

 **长沙迈新途科技有限公司**  
Changsha Maxinpath Technologies.co.,Ltd

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## Overview

Our tungsten & molybdenum products, are produced by state of the art equipment and advanced technology.

Our main products include:

- Tungsten Powder
- Tungsten Powder for High Density Alloy
- Crystalline Tungsten Powder
- Tungsten Powder for Spraying
- Tungsten Plate for Sheet Rolling
- Tungsten Heavy Alloy (THA)
- Tungsten & Molybdenum Additives
- Molybdenum Powder
- Molybdenum Powder for Sputtering Targets
- Molybdenum Powder for Spraying
- Molybdenum Bar for Wire Drawing
- Molybdenum Plate for Sheet Rolling
- Molybdenum Penetrator for Seamless Steel Tube

## Tungsten Powder

**Application:** Tungsten powder is used to produce various tungsten carbide products and tungsten alloys.

**Features:** High purity and wide range of particle sizes.

**Appearance:** Uniform dark grey powder.



### Grade, Particle Size, and Application

Name	Grade	Fsss particle size (μm)	Application
Tungsten powder	FW-1	0.8-2.0	Used to produce cermet
		1.4-2.0	Used to produce doped electrode
		1.8-3.0	Used to produce tungsten plate, rod, and crucible.
		4.0-8.0	Used to produce Tungsten-copper alloy
	FW-1 FW-2	2.5-5.0	Used to produce Tungsten High Heavy Alloy
	FW-2	12.0-30.0	Used to produce macrocrystalline tungsten carbide

### Chemical Composition

Grade		FW-1	FW-2	Analysis (equipment)
Main content(wt%, ≥ )		99.97	99.90	
Impurities content (ppm, ≤)	Fe	50	300	AAS
	*Ni	30	40/80*	
	Si	20	50	
	*K+Na	30	30/70*	
	Al	10	40	ICP
	Cu	7	10	
	Ca	20	40	
	Mn	10	20	
	Mg	10	40	
	Mo	50	100	
	Pb	1	5	
	Bi	1	5	
	Sn	3	5	
	Sb	10	10	
	As	15	20	
	P	10	40	
C	50	100	C/S analyzer	
O	See below table	See below table	O/N analyzer	
Standard		GB/T3458	GB/T3458	

Remarks: 1. The main content is calculated by deducting the impurities content ( gas element is excepted ).  
2. \*: Only apply to fisher size of 12-30μm

## Particle Size and Oxygen Content

Fsss particle size(μm)	Oxygen content (ppm, ≤ )
0.8-1.0	2500
1.0-1.5	2000
1.5-2.0	1500
1.8-2.5	1000
2.5-8.0	700
8.0-30.0	1000

## Physical Property of Tungsten Powder Used for Tungsten Alloy

Fsss particle size(μm)	Compact strength (MPa)	Application
1.8-3.0	≥3.0	Used to produce tungsten plate and rod
1.8-2.6	≥5.5	Used to produce tungsten crucible

Customer can choose the chemical composition according to the requirements and application. We can decide the details after discussion.

### Packaging:

Products are packaged in iron drums or carton drums with vacuum sealed plastic bags.

### Instruction for Storage:

Products should be stored in a dry, ventilated, acid & alkali free environment to prevent them from moisture, oxidation and corrosion of active chemicals. The storage period should not exceed three months. They should be used in half a month after unpacking.

## Tungsten Powder for High Density Alloy

Appearance: Dark grey without clump or visual impurities.

### Grade and Chemical Composition

Grade	FWG-1	FWG-2	FWG-3	FWG-4	Analysis (equipment)	
Main content (wt%, ≥ )	99.95	99.95	99.95	99.95		
Impurities content (ppm, ≤)	Fe	50	50	50	50	AAS
	Ni	20	30	30	20	
	Si	20	20	30	20	
	K	10	10	-	10	
	Na	20	20	-	20	
	Cr	10	10	-	10	
	Co	10	10	-	10	
	ICP	Al	15	20	20	20
		Cu	15	20	10	20
		Ca	10	20	20	10
		Mn	10	10	-	10
		Mg	10	20	20	10
		Mo	200	100	100	200
		Pb	5	10	-	10
		Sn	5	10	-	10
		Sb	10	20	-	20
		As	10	-	-	15
Colorimetry	P	10	-	-	10	
	S	10	-	-	10	
	C	20	30	50	30	
C/S analyzer	O	700	1200	1500	700	
	O/N analyzer					
Standard	GB1077A					

Remarks: The main content is calculated by deducting the impurities content ( gas element is excepted ).

### Physical Property of Tungsten Powder

Grade	Fsss Particle Size				Scott Density (g/cm <sup>3</sup> )	Tap Density (g/cm <sup>3</sup> )	Sieving	
	Average particle size (μm)		Porosity				Sieve size (μm)	Percentage (wt%)
	As-Supplied	Lab Milled	As-Supplied	Lab Milled				
FWG-1	2.50~3.50	2.15~3.15	0.600~0.700	0.440~0.540	2.85~3.35	5.0~7.1	>106	<0.1
							<75	≥97
FWG-2	2.00~4.00	-	-	-	2.50~4.00	-	>106	<0.1
							<75	≥97
FWG-2	2.00~4.00	-	-	-	2.50~4.00	-	<45	≥97
FWG-4	2.50~3.00	-	0.600~0.700	-	2.85~3.35	-	>106	<0.1
							<75	≥97

Remarks: The Scott density is as supplied status.

## Morphology:

We can do morphology test as requested for FWG-1 and FWG-4.

## Particle Size Distribution:

- The particle size (Lab milled) of grade FWG-1 is listed in below table.
- The particle size (Lab milled) of grade FWG-4 is as per below:
  - PSD will not be tested if the fisher size does not exceed 3 $\mu$ m.
  - The content of +10 $\mu$ m is 0% if the fisher sizes exceeds 3 $\mu$ m.

The particle size distribution of FWG-1 and FWG-4 (Lab milled & Nephelometry)

Particle range ( $\mu$ m)	Percentage (wt%)	Particle range ( $\mu$ m)	Percentage (wt%)
$\leq 1$	2.0~8.0	6~7	3.0~9.0
1~2	10.0~23.0	7~8	0.0~8.0
2~3	15.0~23.0	8~9	0.0~5.0
3~4	15.0~23.0	9~10	0.0~3.0
4~5	12.0~17.0	10	0.0
5~6	7.0~15.0	-	-

Customer can choose the chemical composition & physical properties according to the requirements and application. We can decide the details after discussion.

## Packaging:

Products are packaged in iron drums or carton drums with vacuum sealed plastic bags.

## Instruction for Storage:

Products should be stored in a dry, ventilated, acid & alkali free environment to prevent them from moisture, oxidation and corrosion of active chemicals. The storage period should not exceed three months. They should be used in half a month after unpacking.

## Crystalline Tungsten Powder

**Process:** The product is produced in special reduction process using tungsten oxide as raw material.

**Application:** Mainly used for PDC drill bit matrix powder.

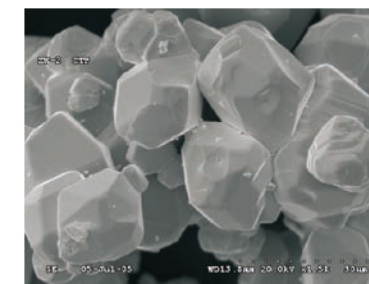
**Features:** Coarse grain size with excellent flow ability.

**Appearance:** Uniform light gray color.

## Chemical Composition

Grade		CTP	Analysis (equipment)
Main content (wt%, $\geq$ )		99.90	
Impurities (ppm, $\leq$ )	Fe	200	AAS
	Ni	200	
	Si	50	
	Cr	150	ICP
	Al	50	
	Cu	20	
	Ca	20	
	Mo	100	
	Mg	50	O/N analyzer
O	500		
Standard		ZGCC's specification	

Remarks: The main content is calculated by deducting the impurities content ( gas element is excepted ).



Morphology of crystal tungsten powder (1500 x)



Crystalline Tungsten Powder

## Grade and Physical Property

Grade	Particle size (mesh)	Sieving	Hall Flow Rate (s/50g)	Apparent density (g/cm <sup>3</sup> )	Tap density (g/cm <sup>3</sup> )
CTP	60-200 mesh	+60 mesh, $\leq 3\%$ -200 mesh, $\leq 5\%$	$\leq 12$	7.5-10.5	9.0-12.5
	80-325 mesh	+80 mesh, $\leq 3\%$ -325 mesh, $\leq 5\%$	$\leq 12$	7.5-10.5	9.0-12.5
	100-325 mesh	+100 mesh, $\leq 3\%$ -325 mesh, $\leq 5\%$	$\leq 12$	7.5-10.0	9.0-12.0
	-325 mesh	+325 mesh, $\leq 5\%$	$\leq 15$	7.5-10.0	9.0-12.0

Customer can choose the chemical composition and physical properties according to the requirements and application. We can decide the details after discussion.

## Packaging:

Products are packaged in iron drums or carton drums with vacuum sealed plastic bags.

## Instruction for Storage:

Products should be stored in a dry, ventilated, acid & alkali free environment to prevent them from moisture, oxidation and corrosion of active chemicals. The storage period should not exceed three months. They should be used in half a month after unpacking.

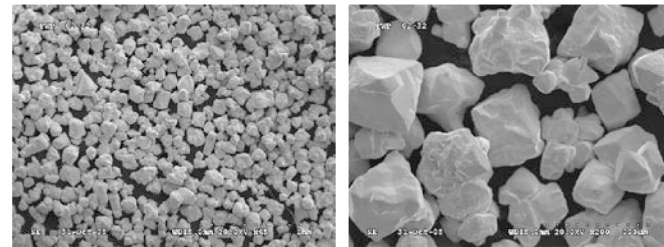
## Tungsten Powder for Spraying

**Process:** The product is produced in special reduction process using tungsten oxide as raw material.

**Application:** It is used as plasma and HVOF coating material.

**Features:** Uniform particle size, excellent flow ability, and corrosion resistance.

**Appearance:** Uniform light grey color



Morphology (45x)

Morphology (200x)

### Chemical Composition

Grade		FWP-1	Analysis (equipment)
Main content (wt%, ≥)		99.90	
Impurities (ppm, ≤)	Fe	300	AAS
	Ni	50	
	Si	100	
	K+Na	30	
	Al	50	ICP
	Cu	20	
	Ca	40	
	Mn	40	
	Mg	40	
	Mo	100	
	Pb	7	
	Bi	7	
	Sn	7	
	Sb	10	
	As	20	
	P	40	
C	100		
O	2000	O/N analyzer	
Standard		GB/T3458	

Remarks: The main content is calculated by deducting the impurities content ( gas element is excepted ).

### Grade and Physical Property

Name	Grade	Particle size (mesh)	Sieving	Apparent density ( g/cm <sup>3</sup> )
Tungsten powder for spraying	FWP-1	200-325	+200mesh: ≤10% -325mesh: ≤10%	5.5-9.0

Customer can choose the chemical composition & physical properties according to the requirements and application. We can decide the details after discussion.

### Packaging:

Products are packaged in iron drums or carton drums with vacuum sealed plastic bags.

### Instruction for Storage:

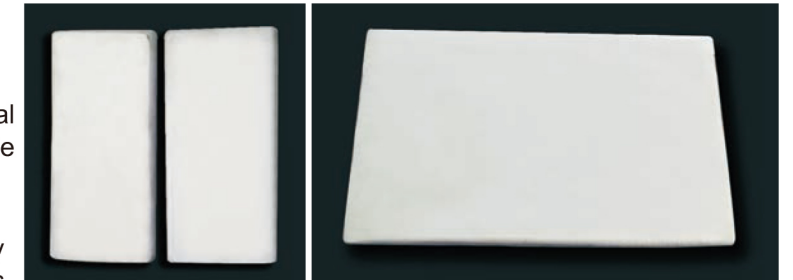
Products should be stored in a dry, ventilated, acid & alkali free environment to prevent them from moisture, oxidation and corrosion of active chemicals. The storage period should not exceed three months. They should be used in half a month after unpacking.

## Tungsten Plate for Sheet Rolling

**Application:** Tungsten plate is used to produce tungsten sheet by rolling.

**Features:** High purity, excellent electrical and thermal conductivity. Remarkable corrosion and radiation resistance.

**Appearance:** Grey color without any defects, such as cracks and broken edges.



Tungsten Plate Blank

### Grade and Physical Property

Name	Grade	Size		Application
		Thickness (mm)	Unit Weight (Kg)	
Pure tungsten plate	WBP	20-40	5-30	Used to produce tungsten workpiece, sheet, target, polished plate, thermal shield, boat, etc.

### Chemical Composition Of Tungsten Plate

Grade		WBP	Analysis (equipment)
Main content (wt%, ≥)		99.95	
Impurities (ppm, ≤)	Fe	30	AAS
	Ni	20	
	Si	20	
	K+Na	Actual value	
	Cr	40	ICP
	Al	20	
	Cu	10	
	Ca	20	
	Mn	-	
	Mg	10	
	Mo	40	
	Pb	1	
	Bi	1	
	Sn	1	
	Cd	1	
	Sb	10	
As	15	Colorimetry C/S analyzer	
P	10		
C	30	O/N analyzer	
O	20		
N	20		
Standard		ZGCC's specification	

Remarks: The main content is calculated by deducting the impurities content ( gas element is excepted ).

## Physical Property of Tungsten Plate

Name	Grade	Density (g/cm <sup>3</sup> )	Grain Size (µm)
Tungsten Plate	WBP	18.5-18.8	1000-2500

Customer can choose the chemical composition and physical properties according to the requirements and application. We can decide the details after discussion.

### Packaging:

Tungsten powders are packaged in iron drums or carton drums with vacuum sealed plastic bags.

Tungsten plate are packaged in wooden cases or cartons, with plastic foam in between.

### Instruction for Storage:

Tungsten powders should be stored in a dry, ventilated, acid & alkali free environment to prevent them from moisture, oxidation and corrosion of active chemicals. The storage period should not exceed three months. They should be used in half a month after unpacking.

Tungsten plate can be brittle. They should be handled carefully during unpacking and moving.

## Tungsten Heavy Alloy (THA)

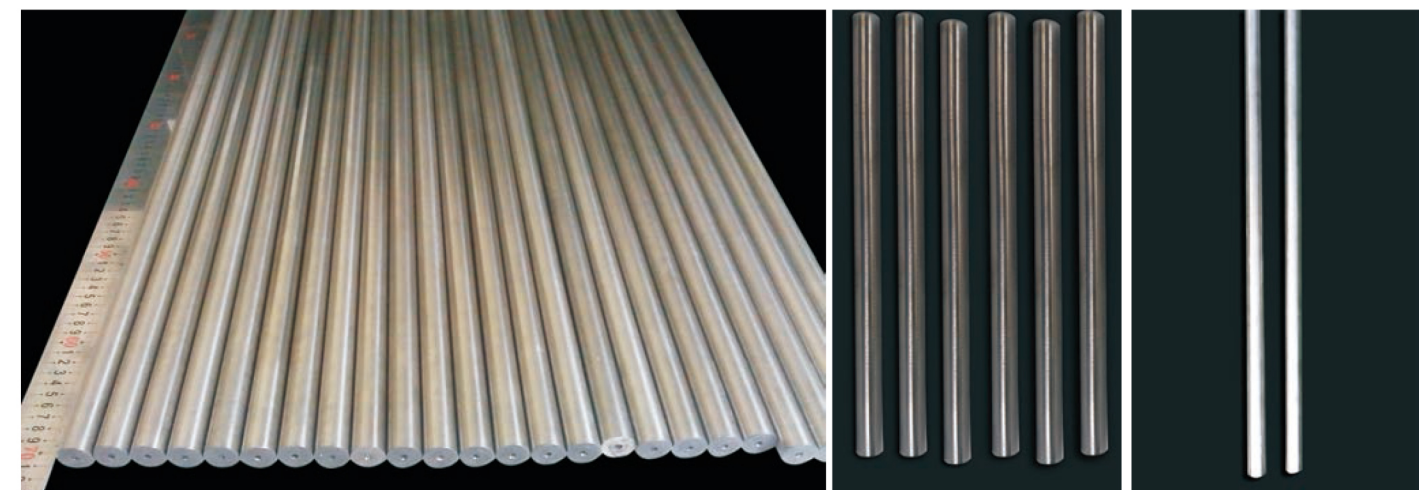
**Application:** THA is used to produce tungsten penetrator cores, rotors of kinetic energy inertia, weight balancer of airplane wings, punching molds, cutting tool rods, valve balls & seats for pumps, and shield materials for radiation.

**Features:** Excellent tensile strength, impact resistance, and ductility.

**Appearance:** THA blank is grey. When ground it is silver grey with metallic luster.



Ground and Polished THA Balls



THA Rod Blanks

Ground and Polished THA Rods

## Grade and Application

Grade	Size (mm)	Cross-section size (mm)
W242	∅ (8.5-10.0) × (173-177) ∅ (11.0-12.0) × (162-165)	Mainly used to produce tungsten penetrator
W252	∅ (8-25) × (100-700)	
GW90	Customer's requirements	Used to produce parts in instruments, medical, oil & gas, nuclear industries, etc.
GW92.5		
GW95		
GW97		

## Physical Property of Tungsten Alloy

Grade	Standard	Density (g/cm <sup>3</sup> )	Hardness (HRC)	Tensile Strength (MPa)	Impact toughness (J/cm <sup>3</sup> )	Elongation (%)
W242	GB	≥18.0	≥25	≥833	≥9.8	≥3
W252	ZGCC's specification	17.4-17.7	43-50	≥1350	≥40	6-15
GW90	ZGCC's specification	16.85-17.3	20-32	≥758	---	≥5
GW92.5		17.15-17.85	22-33	≥758	---	≥5
GW95		17.75-18.35	25-34	≥724	---	≥3
GW97		18.25-18.85	26-35	≥689	---	≥2

Note: GW90, GW92.5, and GW95 will be produced as per ASTM B777 standard.

Customer can choose grade, tungsten content, and physical properties according to the requirements and application. We can decide the details after discussion.

## Packaging:

Products are packaged in wooden cases or cartons, with plastic foam in between; or per customer's requirements.

## Instruction for Storage:

Products should be stored in a dry, ventilated, acid & alkali free environment to prevent them from moisture, oxidation and corrosion of active chemicals. The storage period should not exceed half a year. Products can be brittle. They should be handled carefully during unpacking and moving.

## Tungsten & Molybdenum Additives

### Application:

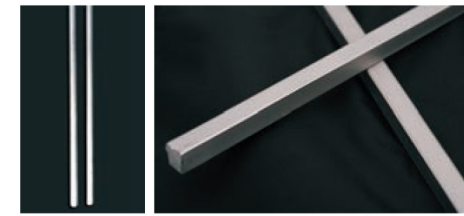
Tungsten is used as an additive for making special steel, mainly: high speed steel for making turning inserts with higher hardness and good wear resistance at high temperature; alloy tool steel for making all kinds of tools, such as drill bits, milling cutters, dies and pneumatic support tools; and hard magnetic materials with a property of high saturation magnetization and coercive force.

Molybdenum is widely used as an additive for making various types of alloy steels, such as: stainless steel; heat-resistant steel; tool steel; cast iron; rollers; super alloys; and special steel. It dramatically improves alloy steel's high temperature strength, hardness, wear resistance, heat resistance and corrosion resistance.

Appearance: Pure greyish metallic luster with no contamination on the surface.



Tungsten bar



Molybdenum bar

## Grade and Application

Name	Grade	Size (mm)		Main content (wt%)	Application
		Cross-section size	Length		
Tungsten bar	TW-1	Square bar : 12×12	30-350	≥99.97	Used as additives for special alloy steel
		Round bar : ∅(15-30)	30-400		
Tungsten end	WQT	-	≥10	≥99.0	Used as additives for alloy steel, high speed steel, and hard magnetic material
		-	≥10		
Molybdenum bar	Mo-1	Square bar : 16×16	150-540	≥99.95	Used as additives for special alloy steel
		Round bar : ∅(15-30)	150-950		
	Mo-2	Square bar: 16×16	150-540	≥99.8	Used as additives for special alloy steel, stainless steel, heat resistant steel, tool steel, cast iron, rollers, super alloys, and non-ferrous metals
		Round bar : ∅(15-30)	150-950		
Mo-3	Round bar : ∅(15-30)	150-950	≥99.5		
Mo-4	Round bar : ∅(15-30)	150-950	≥99.0		
Molybdenum end	MQT	-	≥10	≥99.0	

## Chemical Composition

Grade	TW-1	TW-4	WQT	Mo-1	Mo-2	Mo-3	Mo-4 /MQT	Analysis (Equipment)	
Main content (wt%, ≥)	99.97	99.8	99.0	99.95	99.8	99.95	99.0		
Impurities (ppm, ≤)	Fe	30	300	---	50	300	800	AAS: Fe, Ni, Si in TW-1 and TW-4. ICP: Others	
	Ni	20	500	---	30	500	500		
	Si	20	50	---	30	50	50		
	Al	20	50	---	20	50	50		
	Ca	20	50	---	20	40	50		
	Mg	10	50	---	20	40	40		
	Mo/W	40	500	---	---	---	---		
	Pb	1	5	---	10	15	15		
	Bi	1	5	---	10	15	15		
	Sn	3	5	---	10	15	15		
	Cd	---	---	---	10	15	15		
	Sb	10	10	---	10	15	15		
	As	15	20	---	---	---	---		
	P	10	30	---	10	50	50		Colorimetry
	C	30	100	---	50	500	500		C/S analyzer
O	20	70	---	60	80	800	O/N analyzer		
N	20	50	---	30	---	---			
La+Y	--	--	--	--	--	3000	--	ICP	
Standard	GB/T3459	ZGCC's specification	GB/T3462	ZGCC's specification					

Remarks: The main content is calculated by deducting the impurities content ( gas element is excepted ).

### Packaging:

Products are packaged in wooden cases (fumigation is available) or iron drums, with plastic foam in between.

### Instruction for Storage:

Customer can choose the shape, size, and chemical composition according to the requirements and application. We can decide the details after discussion.

Products should be stored in a dry, ventilated, acid & alkali free environment to prevent it from moisture, oxidation and corrosion of active chemicals. The storage period should not exceed half a year.

## Molybdenum Powder

**Application:** Used to produce various types of molybdenum components and alloys.

**Features:** High purity and wide range of particle sizes.

**Appearance:** Uniform metallic grey color.



Molybdenum Powder

### Grade and Application

Name	Grade	Fsss particle size (μm)	Apparent density (g/cm <sup>3</sup> )	Application
Pure molybdenum powder	FMo-1	1.5-2.5	---	Cermet and molybdenum penetrator
		2.5-4.5	---	Pure molybdenum bar, rod, plate, molybdenum alloy, and electronic components
Lanthanum-doped molybdenum powder	FM*L	2.5-3.5	0.9-1.4	Lanthanum-doped bar, rod, and plate
Yttrium-doped molybdenum powder	FM*Y	2.5-3.5	0.9-1.3	Yttrium-doped molybdenum bar
Molybdenum alloy powder	FTZM	3.0-4.0	1.1-1.4	TZM alloy
Molybdenum powder	FMo-2	2.0-5.0	---	Alloy additive
		60-200mesh	---	Welding materials

Remarks: Symbol "\*" means the dopant content of rare earth elements. "W/ D/ Z/ G" separately stand for "micro content doping/ low content doping / middle content doping/ high content doping."



## Chemical Composition

Grade	FMo-1	FM*L	FM*Y	FTZM	FMo-2	Analysis (Equipment)	
Main content (wt%, ≥)	99.95	99.95	99.95	99.95	99.90		
Impurities (ppm, ≤)	Fe	50	50	50	50	300	ICP
	Ni	30	30	30	30	50	
	Cr	30	30	30	30	---	
	Al	15	15	15	15	50	
	Si	20	20	20	20	100	
	Cu	10	10	10	10	10	
	Ca	15	15	15	15	40	
	Mn	10	10	10	10	---	
	Mg	20	20	20	20	50	
	W	200	200	200	200	---	
	Pb	5	5	5	5	5	
	Bi	5	5	5	5	5	
	Sn	5	5	5	5	5	
	Cd	10	10	10	10	10	
	Sb	10	10	10	10	10	
	Ti	10	---	---	---	---	
	P	10	10	10	10	50	Colorimetry
C	50	50	50	---	100	C/S analyzer	
N	150	150	150	150	200	O/N analyzer	
O		3000	3000	1200	2500		
Doping content (ppm)	—	La: 200-10000	Y: 200-10000	Ti: 4000-5500 Zr: 600-1200 C: 300-1200	—	ICP, C is analyzed by C/S analyzer.	
Standard	GB/T3461	ZGCC's specification			GB/T3461		

Remarks: The main content is calculated by deducting the impurities content ( gas element is excepted ).

Customer can choose the chemical composition according to the requirements and application. We can decide the details after discussion.

## Particle Size and Oxygen Content

Fsss particle size ( μm )	Oxygen content ( ppm, ≤ )
	FMo-1
≤2.0	2000
2.0-2.5	1500
2.5-3.0	1200
3.0-5.5	1000

### Packaging:

Products are packaged in iron drums or carton drums with vacuum sealed plastic bags.

### Instruction for Storage:

Products should be stored in a dry, ventilated, acid & alkali free environment to prevent them from moisture, oxidation and corrosion of active chemicals. The storage period should not exceed three months. They should be used in half a month after unpacking.

# Molybdenum Powder for Sputtering Targets

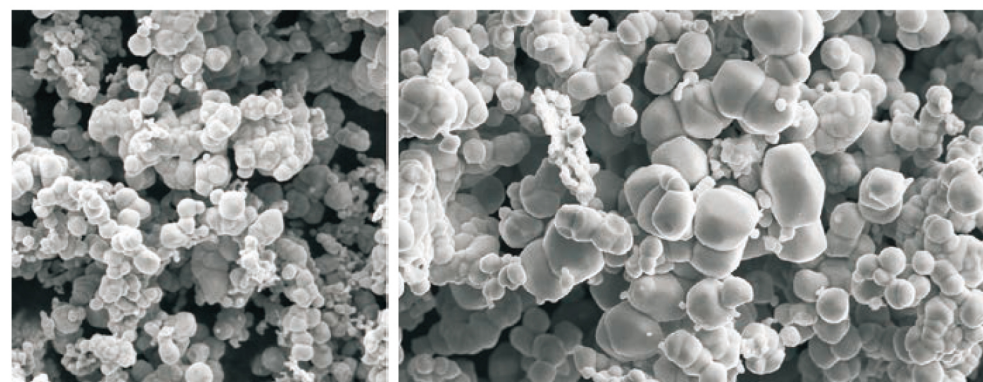
**Features:** High purity and wide range of particle sizes

**Appearance:** Uniform grey color

## Physical property

Description	Grade	Type	Fsss particle size ( μm )	Apparent density ( g/cm <sup>3</sup> )	Laser particle distribution ( μm )		
					D10	D50	D90
Molybdenum powder	FMo-1	BCF-A	3.5-4.5	1.0-1.5	≤8.5	≤18.5	≤30.5
Molybdenum powder	FMo-1	BCF-B	3.8-4.5	1.2-1.5	≤8.5	≤18.5	≤30.5
Molybdenum powder	FMo-1	BCF-C	3.0-3.5	1.2-1.5	≤6.5	≤15.5	≤20.5

## Morphology



Morphology (1500×)

Morphology (2000×)

## Chemical Composition

Grade		FMo-1	Analysis (equipment)
Main content (wt%, ≥ )		99.97	
Impurities (ppm, ≤)	Fe	20	ICP
	Ni	10	
	Cr	10	
	Al	10	
	Si	10	
	Cu	5	
	Ca	10	
	Mn	10	
	Mg	5	
	W	100	
	Pb	1	AAS
	Bi	1	
	Sn	1	
	Cd	1	
	Sb	10	
	Ti	10	
	K	70	
Na	10	Colorimetry	
P	10	C/S analyzer	
C	40	O/N analyzer	
O	600		
N	60		
Standard		ZGCC's specification	

Remarks: The main content is calculated by deducting the impurities content ( gas element is excepted ).

Customer can choose the chemical composition and physical properties according to the requirements and application. We can decide the details after discussion.

### Packaging:

Products are packaged in iron drums or carton drums with vacuum sealed plastic bags.

### Instruction for Storage:

Products should be stored in a dry, ventilated, acid & alkali free environment to prevent them from moisture, oxidation and corrosion of active chemicals. The storage period should not exceed three months. They should be used in half a month after unpacking.

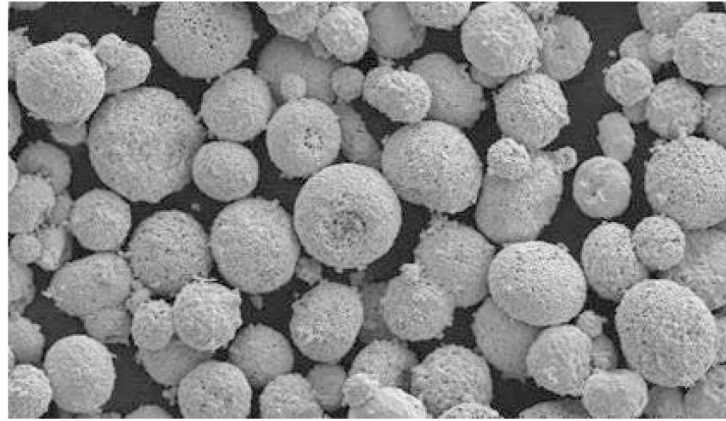
# Molybdenum Powder for Spraying

**Process:** The product is produced by a process of spraying and drying, sintering, crushing and sieving.

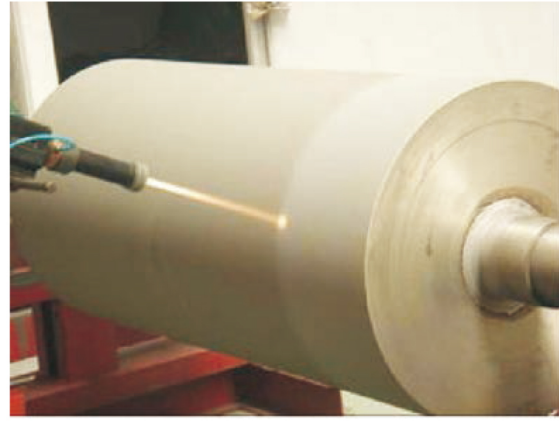
**Application:** It is used to make coatings on the surface by plasma spray and HVOF to protect or repair damaged surfaces to prolong service life. It can be also used as flux in the welding rod.

**Features:** Molybdenum powder has a high melting point, excellent flow ability, high adhesion strength with the iron-based substrate, excellent corrosion resistance, and sliding resistance.

**Appearance:** Uniform grey color



Morphology of spray molybdenum powder (200x)



The demonstration of HVOF spraying

## Grade and Application

Name	Grade	Size	Main content (% , ≥)	Application
Molybdenum powder for spraying	FMP-1	140 -325mesh	99.5	Used as flux in the special welding rod
		170-325mesh	99.5	Used for surface coating of mechanical parts such as automotive gears, piston rings, etc.
	FMP-2	160-325mesh	99.0	

## Chemical Composition

Grade		FMP-1	FMP-2	Analysis (equipment)
Main content (wt%, ≥ )		99.5	99.0	
Impurities (ppm, ≤)	Fe	2000	3000	ICP
	Ni	100	3000	
	P	50	100	Colorimetry
	C	50	100	C/S analyzer
	S	50	100	
	O	1500	1500	O/N analyzer
Standard		ZGCC's specification		
Remarks: The main content is calculated by deducting the impurities content ( gas element is excepted ).				

Customer can choose the chemical composition according to the requirements and application. We can decide the details after discussion.

## Physical Property

Name	Grade	Size (mesh)	Apparent density ( g/cm <sup>3</sup> )	Flow velocity ( s/50g )
Molybdenum powder for spraying	FMP-1	140-325mesh	≥2.0	≤50
		170-325mesh	≥2.0	≤50
	FMP-2	160-325mesh	≥3.0	≤30
Remarks: we could adjust sieving standard as per customer's specification				

## Packaging:

Products are packaged in iron drums or carton drums with vacuum sealed plastic bags.

## Instruction for Storage:

Products should be stored in a dry, ventilated, acid & alkali free environment to prevent them from moisture, oxidation and corrosion of active chemicals. The storage period should not exceed three months. They should be used in half a month after unpacking.

# Molybdenum Bar for Wire Drawing

**Application:** Molybdenum bar is used as raw material for rolling, swaging, and drawing wire.

**Features:** High purity, excellent electrical & thermal conductivity, high yield of wire drawing.

**Appearance:** The straightened molybdenum rod is dark grey.

## Grade and Application of Molybdenum Bar

Name	Grade	Dimension (mm)		Application
		Diameter	Length	
Pure molybdenum bar	MYT	∅(15-26)	350-900	Used to produce molybdenum wire in electrical equipment, spraying molybdenum wire, molybdenum wire in conventional lighting, molybdenum strip, etc.
Lanthanum-doped Molybdenum bar	M*L	∅(15-26)	350-900	Used to produce EDM cutting wire, wire for conventional lighting, heating, high temperature component, etc.
Yttrium-doped Molybdenum bar	M*Y	∅(15-26)	350-900	Used to produce molybdenum strip.

Remarks: Symbol "\*" means the dopant content of rare earth elements. "W/ D/ Z/ G" separately stand for "micro content doping/ low content doping/ middle content doping/ high content doping."

## Chemical Composition of Molybdenum Bar

Grade		MYT	M*L	M*Y	Analysis (equipment)
Main content (wt%, ≥)		99.95	99.95	99.95	
Impurities (ppm, ≤)	Fe	50	60	60	ICP
	Ni	30	30	30	
	Cr	-	40	40	
	Al	20	20	20	
	Si	20	20	20	
	Cu	-	20	20	
	Ca	20	20	20	
	Mn	-	-	-	
	Mg	20	20	20	
	W	-	200	200	
	Pb	10	1	1	
	Bi	10	1	1	
	Sn	10	1	1	
	Cd	10	1	1	
	Sb	10	10	10	
	Ti	-	-	-	
	P	10	10	10	Colorimetry
	C	50	40	40	C/S analyzer
N	30	30	30	O/N analyzer	
O	30	-	-		
Doping content (ppm)		-	200-10000	200-10000	ICP
Standard		GB/T3462 (Mo-1)	ZGCC's specification		

Remarks: The main content is calculated by deducting the impurities content ( gas element is excepted ).

## Physical Property of Molybdenum Bar

Name	Grade	Density (g/cm <sup>3</sup> )	Grain Size (pc/mm <sup>2</sup> )	Curvature (≤, mm)	Taper (≤, mm)
Pure molybdenum bar	MYT	9.6-10	1200-3000	8	2.0
Lanthanum-doped Molybdenum bar	M*L	9.3-9.9	≤500		
Yttrium-doped Molybdenum bar	M*Y	9.3-9.9	-		

Customer can choose the physical properties and chemical composition according to the requirements and application. We can decide the details after discussion.

### Packaging:

Molybdenum powders are packaged in iron drums or carton drums with vacuum sealed.

Molybdenum bar is packaged in wooden cases or cartons, with plastic foam inside.

### Instruction for Storage:

Molybdenum powders should be stored in a dry, ventilated, acid & alkali free environment to prevent them from moisture, oxidation and corrosion of active chemicals. The storage period should not exceed three months. They should be used in half a month after unpacking.

Molybdenum bar should be stored as powders. However, the storage period should not exceed half a year. Molybdenum bar can be brittle. They should be handled carefully during unpacking and moving.

## Molybdenum Plate for Sheetng Rolling

**Application:** Molybdenum plate blank is used as raw material to produce molybdenum sheet by rolling.

**Features:** High purity, excellent electrical & thermal conductivity, good machining performance, and high yield of rolling.

**Appearance:** Grey color without any defects, such as cracks and broken edges



Molybdenum Plate Blank

### Grade, Size and Application of Molybdenum Plate

Name	Grade	Size		Application
		Thickness (mm)	Unit Weight (Kg)	
Pure molybdenum plate	MBP	20-50	5-40	Used to produce molybdenum wafers, boats, targets, isolation screens for thermal radiation shield, and wrapping sheets.
Lanthanum-doped molybdenum plate	MHP	20-50	5-40	Used to produce molybdenum boats and isolation screens for thermal radiation shield.

## Chemical Composition of Molybdenum Plate

Grade		MBP	MHP	Analysis (equipment)
Main content (wt%, ≥)		99.95	99.95	
Impurities (ppm, ≤)	Fe	50	50	ICP
	Ni	30	30	
	Cr	30	30	
	Al	20	20	
	Si	20	20	
	Cu	20	20	
	Ca	20	20	
	Mn	-	-	
	Mg	20	20	
	W	200	200	
	Pb	1	1	
	Bi	1	1	
	Sn	1	1	
	Cd	1	1	
	Sb	10	10	
	Ti	-	-	
	P	10	10	Colorimetry
C	30	30	C/S analyzer	
N	30	30	O/N analyzer	
O	30	-		
Doping content (ppm)	-	200-10000	ICP	
Standard	GB/T3462	ZGCC's specification		

Remarks: The main content is calculated by deducting the impurities content ( gas element is excepted ).

## Physical Property of Molybdenum Plate

Name	Grade	Density (g/cm <sup>3</sup> )	Grain Size ( μc/mm <sup>2</sup> )	Application
Pure molybdenum plate	MBP	9.7-10	1200-3000	The curvature should not exceed 8mm, the thickness and width tolerance of both ends should not exceed 2mm and 5mm, respectively.
Lanthanum-doped molybdenum plate	MHP	9.7-10	Actual value (normally 2000-6000)	

Customer can choose the physical properties and chemical composition according to the requirements and application. We can decide the details after discussion.

### Packaging:

Molybdenum powders are packaged in iron drums or carton drums with vacuum sealed plastic bags. Molybdenum plates are packaged in wooden cases or cartons, with plastic foam.

### Instruction for Storage:

Molybdenum powders should be stored in a dry, ventilated, acid & alkali free environment to prevent them from moisture, oxidation and corrosion of active chemicals. The storage period should not exceed three months. They should be used in half a month after unpacking.

Molybdenum bar should be stored as powders. However, the storage period should not exceed half a year. Molybdenum plate can be brittle. They should be handled carefully during unpacking and moving.

# Molybdenum Penetrator

**Application:** Used to produce seamless steel tube, such as stainless steel, bearings, and high temperature alloy steel.

**Features:** Excellent high temperature strength, good oxidation and corrosion resistance with long life cycle.

**Appearance:** Metallic grey (silver grey after processing) without delamination and cracks.

## Chemical Property

Grade	Main content	Doping element (wt%)			
	Mo (wt%)	Ti	Zr	CeO <sub>2</sub>	C
MDT	≥96	1.0-1.7	0.2-0.4	1.0-1.7	0.2-0.5
Analysis (equipment)		ICP			C/S analyzer

## Type and Physical Property of Molybdenum Penetrator Blanks

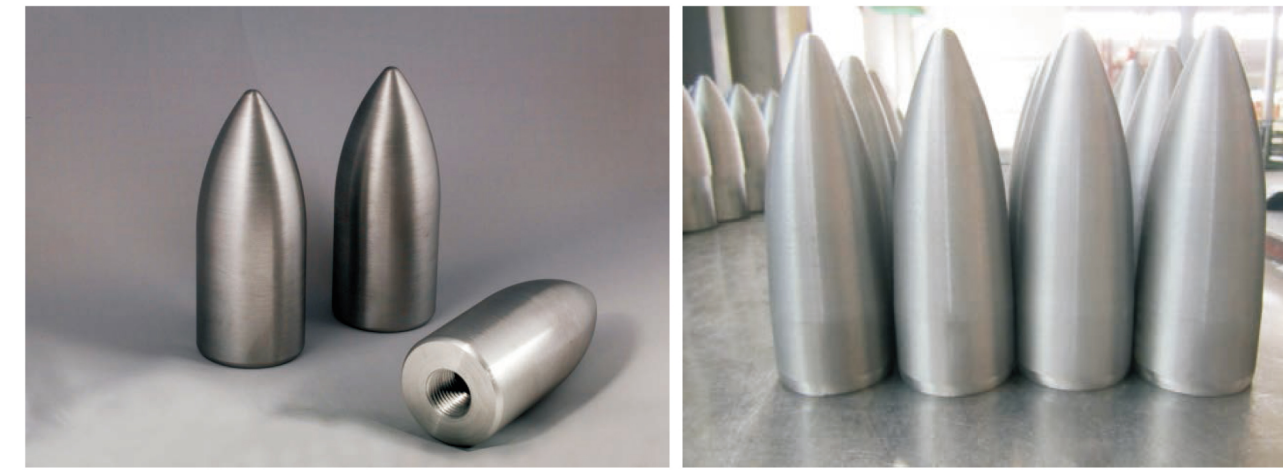
Type	Diameter (mm)		Length (mm)		Density (g/cm <sup>3</sup> , ≥)	Hardness (HRB)
	Size	Tolerance	Size	Tolerance		
RC020-RC070	20~70	+2 -0	60~200	+4 -0	9.3	≥85
RC071-RC085	71~85	+3 -0	160~200	+4 -0	9.25	
RC086-RC100	86~100	+3.5 -0	180~260	+4.5 -0	9.2	
RC101-RC150	101~150	+4 -0	200~300	+5 -0	9.2	
RC151-RC200	151~200	+5 -0	250~350	+6 -0	9.1	

## Size of Finished Molybdenum Penetrator

Type	Diameter (mm)		Length (mm)	
	Size	Tolerance	Size	Tolerance
RC020-RC100	20~100	+0.2 -0	60~250	+1 -0
RC101-RC200	101~200	+0.5 -0	200~350	+2 -0

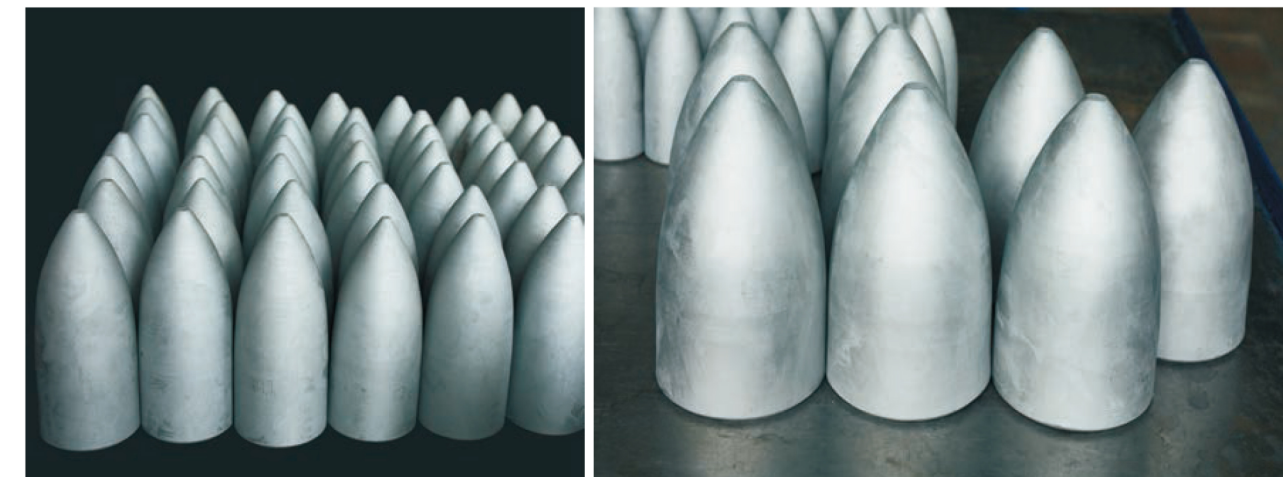
## Recommended Process

Preheating temperature of molybdenum penetrator: 900~1000°C, heating temperature of billet: 1120~1200°C. Glass powder is highly recommended to sprinkle on the surface of the molybdenum penetrator to prevent the steel sticking to the molybdenum.



penetrator

penetrator



Molybdenum Penetrator

1. Isostatic Press



2. Medium Frequency Sintering Furnaces



3. CNC Lathes

