



**ED FAGAN INC.**

# TZM Molybdenum

## Refractory Alloys



Unit 3a South Hams Business Park, Churchstow, Kingsbridge, Devon, TQ7 3QH  
phone +44 (0) 1548 858 770 • fax +44 (0) 1548 856 516

### DESCRIPTION

Molybdenum TZM is an alloy of 0.50% Titanium, 0.08% Zirconium and 0.02% Carbon with the balance Molybdenum. TZM alloy is manufactured by either P/M or Arc Cast technologies and is of great utility due to its high strength/high temperature applications, especially above 2000°F.

TZM has a higher recrystallization temperature, higher strength, hardness and good ductility at room and elevated temperatures than unalloyed molybdenum. In addition, TZM exhibits good thermal conductivity, low vapor pressure, good corrosion resistance and is machinable.

### APPLICATIONS

Structural furnace components; die inserts for casting aluminum; hot stamping tooling; rocket nozzles; electrodes.



Aluminum Die Casting



Rocket Nozzles

### MECHANICAL PROPERTIES

<b>Tensile Strength</b>	<b>KSI(Mpa)-RT</b>	110(760)
<b>Elongation</b>	<b>% in 1.0"</b>	15
<b>Hardness</b>	<b>DPH</b>	220
<b>Modulus of Elasticity</b>	<b>KSI</b>	46000
	<b>Gpa</b>	320
<b>Specific Heat</b>	<b>Cal/g-°C</b>	0.073
<b>Coefficient of Linear Thermal Expansion</b>	<b>micro-in/°F</b>	2.50
	<b>micro-in/°C</b>	5.20
<b>Electrical Resistivity</b>	<b>microhm-cm</b>	6.85

### SPECIFICATIONS

<b>ASTM</b>	B368 type 364
	B387 type 364
<b>AMS</b>	7817

### FORMS AVAILABLE

<b>Rod</b>	6.350mm - 25.40mm
<b>Sheet</b>	0.762mm
<b>Plate</b>	4.749mm - 9.525mm

### PHYSICAL PROPERTIES

<b>Density</b>	<b>lb/in³</b>	0.37
	<b>gm/cm³</b>	10.22
<b>Melting Point</b>	<b>°F</b>	4753
	<b>°C</b>	2623
<b>Recrystallization Temp.</b>	<b>°C</b>	1400

### CHEMISTRY - Minimum % 99.20 Mo



Ed Fagan Inc also specializes in locating exotic materials. So, if you can't locate that hard-to-find material you need... Put EFI's material locator service to work for you!

[www.material-locator.com](http://www.material-locator.com)

**THE MATERIALS YOU NEED,  
WHEN YOU NEED THEM**



[www.edfagan.eu](http://www.edfagan.eu)  
[sales@edfagan.eu](mailto:sales@edfagan.eu)  
+44 (0) 1548 858 770



## Glass Sealing/ Controlled Expansion Alloys

EFI provides the highest quality materials including materials from Carpenter Technology Corp.

### ASTM F15 Alloy:

aka Kovar & Pernifer 2918  
Coil/Strip, Sheet, Plate,  
Bar, Wire

### Invar 36:

Bar, Sheet, Plate

### 42/46/48/52 Alloy:

Coil/Strip, Sheet, Plate, Bar

### Electronic Nickel

### 200/201/233/270:

Coil/Strip, Rod, Sheet, Plate

## Soft Magnetic Alloys/ EMI Shielding & Laminations

EFI is a distributor of magnetic shielding alloys for the world's leading producer of these alloys – ThyssenKrupp VDM.

### EFI Alloy 79: aka Magnifer 7904,

Moly-Permalloy & HyMu 80  
Sheet, Coil/Strip

### EFI 50:

aka Magnifer 50 & High Perm 49  
Bar, Coil/Strip

### Carpenter VimVar Core Iron:

Rod, Bar

### Carpenter Hiperco 50:

Coil/Strip, Billet

**Radiometal 4550:** Rod, Coil/Strip

## Refractory Metals/Alloys

EFI is a stocking distributor of Molybdenum & Tungsten products, as well as many other refractory metals and alloys, providing the highest quality materials available.

### Molybdenum:

Bar, Sheet, Plate, Coil/Strip

### TZM Molybdenum Alloy:

Sheet, Bar

### Tungsten:

Bar, Coil/Strip, Sheet

**Tantalum:** Sheet, Tubing

**Niobium:** Strip

**Tungsten Alloy:** Rod, Shapes

**Rhenium:** Sheet

## Hard-to-Find Special Purpose Metals, Alloys and Materials

Are you spending too much of your valuable time trying to locate suppliers of specialty metals and materials? Use EFI's Material Locator (see below) to source it for you so you can get back to doing what you do best.

- Coil/Strip
- Sheet
- Plate
- Rod
- Tube
- Pipe
- Wire

## JUST IN TIME DELIVERY

All standard stock items can be **shipped within 24 hours** – and are often **shipped the same day**. All materials are certified with shipment.

## METALS WE DISTRIBUTE

Titanium  
Zirconium

High Temperature Alloys  
Corrosion Resistant Alloys  
Stainless Steel

Copper – OFE, OFHC  
Brass & Bronze  
Beryllium Copper

## SERVICES WE OFFER

Slitting, Shearing, Saw Cutting, Centerless Grinding, Water-jet Cutting, Laser Cutting,  
Custom Stocking Programs • Consignment Programs



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