

## Heater Block Machining Job Sheet

Step	Process
1	Cut the 1" diameter aluminum rod to 3.25" length in the cut-off saw (this leaves 1/8" extra material on each end for finishing).
2	Place the 1" aluminum rod in the lathe and <i>face</i> (machine) <i>one end</i> of the rod with the right-hand tool. Note that <i>the other end isn't faced until we get to step 7 below</i> .
3	<p>Drill a hole <b>through</b> the center axis of the piece using the <i>tap drill bit</i> for a 3/8-24 NF thread. <b>This is not a tap and is not a 3/8" drill bit; you will need to look it up on the chart in the shop or in Appendix 1.2, pg. 71, in the text.</b> It is the drill bit used to prepare a hole of the correct size to be tapped with a 3/8-24 NF thread.</p> <p>Go slowly and <i>remove chips regularly</i> to avoid breaking the drill. It is necessary to pull the drill <b>entirely</b> out of the block to remove the chips. We strongly advise that you use a lubricant when drilling this hole.</p>
4	Drill to a depth of 1.75" ( <b>edge depth</b> ) with a 1/2" drill and then with an 11/16" drill. Remember that larger drills require slower speeds on the lathe.
5	Turn the right 0.375" of the piece down to 0.800" outside diameter using the right-hand tool. ( <b>Note the tight tolerance of this surface as specified on the drawings</b> ).
6	Round edges with emery cloth or fine sandpaper, <b>using a slower speed</b> .
7	Take the piece out of the lathe, flip it end-for-end, and again place it in the lathe. Face the end of the rod with the right-hand tool (you also have to make it the correct overall length in this step).
8	<p>Using a 3/8-24 NF tap (<b>NOT a tap drill</b>), tap (thread) the hole with the block in the lathe <b>with the power off</b>. You should ask for a tap, a tap handle, a spring center, and a can of TapMagic. Go slowly and remove chips often. You remove chips by backing the tap out about 1/2 turn every 1-2 turns. It is <i>not</i> necessary to remove the tap entirely to clear the chips.</p> <p>This hole must be threaded <i>all the way through</i> so an object can be screwed in from either the inside or the outside of the block. Screw an item with a 3/8-24 NF thread into the inside of the block to verify that the threads go clear through. It <b>may</b> be necessary to use a <i>bottoming tap</i> to finish the hole.</p>
9	Round edges with a file, <b>using a slower speed</b> .
10	Drill the off-center 0.125" hole with the drill press or mill. <b>Go very slowly and remove chips often; many students have broken drills on this operation.</b> If you break a drill here, it probably won't come out.

[Modified: January 16, 2019]