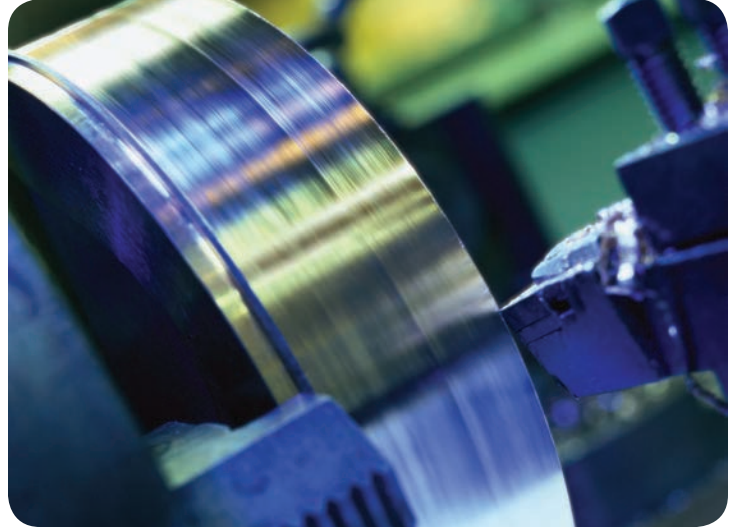


# MACHINING GUIDE FOR TUNGSTEN ALLOYS

[as per ASTM B 777, EU RoHS Directive Compliant]

Tungsten Alloys\* are alloyed with different elements such as nickel, copper, and iron to produce a large variety of grades. Many of these alloys have engineering properties similar to steel and are relatively easy to machine. These alloys can be drilled, milled, turned, and tapped using standard tools and equipment, while using speeds and feeds similar to Grey Cast Iron. Tungsten Alloys can also be plated or painted to enhance their corrosion protection.

Tungsten Alloys have found wide acceptance in applications such as radiation shielding, medical equipment, boring bars, vibration dampening, sporting goods, as well as counterweights in aircraft and racing cars.



## PARAMETERS AND TOOLING TO ACCOMPLISH PROPER MACHINING:

### TOOLS:

C-2 Grade carbide tooling is recommended. Use as generous a nose radius as possible.

### OPERATIONS:

- Turning/Boring: Positive rake is recommended  
Roughing: 0.050"/0.200"  
Depth of Cut: 0.008"/.010" Feed.
- Finishing: 0.010"/0.030"  
Depth of Cut: 0.003"/0.005" Feed.
- Turning Speed: 250/350 Surface feet per minute.

**Note:** For above operations, air is the preferred method of cooling tools; coolant can be used.

### DRILLING/TAPPING:

- Drilling: Use Carbide tipped or solid carbide drills with air or coolant such as Molydisulfide cutting fluid. Drill tap holes to 50-55% of thread hole requirement.
- Tapping: Use straight flute, high alloy taps. For small threaded holes, thread forming taps can be used. Nitrided or solid carbide taps will extend life of tap on long run jobs.

### GRINDING:

Use Aluminum Oxide type wheels ("J" grade typical) with coolant to remove grinding material rapidly.

### MILLING:

Feeds and Speeds should follow Grey Cast Iron recommendations.

Feeds: 0.003" per tooth as a starting point.

Speed: 75 - 750 sfpm with carbide tools; adjust to depth of cut.

End Milling: Slight "climb" is best starting point.

**Note:** For above operations, air is the preferred method of cooling tools; coolant can be used.

### EXOTIC OPERATIONS:

Wire EDM; Solid EDM; Waterjet Cutting can be performed on tungsten alloys.

For the various grades of EFI Tungsten Alloys available, visit our website. You can also download the Tungsten Alloys brochure from our Product Literature web page.

\*Tungsten Alloys are also known as Mallory 1000, Densally, Fansteel 77 and Densimet.

**ED FAGAN INC.**  
Special Purpose Alloys

[www.edfagan.com](http://www.edfagan.com)

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

## Controlled Expansion | Glass Sealing Electrical & Electronic Nickel

Ed Fagan Inc. supplies the highest quality metals and alloys including materials from Carpenter Technology Corp.

### ASTM F15 Alloy

Forms: Coil/Strip, Plate, Round Bar, Sheet,  
Wire, Wire Rod

Trade Names: Kovar®, Pernifer® 2918, NILO K®, DilverP1®

### Alloy 42/46/48/52

Forms: Plate, Round Bar, Sheet

Trade Names: Pernifer®40, 46, 48, 50; NILO® 42, 46, 48, 50;  
Glass Seal 42, 46, 48, 50

### Invar 36®

Forms: Plate, Round Bar, Sheet, Wire, Wire Rod

Trade Names: Pernifer® 36, NILO® 36, Invar Steel

### Super Invar 32-5®

Forms: Plate, Round Bar, Sheet

### Electronic Nickel

#### 200/201/233/270

Forms: Coil/Strip, Round Bar, Sheet, Wire, Wire Rod

## Soft Magnetic Alloys | EMI Shielding & Laminations

Ed Fagan Inc. is an exclusive distributor of  
“EMI shielding alloys” for VDM Metals GmbH,  
the world’s leading producer of these alloys.

### EFI Alloy 50

Forms: Coil/Strip, Rectangular Bar, Wire

Trade Names: Alloy 47-50,

High Permeability 49®, Magnifer® 50

### EFI Alloy 79

Forms: Coil/Strip, Rectangular Bar, Round Bar,  
Sheet, Wire

Trade Names: Hipernom, HyMu80®,

Magnifer® 7904, Molypermalloy, Permalloy 80®

### Carpenter Hipercor 50® and Hipercor® 50A

Forms: Coil/Strip, Plate, Round Bar

### Carpenter VimVar Core Iron

Forms: Coil/Strip, Round Bar, Sheet

## Refractory Metals and Alloys

Ed Fagan Inc. is your leading source for  
quality refractory metals and alloys. We stock  
molybdenum and its alloys in various forms and  
sizes manufactured from Plansee Group.

### Molybdenum

Forms: Bar/Rod, Plate, Precision Cut Wire, Sheet/  
Strip, Spooled Wire, Threaded Rod/Nuts

### Molybdenum Lanthanum Oxide (ML)

Forms: Bar/Rod, Plate, Precision Cut Wire, Sheet/  
Strip, Spooled Wire

### Molybdenum TZM

Forms: Bar/Rod, Plate, Sheet

### Niobium

Forms: Coil/Strip, Plate, Round Bar, Sheet, Wire

### Rhenium

Forms: Coil/Strip, Plate, Round Bar, Sheet

### Tantalum

Forms: Coil/Strip, Plate, Round Bar, Sheet, Wire

### Tungsten

Forms: Bar/Rod, Coil/Strip, Parts (To  
Specification), Plate, Precision Cut Wire, Sheet

### Tungsten Alloy

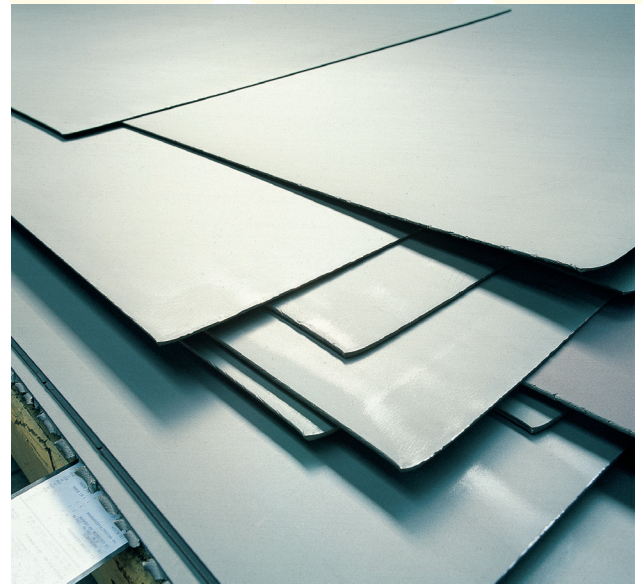
Blank Forms: Flats, Parts, Plate/Sheet, Round Bar, Shapes

## Alloys and Metals We Distribute

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

## Ed Fagan Inc. Services

Slitting, Shearing, Saw Cutting, Centerless Grinding,  
Water Jet Cutting, Laser Cutting, Custom Stocking and  
Consignment Programs



**JUST-IN-TIME DELIVERY:** All of our **standard stock** items can be  
**shipped within 24-hours** of your order confirmation and most are **shipped the same day**.  
All materials certified with shipment. For special orders and non-stock materials, contact our  
sales team for our competitive pricing and delivery lead times.

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Special Purpose Alloys

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