**TZM Molybdenum**

**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; glass to metal seals; electrodes.

**MECHANICAL PROPERTIES**

<table>
<thead>
<tr>
<th>Property</th>
<th>KSI (Mpa) - RT</th>
<th>Elongation % in 1.0”</th>
<th>Hardness DPH</th>
<th>Modulus of Elasticity KSI Gpa</th>
<th>Specific Heat Cal/g°-C</th>
<th>Coefficient of Linear Thermal Expansion micro-in/°F micro-in/°C</th>
<th>Electrical Resistivity microhm-cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength</td>
<td>110 (760)</td>
<td>15</td>
<td>220</td>
<td>48,000</td>
<td>0.073</td>
<td>2.50</td>
<td>6.85</td>
</tr>
</tbody>
</table>

**PHYSICAL PROPERTIES**

<table>
<thead>
<tr>
<th>Property</th>
<th>lb/in³</th>
<th>gm/cm³</th>
<th>°F</th>
<th>°C</th>
<th>°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>0.37</td>
<td>10.22</td>
<td>4753</td>
<td>2623</td>
<td>1400</td>
</tr>
</tbody>
</table>

**SPECIFICATIONS**

- **ASTM**
  - B386 type 364
  - B387 type 364
- **AMS**
  - 7817

**FORMS AVAILABLE**

- **Rod** 0.020” - 2.0”
- **Sheet** 0.005” - 0.187”
- **Plate** 0.1875” - 0.50”

If you do not see the size or form you require listed above please call us. New stock sizes and forms are added often.

**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!
Glass Sealing / Controlled Expansion Alloys / Electrical & Electronic Nickel

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

ASTM F15 Alloy:
aka Kovar, Perfin 2918, NILO K & Dilvar P1
Coil/Strip, Sheet, Plate, Round Bar

Invar 36:
aka Perfin 36, NILO 36 & Invar Steel
Round Bar, Sheet, Plate

Super Invar 32-5:
Round bar, Sheet, Plate

42/46/48/52 Alloy:
aka Perfin 40, 46, 48 & 50;
NILO 42, 46, 48 & 50;
Glass Seal 42, 46, 48 & 50
Coil/Strip, Sheet, Plate, Round Bar

Electronic Nickel
200/201/233/270:
Coil/Strip, Round Bar, Sheet

*Products listed in Italics are special order and not standard stock items. Please call for availability.

Soft Magnetic Alloys/ EMI Shielding & Laminations

EFI is a distributor of magnetic shielding alloys for the world’s leading producer of these alloys – VDM Metals GmbH.

EFI Alloy 79:
aka Magnifer 7904, Moly-Permalloy,
HyMu 80, Hypermn & Permalloy 80
Round Bar, Sheet, Coil/Strip

EFI Alloy 50:
aka Magnifer 50, High Permeability 49 & Alloy 47-50
Round & Square Bar, Coil/Strip

Carpenter VimVar Core Iron:
Round Bar

Carpenter Hiperco 50:
Plate, Coil/Strip

Carpenter Hiperco 50A:
Round Bar

Radiometal 4550:
Round Bar, 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:
Round Bar, Sheet, Plate,
Threaded Rod & Nuts
*Foil/Coil/Strip, Wire

TZM Molybdenum Alloy:
Round Bar, Sheet, Plate

Tungsten:
Round Bar, Plate, *Sheet, *Wire

Tungsten Alloy:
Round Bar, *Sheet, *Plate,
*Shapes, *Flat Blanks

Tantalum: Round Bar, Sheet

*Niobium: Foil/Coil/Strip

*Rhenium: Sheet

*Products listed in Italics are special order and not standard stock items. Please call for availability.

METALS WE DISTRIBUTE

Titanium - CP & 6Al-4V • High Temperature Alloys • Corrosion Resistant Alloys • Stainless Steel

JUST IN TIME DELIVERY: All standard stock items can be shipped within 24 hours – and are often shipped the same day. For special order materials, EFI has long relationships with the manufacturers of these materials, so please contact a sales rep to discuss price and delivery options. All materials can be certified with shipment.

SERVICES WE OFFER

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

Are you spending too much of your valuable time trying to locate specialty metals and materials? If you can’t locate the hard-to-find materials you need, use EFI’s Material Locator to source them for you.

www.Material-locator.com