

**CATALOG OF TUNGSTEN ALLOY PRODUCTS**

Tungsten Alloy Products

Revision No.2

Date of Preparation: 08/18/2011

Reason for Issue: Updated Format

---

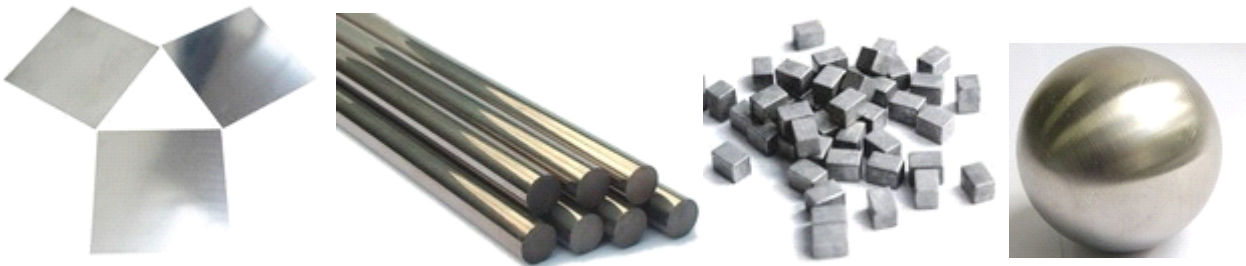
Chemical Name: Tungsten Carbide

Chemical Family: Refractory Metal (non-ferrous metal)

*Chemical Formula: WC*

E-Biz Center of China Tungsten Industry Association

---



MORE INFORMATION

Web: [www.tungstenalloys.net](http://www.tungstenalloys.net)

Email: [ebiz@ctia.com.cn](mailto:ebiz@ctia.com.cn)

# PRODUCTS CONTENTS

<b>1. COMPOSITION DETAILS.....</b>	<b>2</b>
<b>2. TUNGSTEN ALLOY PLATES / SHEET / FOIL.....</b>	<b>4</b>
<b>3. TUNGSTEN ALLOY ROUND ROD / BAR.....</b>	<b>5</b>
<b>4. TUNGSTEN ALLOY TUBE / PIPE.....</b>	<b>6</b>
<b>5. TUNGSTEN ALLOY BALL.....</b>	<b>7</b>
<b>6. TUNGSTEN ALLOY CUBE.....</b>	<b>7</b>
<b>7. TUNGSTEN BUCKING BAR.....</b>	<b>7</b>
<b>8. TUNGSTEN PARTS.....</b>	<b>8</b>
<b>COMPANY INFORMATION.....</b>	<b>9</b>

# 1. COMPOSITION DETAILS

Tungsten alloy generally are refractory metal, which have two-phase composites consisting of W-Ni-Fe or W-Ni-Cu or even W-Ni-Cu-Fe, some tungsten alloy is added Co, Mo, Cr, etc. It could be made as various shapes, such as rod, cube, block, brick, ring, etc.



Usually, Tungsten alloy could be manufactured as the parts of military defense, radiation shielding, extrusion die, some counterweights, such as yacht counterweights, vehicle counterweights, airplane counterweights, helicopter counterweights, boat counterweights, tank counterweights, etc.

Ingredient name	CAS Number	% WT
Tungsten	7440-33-7	70-99%
Nickel	7440-02-0	0-21%
Iron	7439-89-6	0-9%
Copper	7440-50-8	0-25%
Cobalt	7440-48-4	0-4%

## The advantage of tungsten alloy

- Ability to absorb the rays: The ability is so strong that it's about 30-40% higher than lead;
- High Thermal conductivity coefficient: 5 times that of die steel;
- Low Thermal expansion coefficient: Only 1/2-1/3 of that of iron or steel;
- With good weld-ability and process-ability.

## The applications of tungsten alloy

- Radiation shield, collimator, nuclear shielding, beam stop, PET syringe shield, vial shield, isotope container, FDG container, multi leaf collimator;
- Balanced part; heavy metal boring bar, yacht, sailboat, submarine and other vessels crank camshafts, holders for Well Logging, Racing Weights. Vibration damping and dynamic balancing. Tungsten sinker bar, Tungsten bucking bar, Tungsten boring bar, Tungsten Sinkers, tungsten alloy counterweights for golf and tungsten alloy dart parts spheres, cubes, and projectile shapes;

- High-temperature die, Electroheat , brass and copper, Tooling for low-pressure die-casting of aluminum and brass, Hot upsetting dies, Filler rods for die repair, upsetting anvil block, electrical rivet;
- Shrapnel head; Penetrators;
- Electrical contact;
- Balanced ball for missile and plane; golf and tungsten alloy dart parts spheres, cubes, and projectile shapes;
- Core for armor piercing bullet measurement.

### **Tungsten alloy data sheet**

Type	Density g/cm <sup>3</sup>	Tensile strength MPa	Elongation	HRC
85W-10.5Ni-4.5Fe	15.8-16.0	700-1000	20-33	20-30
90W-7Ni-3Fe	16.9-17.1	700-1000	20-33	24-32
90W-6Ni-4Fe	16.7-17.0	700-1000	20-33	24-32
91W-6Ni-3Fe	17.1-17.3	700-1000	15-28	25-30
92W-5Ni-3Fe	17.3-17.5	700-1000	18-28	25-30
92.5W-5Ni-2.5Fe	17.4-17.6	700-1000	25-30	25-30
93W-4Ni-3Fe	17.5-17.6	700-1000	15-25	26-30
93W-4.9Ni-2.1Fe	17.5-17.6	700-1000	15-25	26-30
93W-5Ni-2Fe	17.5-17.6	700-1000	15-25	26-30
95W-3Ni-2Fe	17.9-18.1	700-900	8-15	25-35
95W-3.5Ni-1.5Fe	17.9-18.1	700-900	8-15	25-35
96W-3Ni-1Fe	18.2-18.3	600-800	6-10	30-35
97W-2Ni-1Fe	18.4-18.5	600-800	8-14	30-35
98W-1Ni-1Fe	18.4-18.6	500-800	5-10	30-35
90W-6Ni-4Cu	17.0-17.2	600-800	4-8	25-35
93W-5Ni-2Cu	17.5-17.6	500-600	3-5	25-35

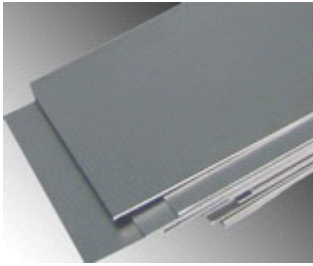
We supply tungsten alloy products such as WNiFe and WNiCu. The products are tungsten alloy rod, tungsten alloy ball, tungsten alloy block, tungsten alloy ring and tungsten alloy finished parts according to the user's drawing and we can provide other types and sizes tungsten alloy products with varying contents and properties.

**MORE INFORMATION**

Web: [www.tungstenalloys.net](http://www.tungstenalloys.net)

Email: [ebiz@ctia.com.cn](mailto:ebiz@ctia.com.cn)

## 2. TUNGSTEN ALLOY PLATES / SHEET / FOIL

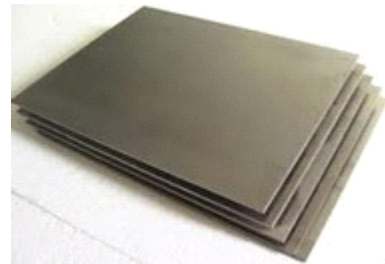


### Tungsten alloy plates / sheet / foil

1. width\*Length: (2.0-250.0mm)\*(2.0-250.0mm)
2. thickness: 0.1mm-15mm
3. Density: 15.8-18.75 g/cm<sup>3</sup>
4. Composition: W content: 85-99%, W-Ni-Fe, W-Ni-Cu
5. Surface: Sintering surface, Forged surface, Ground surface

### Application of Tungsten plates

Tungsten alloy sheet is widely used in radiation shields, packaging materials, cable, shipbuilding, electro-vacuum industries, metallurgical machinery and electronics. Choose the best material, all will be tested by our quality department, and before loading, we will test all, in order to supply you the best products.



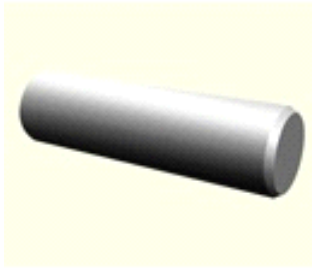
Tungsten alloy plate plays an important role in manufacturing of collimator for nuclear medicine, nuclear research, geology and homeland security. These materials provide reliable protection against X-rays and gamma radiation.

### Specification of tungsten sheet

Thickness [mm]	Tol [mm]	Width [mm]	Tol [mm]	Length [mm]	Tol [mm]	Quality	Flatness in %
0.100	+/- 0.030	200.0	+/- 0.47	1000	+5/-0	cold rolled, bright	15
0.200	+/- 0.035	200.0	+/- 0.47	1000	+5/-0	cold rolled, bright	15
0.300	+/- 0.035	200.0	+/- 0.70	1000	+5/-0	cold rolled, bright	15
0.400	+/- 0.050	200.0	+/- 0.70	1000	+5/-0	cold rolled, pickled	15
0.500	+/- 0.060	200.0	+/- 1.00	1000	+5/-0	cold rolled, pickled	15
0.500	+/- 0.110	500.0	+/- 1.20	1000	+5/-0	hot rolled, pickled	20
1.000	+/- 0.200	500.0	+/- 1.20	1000	+5/-0	hot rolled, pickled	20
1.500	+/- 0.250	500.0	+/- 1.70	1000	+5/-0	hot rolled, pickled	20
2.000	+/- 0.250	500.0	+/- 1.70	1000	+5/-0	hot rolled, pickled	25
3.000	+/- 0.300	300.0	+/- 1.70	800	+5/-0	hot rolled, pickled	25
4.000	+/- 0.200	200.0	+/- 1.70	600	+5/-0	hot rolled, pickled	25
5.000	+/- 0.200	200.0	+/- 1.70	550	+5/-0	hot rolled, pickled	25

Note: The specification and composition of tungsten alloy sheet can be self-defined by customer.

### 3. TUNGSTEN ALLOY ROUND ROD / BAR



#### Tungsten alloy round rod / bar

1. Diameter: 2.0-100.0mm
2. Length: 50-1000mm
3. Density: 15.8-18.75 g/cm<sup>3</sup>
4. Composition: W content: 85-99%, W-Ni-Fe, W-Ni-Cu
5. Surface: Sintering surface, Forged surface, Ground surface

#### Application of Tungsten alloy rod

These kinds of rods could be machined further, which are usually used to making the parts of counterweight, radiation shielding, military defense appliance, welding rod extrusion die, also for some sports fields, such as darts, billets, golf club, etc. Besides, we can manufacture and offer tungsten alloy rod as the counterpart of Anvil 1150, whose properties are much similar.



As its high density, high melting point, small capacity, excellent hardness, superior wearing resistance, high ultimate tensile strength, etc, tungsten alloy rod is increasingly welcomed by public.

#### General Specifications of tungsten alloy rod

Type	Diameter (mm)	Dia. tolerance (mm)	Length (mm)	L tolerance (mm)	Liner rate
Sintering Rod	Φ40-100	±3	<500	±5	±5%
Forged Rod	Φ20-80	±2	<800	±5	±2%
Ground Rod	Φ2-60	±0.1	<650	±1	±0.5%

## 4. TUNGSTEN ALLOY TUBE / PIPE



### Tungsten alloy tube / pipe

1. Diameter: 30-500mm
2. Thickness: 2-30mm
3. Length: 10-1000mm
4. Composition: W content: 85-99%, W-Ni-Fe, W-Ni-Cu
5. Density: 15.8-18.75 g/cm<sup>3</sup>

Tube(mm)	Thickness (mm)	Length (mm)
φ30~100	2~15	
φ100~200	10~20	<1000
φ200~300	15~20	
φ300~500	15~30	

Note: The specification and composition of tungsten alloy tube can be self-defined by customer.

## 5. TUNGSTEN ALLOY BALL



### Tungsten alloy ball

1. Diameter: 1.0mm-100.0mm
2. Density: 15.8-18.75 g/cm<sup>3</sup>
3. Composition: W content: 85-99%, W-Ni-Fe, W-Ni-Cu
4. Surface: Sintering surface, Forged surface, Ground surface

## 6. TUNGSTEN ALLOY CUBE

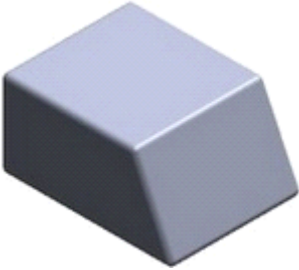
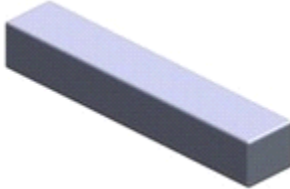
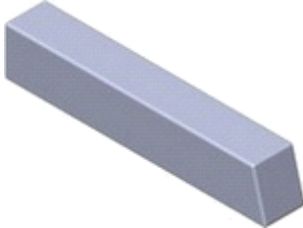
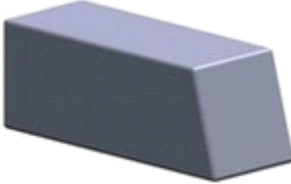
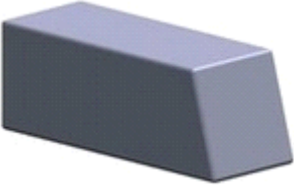
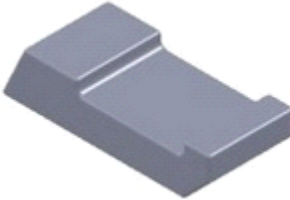
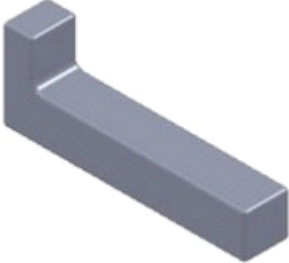
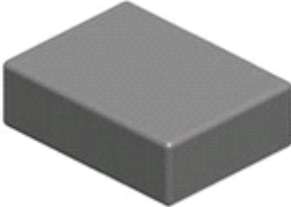
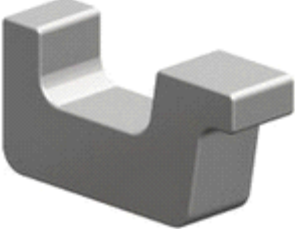
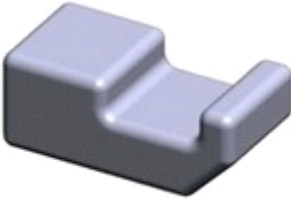


### Tungsten alloy cube

1. Density: 15.8-18.75 g/cm<sup>3</sup>
2. Composition: W content: 85-99%, W-Ni-Fe, W-Ni-Cu
3. Supply state: Sinter state, Grind state
4. Application: balance weight, Military industry

## 7. TUNGSTEN BUCKING BAR

Our bucking bars are normally made from tungsten heavy alloy. All edges are deburred and working surfaces are polished for troubles-free use. This helps to prevent marring of formed buck tails. Please notice that never hold a bucking bar in a vise unless the vise jaws are equipped with protective covers to prevent marring of the bucking bar.

Item	Description	Item	Description
	Code: BG-TBB-01 Specification: 0.75"×1.5"×2" Weight:603g		Code: BG-TBB-06 Specification: 0.625"×1"×4" Weight:744g
	Code: BG-TBB-02 Specification: 0.63"×1"×4" Weight:680g		Code: BG-TBB-07 Specification: 1.5"×1.5"×4" Weight:2540g
	Code: BG-TBB-03 Specification: 1"×2"×6" Weight:1792g		Code: BG-TBB-08 Specification: 1"×2"×3.5" Weight:1787g
	Code: BG-TBB-04 Specification: 0.75"×1.5"×4" Weight:720g		Code: BG-TBB-09 Specification: 0.625"×1.5"×2" Weight:603g
	Code: BG-TBB-05 Specification: 1"×1.875"×3.75" Weight:1315g		Code: BG-TBB-10 Specification: 0.75"×1.5"×2.5" Weight:757g

MORE INFORMATION

Web: [www.tungstenalloys.net](http://www.tungstenalloys.net)  
Email: [ebiz@ctia.com.cn](mailto:ebiz@ctia.com.cn)



## 8. TUNGSTEN PARTS

### Tungsten fabricated parts



Most of our tungsten fabricated parts and molybdenum fabricated parts are used as ion implantation parts for semiconductor industry and as sputtering targets for the solar industry. We also produce parts for X-ray and electron tubes which be made of tungsten and molybdenum. Tungsten crucibles and molybdenum crucibles for

quartz melting and high temperature vacuum furnace are also our main products.

### Furnace components

High temperature industrial furnaces frequently require tungsten components for their successful operation. Tungsten rod or flat sheet heating elements are used in vacuum and hydrogen furnaces. Tungsten metal is also used for heat shielding and other furnace components and structures.



### Electronic/Semiconductor equipment components

Silicon wafer processing relies on the use of ion implantation systems which inject ions at high energy directly into silicon wafer surfaces. The ion plasma source is energized via tungsten electrodes which operate within fabricated molybdenum or tungsten arc chambers.