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.

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