

MEC1000

Tesla Turbine Operation Sheets

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Cover, Housing – 2 axis CNC Mill

Operation 1 – 5 min

1. Cut a piece of 5x5 stock from 3/8 thick Lexan.
2. Do not bother squaring the edges.
3. Setup in mill and circ-interp the center hole. Be sure it fits the machining fixture before you take your part out of the machine.

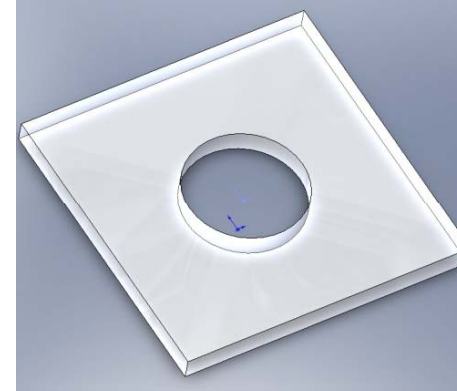
Operation 2 - 45min

1. Mount in machining fixture.
2. Set the datum to be center of fixture. Clamp the cover as shown.
3. Program and machine the outer profile. Hint: if you use the “contour” canned cycle, you can add a finish pass to the profile as a built-in step.
4. Drill and counter bore the fastener holes.

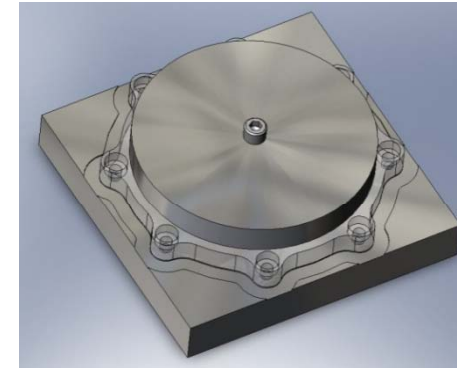
Operation 3 – 20 min

1. Using 4 fasteners bolt the cover to the fixture.
2. Remove the large clamp washer
3. Drill and tap the small threaded holes.

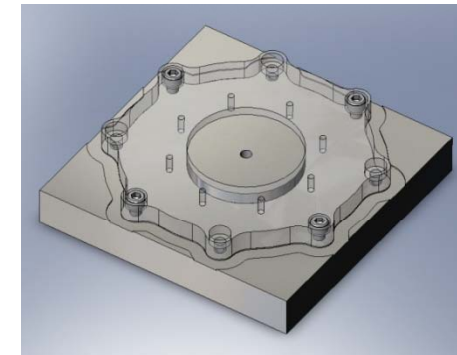
Op1



Op2



Op3



Shaft, Rotor - Lathe

Operation 1 - 40min

1. Cut stock 3.6" long from 416 ½ hard SS
2. Hold in 3-jaw chuck
3. Rough red area . RPM=470, F=.010, DOC=.050
4. Finish red area. RPM=860, F=.005, DOC=.005

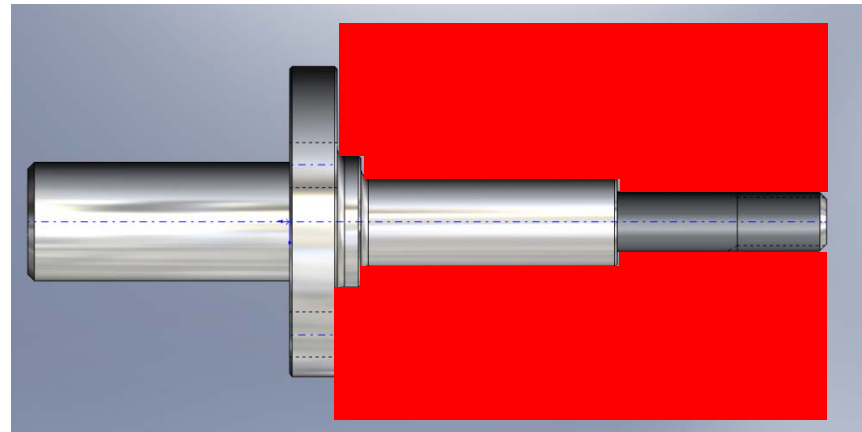
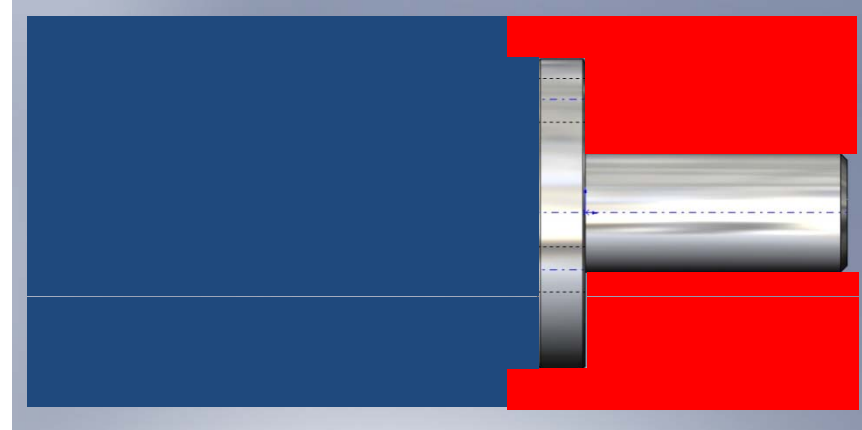
Op1

Operation 2 – 50 min

1. Hold in collet.
2. Rough red area (use same settings as rough above).
3. Finish red area (use same settings as rough above).
4. Thread end using die and die holder.

Hints:

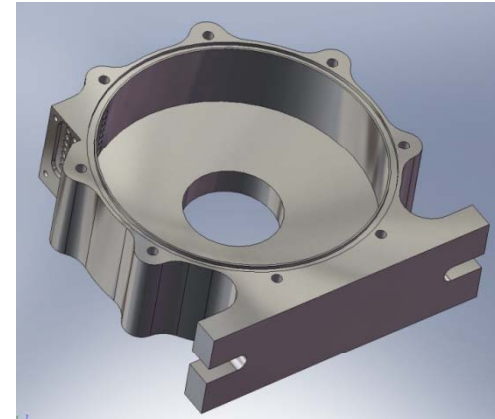
- The minimum DOC (depth of cut) should be greater than .005" when cutting SS. Do not attempt to creep up on the final diameter by removing tiny cuts as this will cause taper in your part and yield poor surface finish.
- Cut these dry, thus NO cutting fluid. Make sure you use the TiN coated carbide inserts only.
- Let the part cool to room temp before making final cut!
- Measure many times, final cut once!



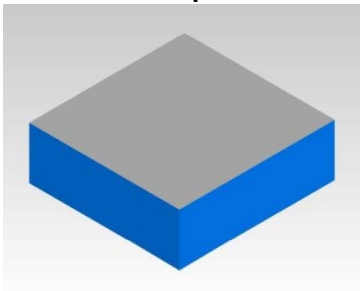
Turbine Housing – 2 axis CNC Mill

Operations.

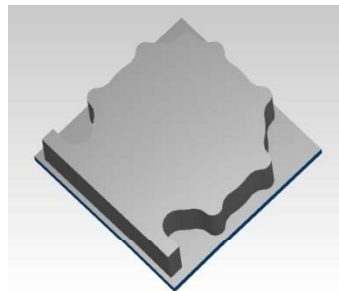
1. Cut aluminum stock 2.5" x 5" x 5.4". Setup in mill and face top surface removing only enough material to clean up the top surface, about .020".
2. CNC pedestal mill outside profile. Be careful not to machine into jaws!
 1. Rough cut settings: 3 flute $\frac{3}{8}$ " HSS roughing end mill. F=10 ipm, DOC=.400, S=2400 rpm.
 2. Finish settings: 2 flute $\frac{3}{8}$ " HSS end mill F=10 ipm, DOC= full height, S=2400 rpm.
3. CNC mill large circular pocket
 1. Rough settings: 3 flute $\frac{3}{8}$ " HSS roughing end mill. F=10 ipm, DOC=.400, S=2400 rpm.
 2. Finish settings: 2 flute $\frac{3}{8}$ " HSS end mill F=10 ipm, DOC= full height, S=2400 rpm.
4. CNC mill small circular pocket
 1. Rough cut settings: 2 flute $\frac{3}{8}$ " HSS end mill. F=10 ipm, DOC=thru S=2400 rpm.
 2. Finish settings: 2 flute $\frac{3}{8}$ " HSS end mill F=10 ipm, DOC= thru, S=2400 rpm.
5. CNC mill o-ring groove
 1. Rough cut settings: 2 Flute $\frac{3}{32}$ " carbide end mill. F=5 ipm, DOC=full, S=3000 rpm
 2. Rough cut settings: 2 Flute $\frac{3}{32}$ " carbide end mill. F=5 ipm, DOC=full, S=3000 rpm
6. Drill n tap 10-24 threaded holes
7. Flip over and machine off pedestal bringing part to proper thickness
8. Machine remaining backside pockets and drill n tap backside holes



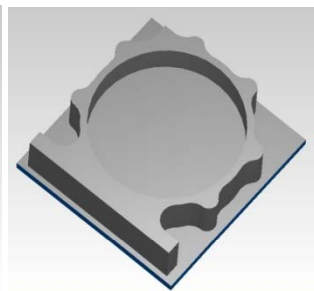
Op1



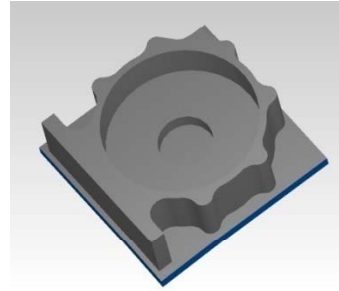
Op2



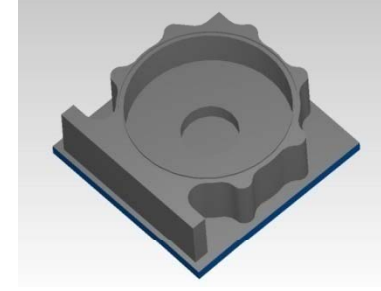
Op3



Op4



Op5



Bearing Housing-2 axis CNC mill

Operation 1 - 30min

1. Cut stock 2.0" long from 2" dia 6061
2. Hold in 3-jaw chuck
3. Rough red area . RPM=860, F=.010, DOC=.100
4. Finish red area. RPM=860, F=.005, DOC=.005

Operation 2 – 50 min

1. Hold in 3 jaw chuck
2. Face end to bring part to proper length
3. Drill .75 dia hole to depth shown.
4. Bore large diameter (.8745) first!
 1. Hint: always machine for MMC (maximum material condition = smallest hole or largest diameter).
 2. Hint: Make sure you can accurately bore a smaller dia hole in the part before trying to hit the close tol diameters. For example, try boring a hole .8500-8505 before boring the .8745 hole. If you can make this hole, then you can make the other 2 with confidence.
5. Bore the small diameter hole.
6. Machine the red area.
7. Machine the internal groove
8. Setup on mill and drill and c'bore the fastener holes.

