



Q: “How do I machine Composite Bearings?”

A:

The most common type of fabrication customers have questions about is how to cut composite bearing materials. Depending on how critical the squareness (perpendicularity) of the cut needs to be, on smaller bearings a standard chop saw can be used. The typical tolerance for perpendicularity is 0.005” off the chop saw. Polygon recommends a diamond plated blade tipped with 120 grit diamonds. A rougher grit (80) can be used but that will often times result in a poorer surface finish. Polygon also recommends having the blade turning at between 1500-3000 RPM with a water-soluble coolant flooding the tube as it is being cut. This coolant will allow the tube to be cut without burning the end, generated during the cutting process

On larger tubes, or when perpendicularity is critical, Polygon recommends cutting the tubes on a standard lathe. In production, this type of cut is done by mounting a tool post grinder on the cross slide and dividing the tube using a 120 grit diamond blade. A three-jaw chuck is used to turn the tube indicating the tube so it turns true to the tool post grinder. The tool post grinder is typically used at between 1500-3000 RPM and the tube is turned as 15-20 RPM when divided. Once again, the same type of coolant system is recommended. In addition, it is advisable to cut from the inside out whenever possible to eliminate the fraying of the liner on the inside of the bearing.

Many times after the bearing has been cut a de-burring operation needs to take place. A very simple de-burring operation consisting of nothing more than spinning the part and holding a piece of sand paper against the outside edge of the bearing will work quite well. The reverse is also possible by mounting a piece of sand paper in a drill press spindle and running the part onto the paper to remove any loose fibers caused from the cutting operation.



When turning the tubes on a lathe, Polygon recommends using a diamond tipped cutting insert. On our standard CNC lathe, the tube is turned at 2000-3000 RPM with a 0.003” per revolution feed rate. The depth of the cut is usually dependent on the length of the diamond tip on the cutting insert (typically between 0.060” - 0.100”). It is important when cutting fiberglass using a diamond insert to again use a water-soluble coolant to dissipate the heat generated while cutting. Excessive heat will cause the bond between the diamond and the carbide insert to fail causing the tip to come off.