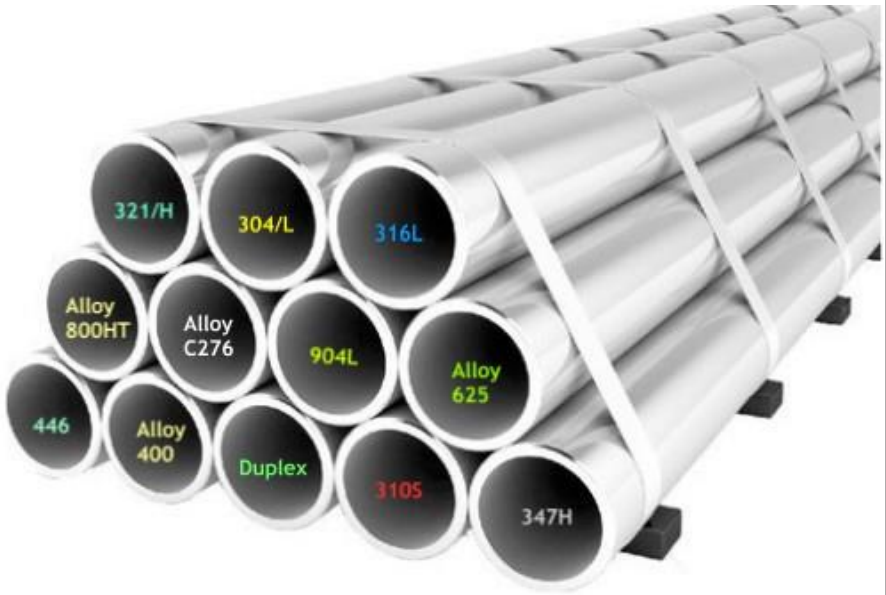
MOLYBDENUM

Datasheet for Molybdenum

- Pipes & Tubes
- Sheets & Plates
- Bars & Rods, Forgings
- Fittings & Flanges
- Nuts & Bolts
- Valves



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Datasheet for Molybdenum

Moly Alloy Pipe, Mo-La Tube, TZM Tube, TZM0092 Alloy

What is Molybdenum?

- Molybdenum is gray-metallic and has the third-highest melting point of any element next to tungsten and tantalum. It is found in various oxidation states in minerals but does not occur naturally as a free metal. Molybdenum allows readily to form hard and stable carbides. For this reason, Molybdenum is frequently used for making steel alloys, high strength alloys, and superalloys. Molybdenum compounds usually have a low solubility in water. Industrially, they are used in high-pressure and high-temperature applications such as pigments and catalysts. Molybdenum is the most commonly used of all refractory metals, in part because it is the least expensive refractory metal.
- Like tungsten, molybdenum is used in the medical field. However, because molybdenum is less dense than tungsten, it is not used as often in radiation shielding applications. But its higher thermal conductivity, lower thermal expansion coefficient and lower overall density make it an ideal material for use in rotating x-ray anodes and CT imaging systems. Molybdenum is better suited to diagnostic imaging than shielding applications, but this refractory metal is just as indispensible to the medical field and its emerging technologies.

Size Reference of Molybdenum Products

- **Form** Specifications (inches)
- **Plate** 0.04-1.57 Thick x 3.15-18.90 Wide x Length
- **Sheet** 0.004 (min) Thick x 1.57-21.65 Wide x 1.57-21.65 Long
- **Wire** 0.014 (min) Diameter x Length
- **Rod** 0.012 – 5.90 Diameter x Length
- **Strip** 0.001 (min) Thick x Width x Coiled
- **Tube** Custom Sizes Available

Molybdenum Product Specification

Material:	Pure molybdenum, Molybdenum alloy
Size:	OD: 30～500mm, WT: 0.3～30mm, Length: ≤4000mm

Purity:	≥99.95%, TZM, TZC, MoLa, etc
Standard:	ASTM B386, ASTM B387
Status:	Machining, Sintering, Welding, Stretching
Density:	9.8～10.2g/cm3
Technology:	Powder metallurgy

Grade Specification of Molybdenum

- Molybdenum 360—Unalloyed vacuum arc-cast molybdenum.
- Molybdenum 361—Unalloyed powder metallurgy molybdenum.
- Molybdenum Alloy 363—Vacuum arc-cast molybdenum-0.5 % titanium-0.1 % zirconium (TZM) alloy.
- Molybdenum Alloy 364—Powder metallurgy molybdenum-0.5 % titanium-0.1 % zirconium (TZM) alloy.
- Molybdenum 365—Unalloyed vacuum arc-cast molybdenum, low carbon.
- Molybdenum Alloy 366—Vacuum arc-cast molybdenum-30 % tungsten alloy.

Chemical Properties of Molybdenum

Molybdenum content	Other single element content	Total content of other elements
≥99.95%	≤0.01%	≤0.05%
Molybdenum alloy according to customer's requirements		

Mechanical, Physical and Thermal Properties of Molybdenum

Molecular Weight	95.94
Appearance	Silvery
Melting Point	2623 °C

Boiling Point	4639 °C
Density	10280 kg/m3
Solubility in H2O	N/A
Electrical Resistivity	5.2 microhm-cm @ 0 °C
Electronegativity	1.9 Paulings
Heat of Fusion	6.6 Cal/gm mole
Heat of Vaporization	128 K-Cal/gm atom at 4612 °C
Poisson's Ratio	0.31
Specific Heat	0.0599 Cal/g/K @ 25 °C
Tensile Strength	N/A
Thermal Conductivity	1.38 W/cm/K @ 298.2 K
Thermal Expansion	(25 °C) 4.8 µm·m-1·K-1
Vickers Hardness	1530 MPa
Young's Modulus	329 GPa

Manufacturing Process of Molybdenum

Molybdenum tube is provided from forged rods and sintering directly. Mo tube with OD smaller than 60mm are mostly machined and gun drilled from forged rod, tube with larger diameter is sintered per size directly. The process methods of tubes and crucibles are always for saving cost and according to customer’s requirement.

Properties of Molybdenum

- Low co-efficient of thermal expansion ($5.1x10^{-6}$ m/m/°C) which is about half that of most steels
- Good thermal conductivity
- Good electrical conductivity
- Good stiffness, greater then that of steel (Young's Modulus 317MPa)
- High melting point (2615°C)
- Good hot strength
- Good strength and ductility at room temperature
- High density (10.2 g/cm^3)
- Its ability to withstand high temperatures and maintain strength under these conditions are responsible for the fact that molybdenum finds most of its application at elevated temperatures. In fact, it can work at temperatures above 1100°C (in non-oxidising conditions), which is higher than steels and nickel-based superalloys.
- When exposed to temperatures in excess of 760°C in air rapid oxidation can result. Under these conditions, the oxide layer sublimes and the base metal is attacked. Thus, molybdenum performs best in inert of vacuum environments.

Applications of Molybdenum

- Molybdenum tube (pipe) can be used at service temperature up to 1,800 degrees.
- Used in components of electron tube, heaters of high-temperature furnaces, thermocouple retainers.
- Defense
- High Purity Materials
- Metals
- Nuclear Energy
- Refractory Metals & Alloys
- Research and Laboratory
- Space
- Solar Industry

Types of Molybdenum Products

Molybdenum Hollow Pipe	Molybdenum Heater for High Temperature
Molybdenum Seamless Pipe	Molybdenum Heat Exchanger Tube

Molybdenum Bush Hex Pipe	Potassium-doped Molybdenum Wire
Molybdenum Round Pipe	Molybdenum Welded Pipe
Molybdenum Alloy Round Pipe	Molybdenum Rotating target
Molybdenum Aero engine tube	Molybdenum Custom Pipe
Molybdenum Alloy Custom Pipe	Molybdenum Thick Wall Pipe
Molybdenum Elliptical and Oval Tube	Molybdenum Thin Wall Pipe
Molybdenum Pipe Fittings	Molybdenum Forging
Molybdenum Strips	Molybdenum Fasteners
Molybdenum Flex pipe	Molybdenum Plates, Sheets and Bars
Molybdenum Alloy Polished Pipe	UNS Molybdenum lined pipe
Molybdenum Exhaust Pipe	Molybdenum Micro Tube
Molybdenum Bar/Billet	Molybdenum Wire/Welding Wire
Molybdenum Boiler Tube	Molybdenum Coil Tubing
Molybdenum Capillary Tube	Molybdenum U Shaped Tube
Molybdenum Rods	Precision Molybdenum Tubing
Molybdenum Suppliers	Molybdenum Pipe Manufacturers
Molybdenum Ingots	Molybdenum Foil
Molybdenum Metals	Molybdenum Crucibles

ML1418 Molybdenum Lanthanum Wires (Mo-La wires)	MU1417 Molybdenum Strip (Mo strip)
MU0079 Molybdenum Plate (Mo Plate)	TSW0081 Molybdenum Spraying Wire (Moly Spraying Wire)
MU0080 Molybdenum Wire (Mo Wire)	MU1420 Molybdenum Foil (Mo Foils) MU0078
Chrome Moly Tubes	MU0078 Molybdenum Sheet (Mo Sheet)

Manufacturing Molybdenum Products

Molybdenum Sheet	Molybdenum Plate Cuttings/Profiles	Molybdenum Nuts, Bolts and Fasteners
Molybdenum Plate	Molybdenum Foil, Coil	Molybdenum Wire
Molybdenum Blocks/Slabs	Molybdenum Strip	Molybdenum Ingot
Molybdenum Rod/Bar	Molybdenum Pipes and Tubes	Molybdenum Forgings and Castings
Molybdenum Flanges	Molybdenum Forged Fittings	Molybdenum Buttweld Fittings

About Metallica Metals – The Steel Pipes Factory

- Established in 1975, the Metallica Metals Group (The Steel Pipes Factory) has its operations spread across major cities in India. We are a pioneer in the stainless steel pipes, nickel alloy products, titanium products, carbon steel pipes and alloy steel pipes manufacturing and processing industry. Our products including pipe fittings, flanges, pipes, sheet plates and valves are exported to over 70 countries across the world, while in India we have supplied to even the remote areas. With over 250 tons of sale in stainless steel and carbon steel pipes every day, Metallica has emerged as a prominent vendor for many buyers in India and Overseas
- More than 3000 tons ready from stock and new production ready in just a few weeks.
- Feel free to contact us on - Email: info@metallicametals.com | Tel: +91 8928722715 | +91-22-66581538, +91-22-67436694, +91-22-66109768

Our Key Products

STAINLESS STEEL & NICKEL ALLOYS

Pure Nickel Alloys
Monel Alloys (Ni-Cu Alloys)
Inconel (Ni-Cr-Mo) Alloys
Incoloy Alloys (Ni-Cr-Fe)
Hastelloy Alloys
Stainless Steel 304/304L
Stainless Steel 309S/309H
Stainless Steel 310/310S
Stainless Steel 316/316L
Stainless Steel 316Ti
Stainless Steel 317/317L
Stainless Steel 321/321H
Stainless Steel 347/347H
Stainless Steel 904L
Duplex Steels (UNS S32205, UNS S31803)
Super Duplex Steels (UNS S32760 / UNS S32750)
Stainless Steel 254 SMO (UNS S31254 / 1.4547)

INSTRUMENTATION TUBES & FITTINGS

Instrumentation Tube
Hydraulic Tubing
Seamless Tubing
Instrumentation Tube Fittings
Double Compression Tube Fittings
Precision Pipe Fittings
Needle & Guage Valves
Manifold Valves

PRODUCTS

Steel Sheet & Plate
Steel Coil & Strip
Steel Pipes
Steel Tubes
Electropolish Tube
Heat Exchanger Tubes
Steel Bars/Rods & Wire
Fasteners (Nut, Bolt, Washer)
Steel Angle Bars
Hex Steel Bars
Round Steel Bars & Rod
Flat Steel Bars
Forgings, Rings & Forged Blocks
Stainless Steel Pipe
Stainless Steel Seamless Pipe
Stainless Steel Welded Pipe
Stainless Steel Tubes
Stainless Steel Furnace Tubes
Stainless Steel Seamless Tubing
Stainless Steel Heat Exchanger Tubes
Large Diameter Pipe

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