

## Vacuum Chucking

### Cautions

Vacuum chucking systems are intended for fairly experienced turners. The following is a list of possibilities that may cause failure and result in your work flying off the lathe.

- Power is disrupted at the vacuum pump.
- Turning through the work.
- A severe catch while turning.
- Soft or punky wood that is too porous to hold vacuum pressure.
- Thin walled work that collapses under the vacuum pressure.
- Wood failure due to defects in the wood.
- Porous wood grain allowing air to be drawn through the end grain of the wood, such as red oak.

### Components

1. Vacuum source: A vacuum needs to be created in order to hold the work to the desired fixture. This source needs to be constant and reliable. We recommend the Gast vacuum pump (Part number 327-1500).
2. Holdfast Vacuum Adapter Kit: The adapter consists of a threaded rod that slips through the headstock spindle, a self centering rotating air fitting that connects to the rod on the handwheel side and a # 2 MT vacuum fitting that fastens to the rod inside the spindle. (See drawing)
3. Vacuum Cylinders: These cylinders should be trued on each end. One end is ready to accept a foam seal and the other end is ready to be jam fitted into the base plate disk that is mounted on a faceplate.
4. Base Plate: This is a piece of MDF that is fastened to a faceplate. Grooves are cut into the disk that holds the cylinders in place during use.

### General Safety

1. Always wear proper clothing eye and face protection. Also use adequate respiration equipment while turning, sanding and finishing.
2. Never stand in the firing line of the work, in case the piece comes off the lathe!
3. Test and inspect the grip of the vacuum chuck before turning the lathe on.
4. Use slow speeds (max. 800 rpm).
5. Use tailstock for support whenever possible.

### Turning the Base Plate

1. Draw a circle 2" larger than cylinder being used on the base plate, then cut it out on the band saw.
2. Mount a good quality 4" or larger faceplate (must have a hole in the middle) onto the center of the base plate. This faceplate should be dedicated for your vacuum system and not removed.

3. Before screwing them together, run a small bead of glue around the center hole of the faceplate just before you attach the plate to the wood. This will ensure a good seal between the wood and faceplate. (See drawing on reverse side)
4. Mount the faceplate and base plate onto the lathe. Turn and sand the outer rim of the MDF until it is true. Finish the disk with several coats of a high build finish. Drill or turn a 1" hole into the center of the base plate. This will allow the vacuum pressure to be drawn.

### Fitting Cylinder to Base Plate

The cylinder is connected to the base plate by jam fitting the outside of the cylinder into the base plate (see drawing).

1. Measure the outside and inside diameters of the cylinder that you are attempting to fit with a compass. Transfer and mark the diameters to the base plate.
2. With a parting tool cut into the disk removing all of the inside diameter line, 3/8" deep. Make several cuts from the inside to the outside until you are within a 1/16" of the outside diameter line. Test the size of the groove by trying to fit the cylinder into the groove.
3. Make another small cut and test the fit again, repeat this process until you have a snug fit against the outside of the cylinder (see drawing on reverse side).

### Chuck Setup and Use

Place the vacuum and on/off switch within close reach of the lathe.

1. Assemble the Holdfast vacuum adapter kit in your lathe (see drawing). Note that the hollow thread rod may need to be cut shorter in order to fit your lathe.
2. Mount the faceplate and the cylinder on the lathe and connect the vacuum pump to the Holdfast vacuum adapter kit. When selecting a cylinder choose the biggest diameter for the job.

### Before you Turn on the Lathe

1. Place the bowl over the cylinder and use the point of the revolving center to center the work as closely as possible before you turn on the pump. Turn the pump on and allow the bowl to seat against the cylinder. Before turning on the lathe rotate the work by hand to see if the bowl is centered. If the bowl is off centered turn the vacuum off and adjust the work. Test it again by hand until you are satisfied. Once the work is centered, turn down the speed of the lathe before you turn on the lathe.

**Note:** Flat pieces and unbalanced pieces will have a centrifugal force that may cause them to slide off while the lathe is running. Remember to slow the lathe speed, use a large cylinder for chucking and advance the tailstock into the work if possible.

