

Turning a Threaded Insert and Matching Collar

A threaded insert is an elegant and secure way to close the top of an urn and facilitates filling and emptying the vessel. The components can be turned to a custom size or a standard size- if each hollow form opening is uniform in diameter.

Note to the reader: For the purposes of these instructions I am going to describe how to make an insert that can be glued into a 1-1/2" diameter hole. Cross sectional drawings of the two components and the hollow form opening are attached.

Step by step procedures for the Threaded Collar

Wood Selection, Preparation and Mounting

- 1) Select a dense, dry, side-grain wood; mount between centers and turn a 2" diameter x 4-6" long cylinder
- 2) Prepare a tenon on one end and mount the blank securely in a scroll chuck
- 3) True the blank to a 1-3/4" cylinder
- 4) True the face to a flat-smooth surface

Turning the Collar (Referring to the drawing while following these steps is recommended)

- 5) Using a Jacob's chuck in the tail stock quill and a 1-1/16" diameter Fostner bit, drill a hole in the end of the blank at least 3/4" deep. Measure the depth of the hole and make a pencil mark around the outer circumference of the blank at distance equal this measurement from the end.
- 6) Make a small 45° chamfer on the inside edge of the hole.
- 7) Make a second pencil mark around the circumference 1/4" from the end of the cylinder.
- 8) Set the jaws of a digital caliper to 1-1/2".
- 9) Using a parting tool or a Bedan, reduce the diameter between the two pencil marks, made in Steps 5 & 7, to 1-1/2". Use the digital caliper to verify the accuracy.

Threading the Collar

I recommend a thread pitch of 16 t.p.i. when threading wood 1" to 3" diameter. If using a mechanical threading system, I suggest using a 60° rotary cutter. Keeping the workpiece mounted on a faceplate or a chuck throughout the process will reduce the chance the wood will change position. I have a dedicated threading system in which I use a router to spin the cutter up to 20,000 RPM. Alternatively, you can mount the mechanical threading system to your lathe and utilize the spindle to drive the cutting bit. You will learn the ideal RPM to use with various species of wood and other materials through experience.

- 10) Position the workpiece so the edge of the cutting bit just touches the interior wall of the hole you made in the wood. Re-position the wood so the bit is outside the hole on the wood. Then using the micrometer adjustment, advance the wood 0.0350". This is the depth of the threads.
- 11) Make sure everything is tightened in place and start the cutter spinning. Advance the wood until the cutter bottoms out in the hole. To cut the threads as cleanly as possible and to prevent burning, advance the wood at slow, even, pace without hesitating.
- 12) Stop spinning the cutter and retract the wood using the rotating thread mechanism (do not reposition the base on the lathe bed!). Using a bright light, inspect the threads. When you are satisfied with the threads, move the work piece and chuck back to the spindle of your lathe.

Alternately, you can produce the threads using hand-chasing tools.

- 13) Once the workpiece with the threaded hole is back on the lathe, use a 1/16" wide parting tool to separate the collar from the blank 1/2" from the end. Catch the ring so it doesn't hit the floor and possibly break!

Turning the Threaded Insert (Referring to the drawing while following these steps is recommended)

- 14) Face off the end of the cylinder to a smooth-flat surface.
- 15) Using digital calipers measure the inside diameter of the female threads in the collar.
- 16) Add: 0.070" to the inside diameter measurement and adjust the jaws of the digital caliper to this size and tighten the setscrew.
- 17) Carefully make a mark equivalent to the caliper setting on the end of the cylinder while it is spinning on the lathe.
- 18) Make a line around the outer circumference of the cylinder at 0.50" from the end.
- 19) Using the mark on the end of the face as a guide, reduce the cylinder to a diameter equal to your caliper setting up to the 0.50" mark.
- 20) Ensure the surface is parallel to the axis of the lathe and smooth and the shoulder is dead flat and perpendicular to the axis.
- 21) Using a parting tool, create a shallow indentation 0.150" wide, adjacent to the shoulder (where the smaller diameter meets the larger diameter). This defines where the male threads will end.
- 22) Turn a slight 45° chamfer outside edge of the cylinder.
- 23) Use a 3/8" brad-point drill bit, mounted in a Jacob's chuck, to drill a 3/4" deep hole in the center of the blank.
- 24) Remove the chuck with the workpiece attached and mount it to the threading system.
- 25) Advance the wood so the cutter just touches the workpiece. Back the workpiece up so it is free of the cutter and advance the cutter 0.0350"- this will be the depth of the threads.
- 26) With the cutter spinning, advance the workpiece until the cutter reaches the indentation near the shoulder.
- 27) Stop the cutter from spinning and extract the workpiece far enough to test to determine if the female threads on the collar will go onto the male threads. Adjust the position and run the cutter over the threads repeatedly until you observe a proper fit.
NOTE: when advancing the position of the workpiece after the first pass, move it only about 1/2 a mark at a time so you don't overshoot it!
- 28) Once you are satisfied with the fit, move the chuck and workpiece back to the lathe and part the insert off the blank at least 1/4" left of the edge of the shoulder.

You should now have a threaded collar with a threaded insert. The 3/8" diameter hole in the center of the insert is for inserting a finial. Sometimes I like to cover the bottom of the hole with a turned wooden plug, as well.

Once the insert is glued into the top of a hollow form (which, hopefully, is still attached to a chuck) the outside of the collar and insert can be final turned, sanded and finished. After adding a finish of your choice, lubricate the threads with paste wax to reduce friction.

I hope you have enjoyed this project. Please contact me with questions or comments.

Thank you!

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