

WOODTURNING with VACUUM Al Hockenbery

A vacuum system lets you hold work on the lathe without making any marks on a finished surface. An example is turning the bottom of a nearly finished bowl. My first experience with vacuum was in a Liam O'Neill workshop in a 1994. Liam had recently been learning about vacuum systems from David Lancaster. Liam built a system using an adapter turned from wood that connected the shopvac hose to the outboard spindle. It really worked!

By 1998 I was one of six turners in my club who independently acquired vacuum systems. Three bought pumps and made their own vacuum chucks the other three built their own vacuum pumps and bought drum chucks from Oneway. I bought my pump and gauge from Oneway and I make all my own vacuum chucks. Vacuum is now an essential process in my spherical forms allowing me to hollow after the outside surfaces are turned.

I consider these chucks temporary devices and turn them to fit work pieces as needed or make a new one. I make most of my vacuum chucks from construction lumber face glued to the needed thickness. I drill a through 10mm hole, mount it on a screw chuck, and turn a recess for the faceplate. Before screwing on the face plate, I run a bead of hot melt glue on inside and outside of the screw holes to make an air seal. I then shape the chuck –usually into sort of a thick bowl, round the work piece contact area, glue on the foam with hot melt and seal the outside. The difference between my construction and a stave construction of 12 sides with mitered joints is that mine will leak air through the end grain and probably through the glue joints. Duct tape is made for sealing leaks and comes in designer colors. My chucks are UGLY, EFFECTIVE and EASY to make. I also make vacuum chucks using PVC pipe and Sona tubes which work well for me on spheres. I also use vacuum to hold things off the lathe for carving.

Vacuum principles for woodturning:

I use a vacuum system to hold work on the lathe. I don't know much about the science involved. What I know about vacuum for wood turning is that a closed system draws air through the headstock when you turn on the pump. When you block the airflow into the system with a work piece a vacuum is created in the system. This causes all the air in the world to try to push through the work piece. This either holds the piece or breaks it.

The bleeder valve can be opened to let some air in reducing the pressure on the work piece. To effectively block the airflow, the vacuum chuck must make airtight contact with the work piece. A round chuck and round work of similar diameter will meet and a dense foam will compress into the wood grain to make a nearly airtight seal.

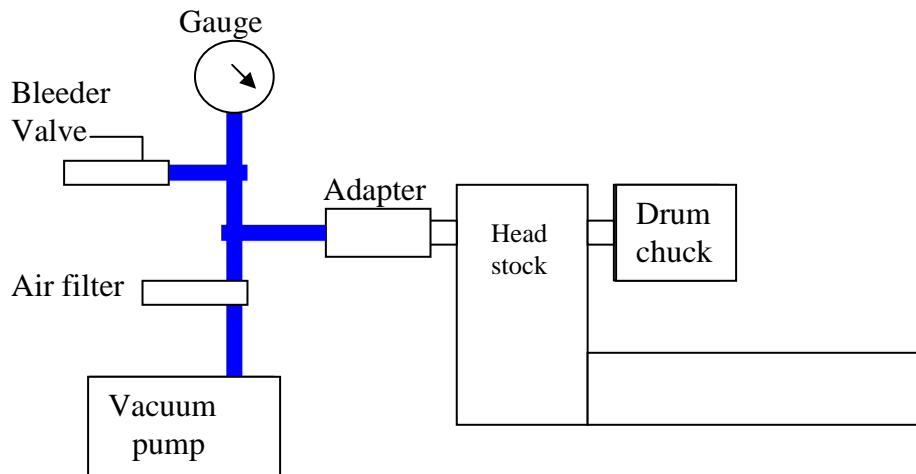
See: *American Woodturner*, Winter 1998, Page 32
article by Ken Keoughan about Dave Lancaster's vacuum system.

Vacuum Pump:

A pump for woodturning should pull a vacuum of 28 to 30 inches of mercury and evacuate 3 cubic feet of air per minute. The air removal is important since your system will leak. Your work piece will leak. Vacuum will pull air through some woods along with any dirt or oils that are on them. This can be avoided by sealing the surface of the work before using the vacuum.



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PLUMBING DIAGRAM

Chuck Material considerations:

Like many things in woodturning there are trade offs when constructing a vacuum chuck. Rigid materials give the best turning results but need a real round contact area for a good seal. Flexible materials give the best seals on less than perfectly round pieces but the hold is spongy and the wood moves a little bit as you turn it.

