



**THE FORERUNNER
IN SPECIALTY METALS**

Machining of CMW Inc. High Density Metals

Pure tungsten is brittle and extremely difficult to machine. The addition of other metals and the use of special powder metallurgy techniques overcome this problem in CMW high density metals.

Excellent surface finishes can be produced by turning, boring, drilling, tapping, milling, shaping and grinding. In general, machining CMW high density metals is similar to machining gray cast iron. Avoid notches where possible, at least eliminate sharp corners.

Tools:

- Use non-ferrous grade carbide tool material for roughing or finishing
- Use 0 deg rake, 12-14 deg clearance and a radius as generous as possible.
- Where sufficient power is available a negative rake will increase tool life.

Turning and Boring:

Roughing:

0.050" to 0.200" depth of cut
0.008" to 0.010" feed

Finishing:

0.010 to 0.030" depth of cut
0.003 to 0.005" feed

Turning Speed:

250 to 350 surface feet per minute; no coolant required. Coolant or air may be used for ease of handling.

Drilling and Tapping:

Use carbide drills. For tapping use a very small amount of cutting oil or Moly-Dee® cutting fluid. Use a negative rake / straight flute steel tap. (Moly-Dee® trademark of Castrol Inc.) Minimize deformation, maximize cutting. (Use largest possible hole for tapping ID and use taps which maximize chip removal. Nitride surface taps of a "CNC" design have been most successful).

Reaming:

Leave 0.010" to 0.020" on I.D. for reaming with carbide tools.

Grinding:

Use a soft wheel and treat as hardened tool steel.

Milling and Shaping:

Feeds and speeds correspond to those for gray cast iron.

Optimum life is achieved by:

Feed: 0.003" per tooth.

Speed: 75 sfpm (HSS cutter)
up to 800 sfpm (carbide flutes)

Light feeds, or beveling of the work piece eliminates breakout.

End milling: Slight climb recommended.

Sawing:

High speed steel blades are recommended at speeds of 250 to 350 surface feet per minute.

Touch up & polish:

If a file is used, do not use oil but fill with chalk. Finish with a soft stone.

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