



Wood Mug Kit

Mugs can be turned from a solid piece of wood, a circular stave design, a staved cone or a segmented turning. Each one will give you the basic shape, while the staved design will create a greater or lesser level of difficulty with flat stock. I recommend starting out with either a solid block of wood or doing a circular stave turning. These methods for building your turning stock are relatively quick and allow you to get right to turning the project.

Most of this project requires spindle turning techniques, but there is some elementary hollowing.

Wood Block Dimensions

Solid Wood

(1) 3³/₄" x 3³/₄" x 8" L. If you can round your blank without losing too much diameter, you can drop down to 3¹/₂" diameter.

Circular Stave

(8) Staves cut 1⁷/₁₆" wide x 7⁷/₈" thick x 8" long.

Each stave should have a 22.5° angle on each side. This can be cut using a table saw or dimension each stave on the table saw and use a router table to apply the 22.5° chamfer. Please use a push stick or block and caution

Stave Glue Up

Each stave should, at minimum, be 1⁷/₁₆" wide when ready for glue up. For this glue up to work, the staves should all match up cleanly in line - the inside corner of each stave needs to match up with the next stave's inside corner. If they don't then the final blank will be crooked and you will encounter all kinds of difficulties caused by the blank being out of round. You can either glue the staves in sets of two, working to a half and then glue the halves together, or you can glue up half a blank at one time.



To glue up half a blank at a time cut 3 additional strips from plywood with the 22.5° angled sides to use for blocking the glue-up together. Attach the first blocking strip to a board. Slide the first turning project stave in against the blocking strip; glue the next project stave to the first one. Do the same for the other staves in this half and use the other strip of plywood to support the last stave. Remember to match up the inside corners of each stave at the front and the back of each stave.

The strips keep the half blank from spreading. By applying pressure from above (a bag of sand in my case) the blanks are compressed together until the glue sets. Remember to use plastic wrap or aluminum foil to keep the sand bag from sticking to the stave half.

When the blank halves glue has dried, take them out and match



Mug Insert Dimensions:

Diameter at lid - 3⁵/₁₆"
Diameter at base - 2³/₁₆"
Lip width from liner - 5⁵/₃₂"
Depth under lip - 1¹/₈"
Length - 5³/₄"

Tools Needed:

Jacobs chuck & 2" forstner bit
Termite or
Hollowing Tool (Recommended)
Gouge or Scraper
Lathe - 6" swing
Dial Caliper
Faceplate or Chuck
Roughing Gouge
Skew
Face Shield

the two halves together. Check the joints for a smooth fit. If there are inconsistencies, run the halves 1-2 passes through a jointer. Anything more and you'll need to put a filler strip in between the halves' joint faces (1¹/₈" flat strip). Once the joints are smooth, glue them together and clamp.

Turning the Project

Start by mounting the block using a chuck or faceplate setup. Ensure that you have approximately 7¹/₂" inches of blank length beyond the depth of the screws (not drywall screws) in the faceplate mounting. The blank should be square at both ends to ease the process of lining up a straight blank. If the block isn't round you can spin it between centers to make it round and part off the ends on each side to "square it up".



With the block squared up, mount in either a chuck or a faceplate. This project is an end grain mounted turning, so screws won't have as great a holding strength as they would in cross grain. It is also important to use all the available holes in the faceplate and screws with sufficient length.

Round the blank using a roughing gouge or skew. You will need to utilize a scrap of wood to apply pressure from the tailstock to the hollow center when turning a stave or staved cone blank. Leave as much diameter clear of the pressure plate as possible



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while maintaining a round surface.

Drill a hole in the middle of the solid blank using a 2¹/₈" forstner bit. The hole should be at least 7" deep. The extra depth gives you the ability to shorten the blank should the turned opening at the top become too wide, or you have problems with tear out at the liner's lip.



This Shows the turning mounted to a face plate for drilling out the center from a solid block. You may need to use a smaller forstner bit first, then re-drill using the 2¹/₈" bit. You don't need to use the largest forstner unless you want to. You could also hog the excess out from boring out with a smaller bit size. The 2¹/₈" forstner is the closest diameter to the bottom diameter of the cup which will make it easier to enlarge the hole accurately to fit.



Measure the inside width of the mug's mouth with a dial caliper and transfer a mark onto the end of the blank.

Use a ring tool, "termite", bowl gouge, large scraper or hollowing tool to further open the drilled hole. A 2¹/₈" Forstner bit is slightly smaller than the bottom diameter of the stainless steel liner. As a result, you will only be doing a small amount of hollowing at the 5⁵/₈" depth and beyond. Most of the widening to fit the liner will be in the first 2 inches at the top. If you have a steady rest, you may want to use it, however light cuts shouldn't require the use of the steady rest.



The ring or termite tool is a very fast cutter. It will hollow out very quickly. 2 to 4 passes from the bottom should take care of everything but the upper portion near the top. As you hollow, occasionally move the tool rest out of the way, clear out the shavings and check the fit of the mug liner. It should fit snugly without being forced. If it will fit, but seems to require force to get it in there, check to make sure you are deep enough. If that's okay, then use a little sand paper to fine tune the fit inside. You can also mark the outside of the liner with crayon, grease pencil or chalk and then re-insert it, *with the lathe turned off*, to indicate where the narrow spot is located.



The top of the blank actually fits inside the lip of the liner (see dimensions). Utilize your dial calipers or push the liner back in to mark the outside diameter of the liner's lip onto the blank. (Do not force the liner in to mark the lip diameter, the liner could be damaged trying to remove it.) Use a parting tool or gouge to trim down the lip diameter of the blank until the liner is just shy of fitting properly into the blank. Because the liner is now going further into the blank you may need to enlarge the internal dimensions a little, further down the into blank.



Sand the edge that the liner's lip is going to cover and get everything to fit correctly. The liner should fit snugly, but still allow you to pull it out. Turn the remainder of the blank down to size. The inside doesn't have to be perfectly smooth. The liner will hide any roughness left from the hollowing process.



Now it's time to decide whether you want the outside shape to be a straight sided tumbler, taper the sides down towards the base of the mug, or create you own special profile.

Once the outside profile is turned, sand the piece and part off the mug. The mug should be parted off 6 inches or more down from the rim of the mug. This will leave you with a hollow wooden tube. A plug can be turned to fit into the hollow at the bottom or you can fill it with epoxy. Epoxy should not exceed 1/2" in thickness. The plug can be turned from flat stock mounted to a waste block using double stick tape. Measure the inside diameter of the hollow bottom and reduce the plug to fit.



If any hollowing was done where the mug was parted off, slide the liner onto a jam chuck or use your chuck jaws, spread out from inside the mug's opening, to hold the blank in place to clean up the inner diameter of the bottom. Bring the tailstock up in support for using a scraper or gouge to lightly clean up the plug edge. Fit the plug and glue into place. Once dry, re-chuck as above and turn any excess off the bottom using light cuts.

Secure the liner in the mug using epoxy or glue under the lip of the liner. The mug can be finish as desired. Finish may be applied on or off the lathe. Re-chuck the mug to power sand again or if the finish needs to turn while drying.



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Finishes

Unfortunately, coffee spills are a normal occurrence, so a finish that resists moisture is required. In recognition of the heavy use you are likely to see with this mug, a CA, Epoxy (Mirror Coat), or poly finish is highly recommended. No matter which finish you use, cleaning the mug in the dishwasher is not recommend.

Troubleshooting

I parted the mug off too short. Use double stick tape on a waste block to turn a flat piece of stock round. Create a new foot for the bottom of the mug. Glue it on to the bottom and re-chuck the mug from the liner's mouth expanding the chuck jaws outward. Bring up the tailstock in support and clean up the foot and its transition to the mug.

The stave blanks halves are too narrow. Cut two strips of wood where the strip's width equals the stave's thickness. Make sure the strips are smooth. Use the strips to widen the circumference of the mug back to the correct dimensions. Glue up the two stave-half blanks and the strips as described above.

I mounted the stave blank and it has an eccentric wobble. This one is tough. The eccentric wobble will cause the most problems fitting the blank into the liner lip. You may not be able to use this blank. Try and just barely round it, then drill as described above. See if the liner will fit with sufficient wood around the lip. If you're okay, continue, but you will have to be as accurate as you can. If you can get the blank hollowed accurately (you may want to take light cuts with a scraper instead of the termite) you should be ok.

If you have any questions or would like to provide feedback on these instructions, please email us at sales@smoothturning.com. Thank you and safe turning.
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