weights for helicopter rotors to name a few current applications.

WHA HOT SWAGED RODS WITH ENHANCED MECHANICAL PROPERTIES:

Goode Carbide is a leader of providing Tungsten Heavy Alloy (WHA) hot swaged rod material with enhanced properties. Goode Carbide can adjust swaging and heat-treating conditions to produce WHA rods with specific combinations of strength and ductility.

Swaged Rods are produced in diameters $<.25"$ to $>1"$ based on customer requirements.

WHA rods are swaged and cut to size to customer-specified thickness, length, surface finish as well as other material properties. We also offer high volume, precision machining, threading, and gun-drilling services. As with all of our materials, our rod begins as metal powder, pressed into ingots, sintered, and then swaged and drawn down. Our advanced drawing / swaging process enables us to tailor the product to meet specific customer material and performance requirements to ensure optimal performance in your application.

Other alloy compositions and properties may be available as a special order.

WHA HOT ROLLED PLATE AND SHEET PRODUCTS:

Goode Carbide has been hot rolling pure tungsten and molybdenum for over 30 years and is the only China-owned tungsten producer with hot rolling capabilities. Goode Carbide offers a range of tungsten heavy alloy plate and tungsten heavy alloy sheet products in varying thickness and length and per our customer request. As with all of our materials, our WHA plate and sheet begins as metal powder, is pressed into ingots, sintered, and then rolled. The process enables us to tailor the product to meet specific customer material and/or performance requirements to ensure optimal performance in your application.

HOT ROLLED WHA PLATE AND SHEET STANDARD SIZES:

$.080"$ to $1"$ thick. Widths and lengths available up to $24"$

Tungsten Heavy Alloy Form Factors

Goode Carbide manufactures tungsten heavy alloy in various forms-from WHA blocks, rods (sintered or swaged)

