Vacuum Chucking for Woodturners

1. What is 'vacuum chucking'? Vacuum chucking is a means of attaching a work piece to a wood lathe using a vacuum. Your vacuum chucking vacuum generator may also be used for vacuum pressing of veneers and large or difficult to clamp glue ups. Vacuum may also be used for hold down clamping. Once you've used a vacuum chucking system, you'll wonder how you ever got along without it. IMHO, vacuum is just as important in the shop as compressed air.

2. What are the requirements for using a vacuum chuck?

    a. Your lathe must have a hollow spindle to allow passage of a vacuum adapter tube.
    b. You must have a means of generating a vacuum. A 'shop vac' will NOT work properly with a vacuum chuck.

3. How is a vacuum suitable for vacuum chucking generated?

    a. Type one: a Venturi generator using compressed air passing through a venturi to achieve a vacuum. This is the least expensive means of vacuum generation if you already have an air compressor that will provide at least 3 CFM of compressed air.
    b. Type two: a motor-driven vacuum pump. These pumps are commonly available through on-line sources such as craigslist, e-bay and surplus outlets. When choosing a motor-driven pump, try to find one manufactured by Gast. Gast pumps are very common, and parts are available for older pumps as well (see: http://www.gastmfg.com/).
    c. A vacuum reservoir is generally recommend and perhaps required to 'hold' a vacuum level without the vacuum generator running or cycling continuously. Vacuum reservoirs can be constructed from schedule 80 pvc pipe and end caps, or portable air compressor tanks.
    d. Standard air compressor fittings can be used in the construction of a vacuum chucking system.

4. What components are needed for the lathe?

    a. A vacuum chuck head. Commercial chuck heads are manufactured by One-way and Holdfast to name a few. Homemade chucks are also popular and are made from pvc tubing and MDF. In both cases, homemade chucks are usually attached to the lathe using a face plate. In all cases, the chuck MUST be 'vacuum tight' with no leaks. This calls for good rubber seals and use of 'teflon tape' on all threaded components.
    b. A vacuum 'feed through' tube to allow attaching the vacuum line. The vacuum feed through, or 'vacuum adapter' usually incorporates a sealed

bearing to allow the lathe spindle to rotate while the attached vacuum line remains stationary.

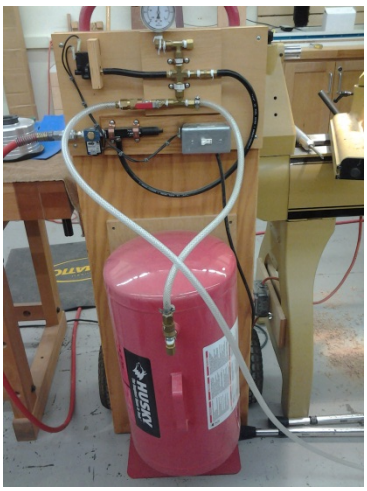
c. I recommend fabrication and use of a 'Christmas Tree' which is nothing more than an 'on/off' and bleeder valve, and also a vacuum gauge. The 'Christmas Tree' is mounted at or on the headstock and places the valves and gauge at eye level. The 'Christmas Tree' is not required but is very handy.
d. A tailstock positioner to accommodate your scroll chuck's thread (ie 1-1/4" 8 tpi). A 'positioner' does not rotate and is used solely in the tailstock to ensure the work piece to be vacuum chucked is aligned properly to the vacuum chuck itself.

5. Resources:

a. Woodcraft: Woodcraft carries, or can quickly get, most of the major components required for your vacuum chuck system.
b. Joewoodworker: Though this site is primarily aimed at the woodworker using a vacuum veneering system, the site also shows how to build both the venturi and motor driven vacuum generators. You can also get the components for building your own vacuum generator. Joewoodworker is, in my opinion, the best web resource for building and using a vacuum generator system. Joewoodworker may be found on the net at http://joewoodworker.com/veneering/welcome.htm
When you go to the above address, read parts 1, 2 and 3 on the left side of the page.
c. Vacupress: Another – and excellent – on line resource. Vacupress may be found on the net at http://www.vacupress.com/vacuumveneering.htm
d. Woodturning forums and Youtube videos. Tons of information out there!

Vacuum Chucking

Vacuum pump and reservoir



Using a air compressor and a tree for control

Bob Schmidt
bob@air-pipe.com