

Mechanical Engineering Student Access Machine Shop Protocol for OMAX Abrasive Jet Machining

QUICK CHECK LIST:

Maximum material dimension 24"x24" (609mm x 609mm)

Maximum Thickness 2" (70mm) (depending on the material)

Maximum dimension of the finished part or nest of parts is

22.75" x 22.75" (578mm x 578mm)

Material less than 24"x24" allow for 0.750" (19mm) per side LARGER than the part for fixturing/hold down.

FILE FORMAT:

- FROM SOLIDWORKS SELECT... MAKE DRAWING FROM PART
- DESELECT SHEET FORMAT..... NO TITLE BLOCK OR BORDERS
- DRAG THE APPROPRIATE VIEW OF THE PART ON TO SHEET
- PART SCALED 1:1
- NO DIMENSIONS
- NO EXTRA LINES, HOLE CENTERLINES or HIDDEN LINES
- Save as *.DXF
- Minimum Hole Diameter 1.50mm (0.060")
- Minimum inside radius 1.00mm (0.040")
 - INCLUDE A SEPARATE *.PDF FILE WITH PART DIMENSIONS, HOW MANY PARTS NEEDED, MATERIAL TYPE, SIZE, & THICKNESS INCLUDED
- Please email your files to meshops-me@berkeley.edu
 - Please drop off your materials at the shop with your name and your project's name written on all pieces.

MORE INFO:

EQUIPMENT:

The OMAX Abrasive Jet Model 2626 uses high pressure water and a garnet abrasive to perform the cutting process. The working pressure of the water is @ 45k PSI.

Materials:

Abrasive jet machining will cut many types of materials and in some cases up to 2" in thickness. Commonly machined materials are steel, aluminum, & polycarbonate.

We can do acrylic; however it may chip or crater at the piercing point or edge of part.

You may experience surface "hazing" on the bottom side of your part, this occurs from pressure back spray during cutting process. There is no way to control or prevent this.

If the material is a laminate or effected by being submerged in water this may not be the best process to use. One way we have found to gain success with certain laminates is to pre-drill at the pierce points. That will require developing the tool path, dry run the part in the OMAX, mark out the pierce points, remove the material from the OMAX, drill pierce points on a drill press or mill, reinstall the material into the OMAX and run. This is a very time consuming task!

Material Size capabilities:

24"x24" is the maximum dimension of material; HOWEVER we need material on the edges to secure the material in the machine. **Maximum dimension of the finished part or nest of parts is 22.75" x 22.75"**
Any material less than 24"x24" please allow for 0.750" per side larger that part for clampdown.

Development of tool path:

Depending on the complexity of the part or parts it may take several hours to develop and de-bug the tool path program. Parts that float or are small in size will need to be tabbed to the parent material sheet.

Parts nesting:

The OMAX software nesting function will just stack the same part next to each other in the vertical and/or horizontal direction. If you want to nest in a way that optimizes the material (NOTE: NOT ADVISED FOR NOVICE USERS) you will need to do that in SolidWorks or whatever Cad program you are using. If you do your own nesting, do not forget to add tabs to the individual parts.

File format:

Regardless of what CAD program you are using, the OMAX software will only recognize a .DXF extension.

In SolidWorks while your part file is open, go to **FILE**; go to **Make Drawing from Part**, de-select "**DISPLAY SHEET FORMAT**". *NOTE: if your part is BIGGER THAN 8.5" SELECT the "D" sized format*, pick to view the profile view you wish cut. For example depending on how the part was developed, you most likely will want the TOP or Front View. Remove all hidden lines, countersinks, counter bores, double lines, center marks and visible dimensions; select the **scale of 1:1** and save as *your part name*.DXF

Other items: Please also provide us with a .PDF of your part with a couple of dimensions shown. Once your part is imported into the OMAX software, we need to verify the file was transferred accurately.

Taper Issues:**Taper:**

There is some taper associated with abrasive jet machining. It will vary due to parameters such as type and thickness of the material. If you need the finished edges to be square and parallel, you will need to design the part with additional material on the part and be prepared to perform secondary machining process to accomplish.

Precision Hole Sizes:

Minimum diameter hole size is @ 1.5mm (0.060")

If you need tighter tolerances, for example you are going to TAP or REAM the holes, call out a 0.020" smaller dimension than is required and finish with a secondary machine process.