

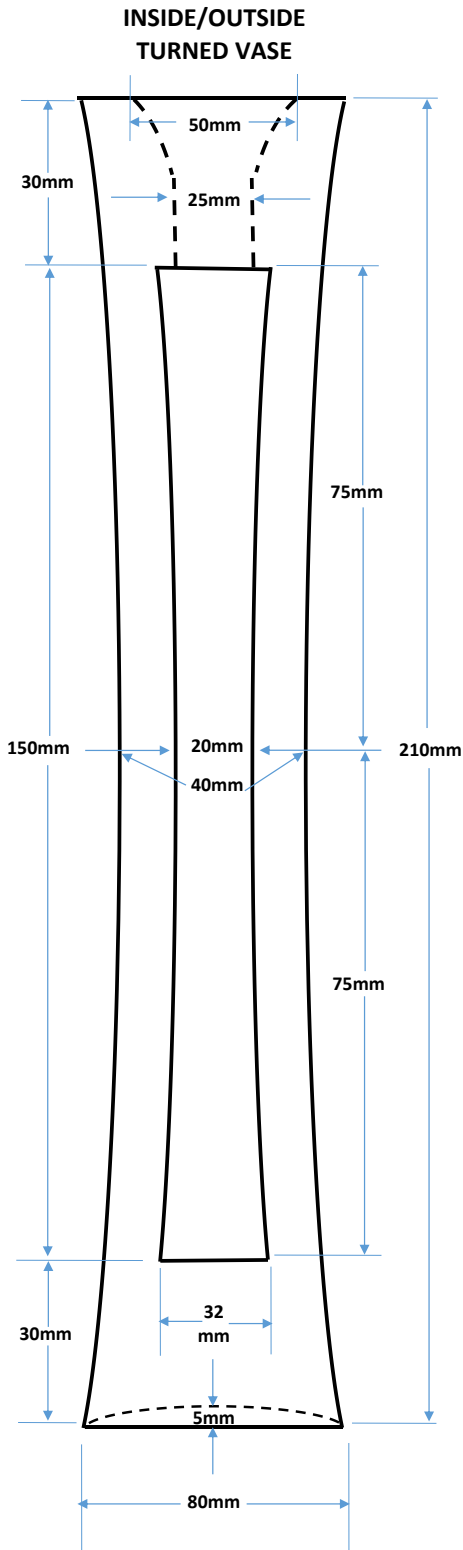


Instructions for Basics Inside–Outside Woodturning

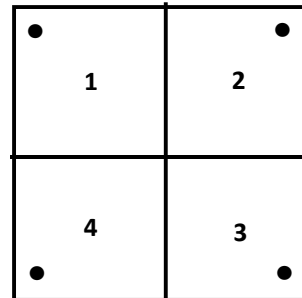


INSIDE-OUTSIDE TURNING – EXERCISE 1

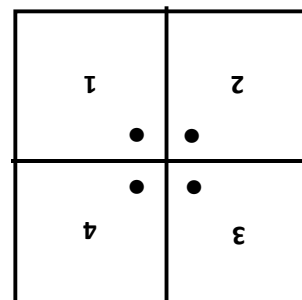
Preparing the Inside of the Vase for Turning



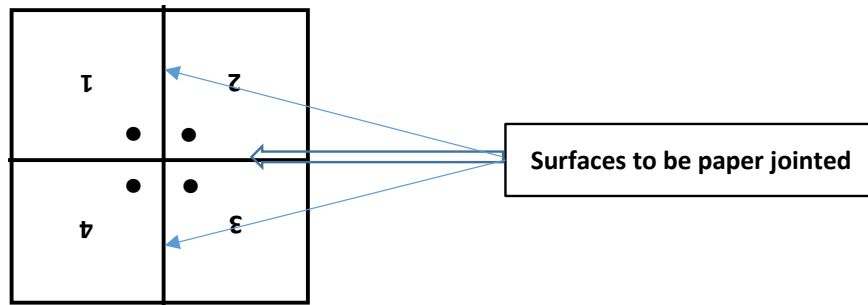
1. Accurately cut four blocks of wood 230mm x 40mm x 40mm.
2. Stand the four blocks on end and group together. With a marker pen:
 - (a) make the outside of one end top and the other end bottom;
 - (b) number the blocks 1 through to 4 – sequentially clockwise; then
 - (b) put a dot in the outside corner of each block (see diagram below). In this position the outside of the job is facing out.



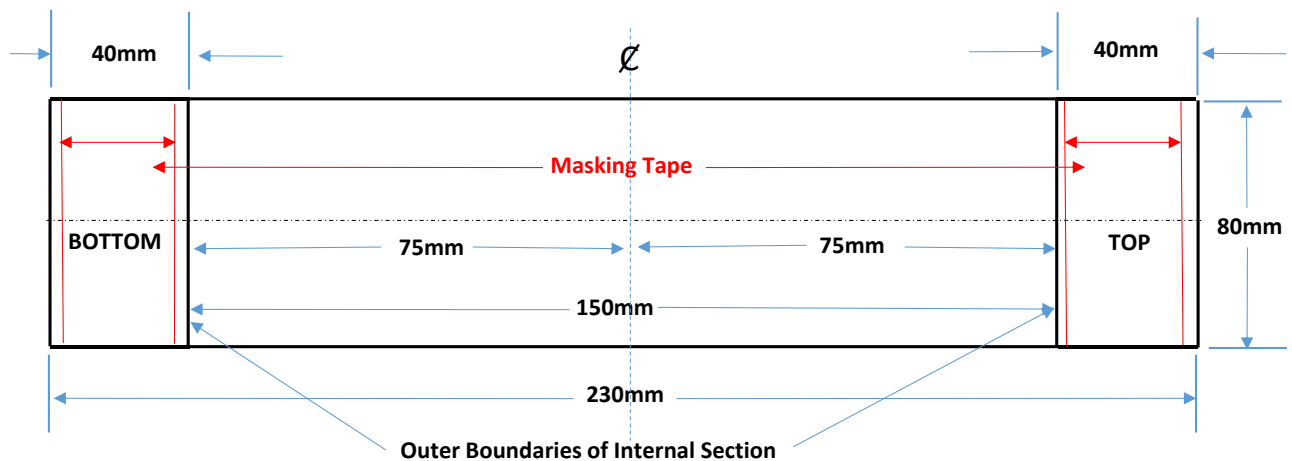
3. Rotate the blocks so that all the dots are in the middle, inside of the job facing out (see diagram below).



4. Cut two pieces of paper (e.g., printer paper – do not use newspaper) slightly larger than the dimension of a single block (e.g., 232mm x 42mm) and one piece slightly larger than combined width of two blocks (e.g., 232mm x 82mm).
5. Paper-joint the pair 1 and 2 (glue on both timber surfaces with paper in between). Similarly, paper joint the pair 3 and 4. Make sure the dots are in the position shown in the diagram on the next page when paper jointing the blocks.

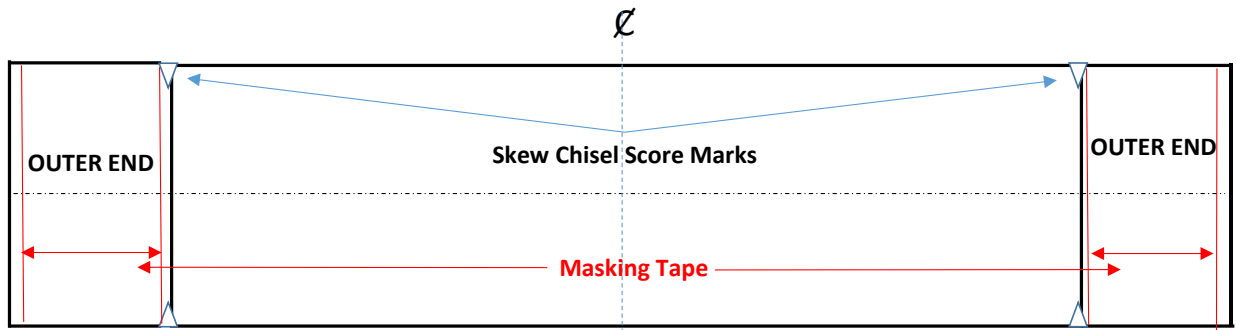


6. Once the glue on the pairs 1 and 2, and 3 and 4 has set, paper joint the two sets of pairs together, making sure all the corner dots are in the middle, and the joints line up perfectly at the centre as per the diagram above.
7. Once the glue has set, tightly wrap masking tape around the outside of each end – about three layers. This is added protection to ensure the job stays together once it has been firmly positioned between centres. It also helps to prevent chipping when cutting the outer and inner limits of the job.

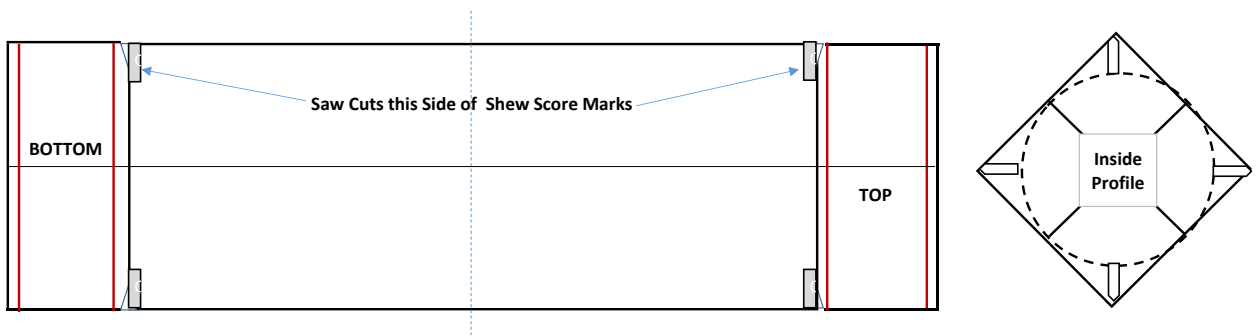


Turning the Inside of the Vase

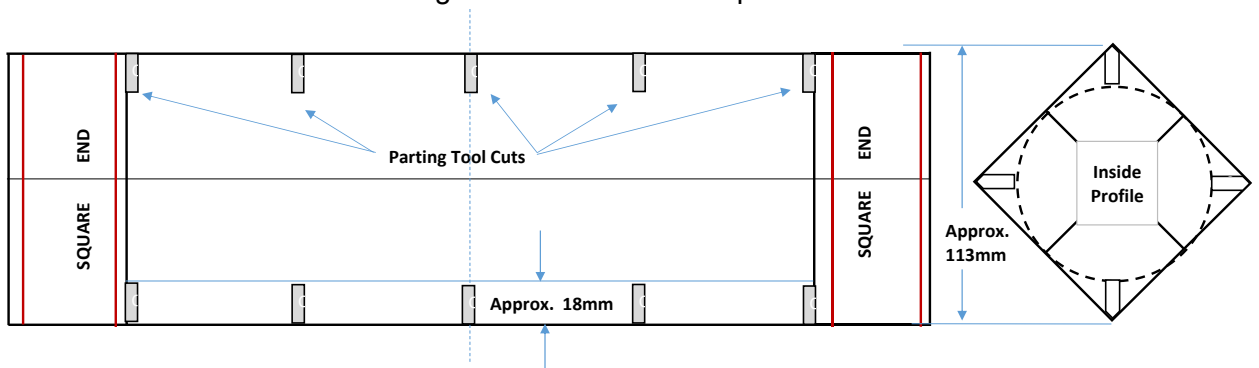
1. Mount the block on the lathe between drive and live centres, making sure your block centres either end are the central junctions of all four blocks.
2. Find the centre between the ends and clearly mark on all four surfaces using a square.
3. From centre measure 75mm either side of centre and clearly mark the left and right outer boundaries of the internal section of the job on all four surfaces using a square – check overall measurement to make sure the length of the inside of the job is 150mm as per the diagram on the next page.
4. With the lathe on, use a skew chisel to lightly scribe the corners of the square block at the outer and inner boundary marks.



- Using the score marks as a guide, use a fine tenon saw to cut 10mm deep grooves in the corners of the block. The cuts should be at right angles to the block. The saw cuts for the outer ends of the job (spigot ends) should be on the outside of the score marks and those for inner limits of the job on the inside of the score marks as per the diagram below. The purpose of the skew chisel scoring and saw cuts is to maintain the integrity (sharpness) of the corners of the end blocks.

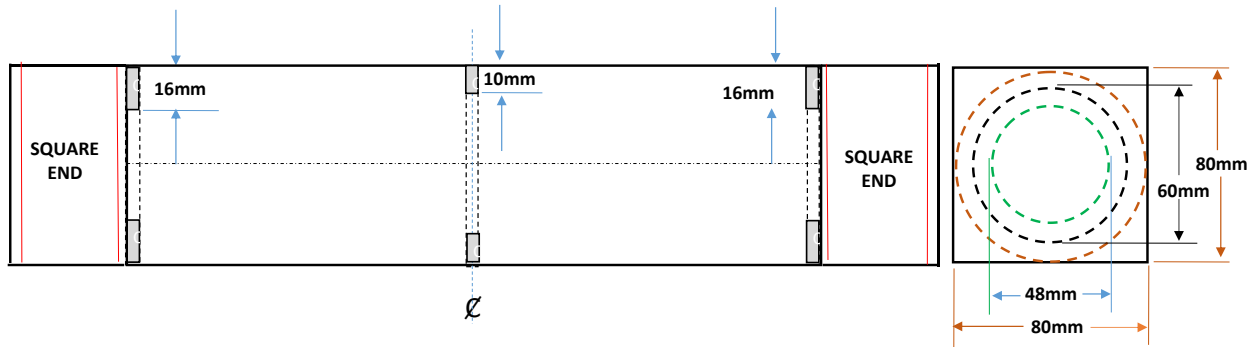


- Using a sharp parting tool cut to just about down to the flat cross section of the inner boundaries of the job – approximately 80mm diameter. Repeat this process at the centre and then centrally between the centre and each end of the internal section of the job (see diagram below). Using these cuts as depth gauges turn the entire length (150mm) of the inside of the job to 80mm diameter. Be careful not to damage the corners of the square end sections.

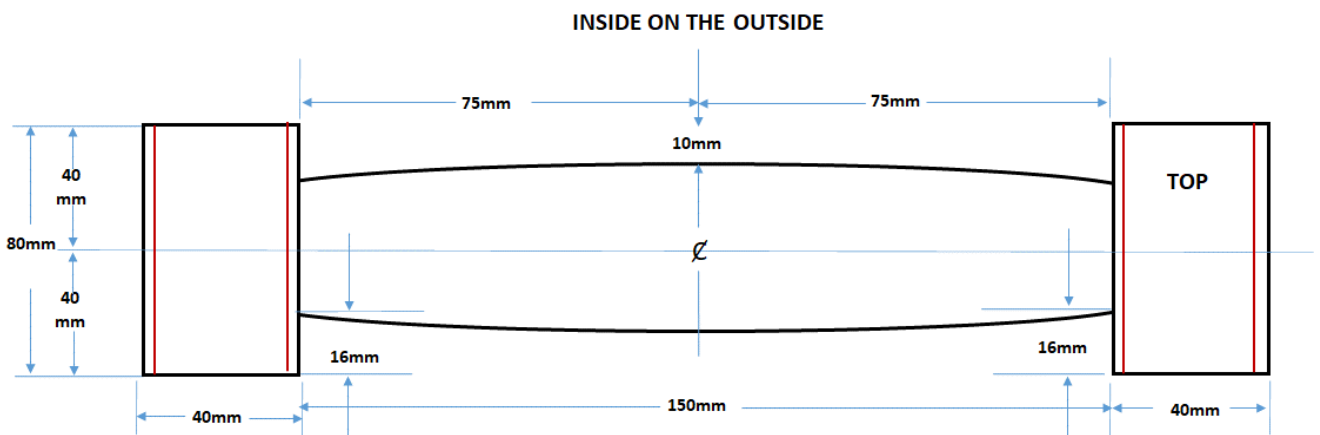


- Once the inner cylinder has been turned round to 80mm diameter use a sharp parting tool to cut profile depth gauges to the depths shown in the diagram on the next page to provide guides for turning the internal profile of the vase.

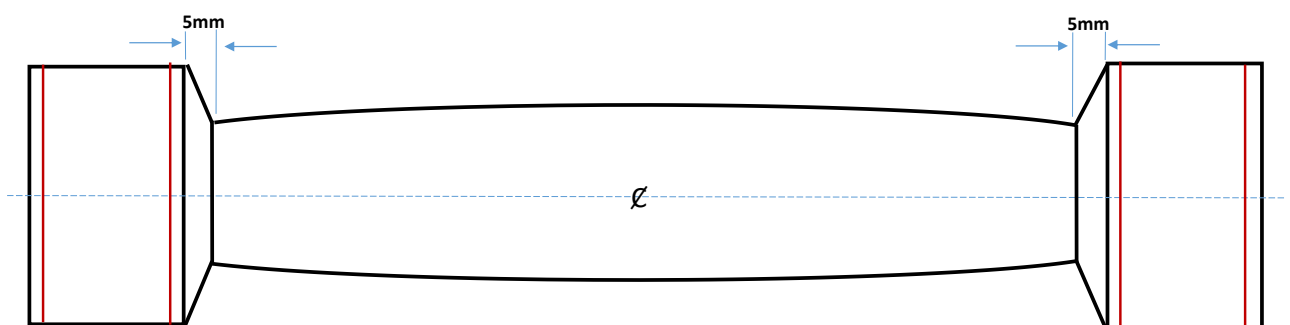
Note: It's not advisable to make the inner component any greater than 40% of the total width of the job as this can result in insufficient wood being available to turn the outside successfully. In this exercise 40% of the 80mm width is 32mm, or looking at it another way, you're reducing the diameter of the core from 80mm to 48mm. So, the maximum depth of the parting tool cuts is 16mm. See diagram next page for cut depths to turn the internal profile for this exercise.



8. Using a spindle gouge carefully turn the internal profile to that in the drawing below. Make an inside template similar to the one on page eight (8) and use it as a guide to achieve a consistent curve on the inner surface.



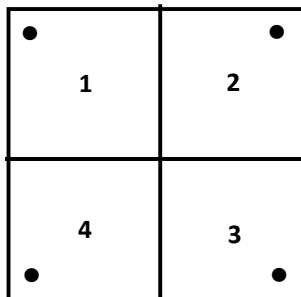
9. On completion of (8) above, measure back 5mm from the job edges of the inside square sections and mark on all flat surfaces as in the diagram below. Use a skew chisel to score the corners and then a spindle gouge to carefully taper the inside edges to the turned round area of the job.



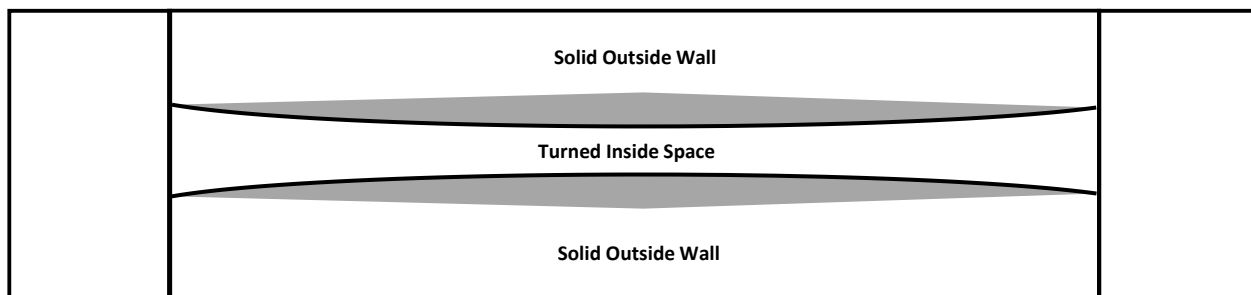
10. Sand and polish (to finish standard) all turned surfaces of the internal section of the job. Masking tape all square areas to prevent getting sealer and polish on these surfaces as they are required to be permanently glued together when the job is turned inside in.
11. The job is now ready to be split up into its component parts and reassembled and permanently glued with outside on the outside. Place the cutting edge of a sharp wood chisel on each joint and lightly tap with a hammer to crack the joint. Once the joint has been cracked, separate the sections.

Turning the Outside

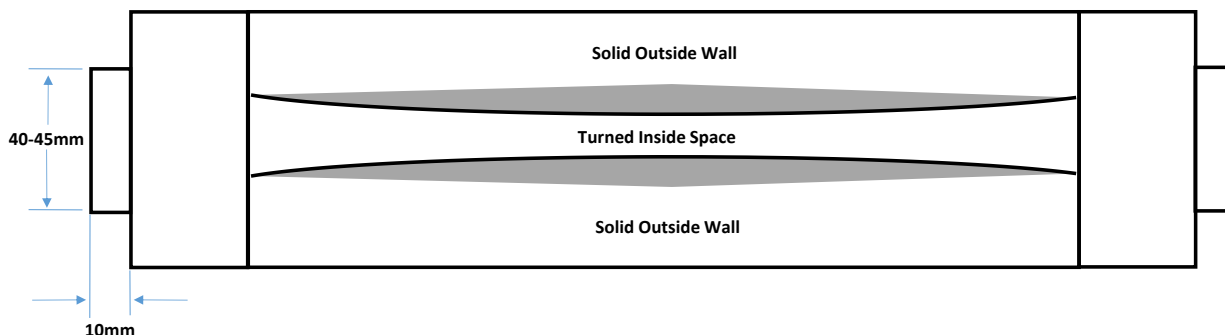
1. Make sure when you are gluing the four pieces together that: (a) the pieces are returned to their original positions with the dots on the outside corners and in the correct number sequence as per the diagram below; and (b) you line up the internal turned part of the job, not the ends. If the ends do not line up, you can trim them once the glue has set.



2. On completion of gluing the blocks together, with the outside on the outside, your job should resemble the diagram below. If necessary, dock the ends to square them off – make sure that both ends are the same length.

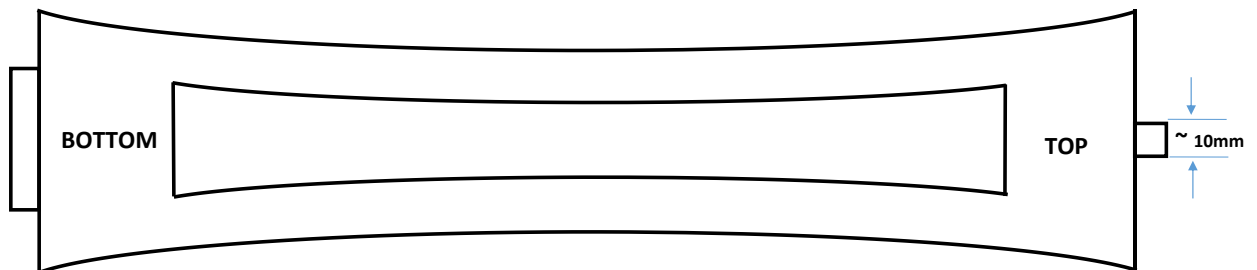


3. From the outside of each square ends measure in 10mm and using a square clearly mark all flat surfaces on both ends. Then, use a skew chisel score the corners as done previously.
4. Using a sharp parting tool cut a 40-45mm diameter spigot/tenon (spigot) on each end as per the diagram below. Remove drive centre and replace it with a chuck of a suitable size for the job and secure the bottom of the job in the chuck with a live centre at the centre at the other end. Turn the whole length of the job to 80mm diameter.



5. Find and clearly mark the centre of the job – the midpoint between the top and bottom of the internal part of the job. Measure out from the centre, in both directions 115mm and clearly mark the ends. If you've had to dock the ends to even them up you will have lost some job length, if so, measure out from the centre an equal distance in either direction to a job length as close as possible to the 230mm maximum length.

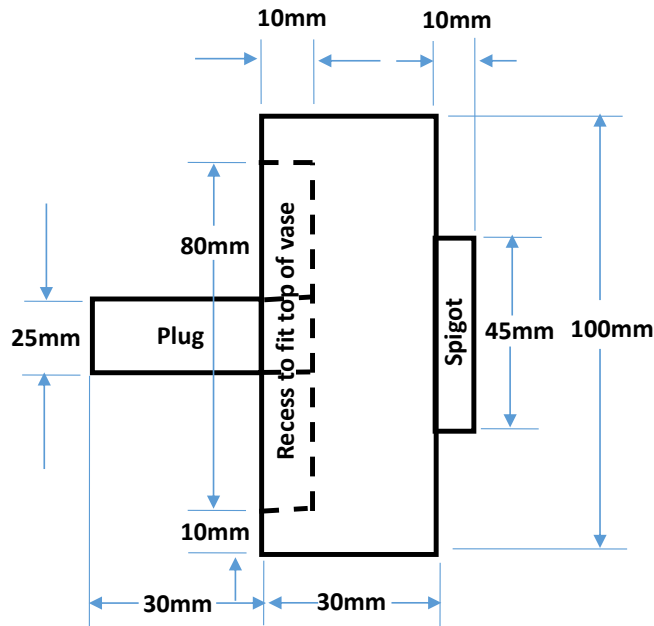
6. Before proceeding any further, make a template similar to the one on page (8) and use it as a guide to achieve a consistent curve on the outside surface.
7. You could use a sharp parting tool to cut a depth gauge for the centre of the job, if you do, don't go any deeper than 15mm.
8. Using a spindle gouge turn the outside shape to the profile and dimensions shown in the diagram on page 1, making use of the template to check your progress.
9. On Completion of (8), lightly sand off the razor-sharp outer edges of the inside turned surfaces and then sand and polish the outside of the job to finish standard.
10. On completion of (9) and with the live centre still in place, use a spindle gouge to form the top of the vase, making sure not to damage the top edge of the vase. To do this, remove the top's spigot by first reducing the spigot to around 10mm diameter, or less (see diagram below) and then removing the live centre to turn off the remaining piece of the spigot.



11. With the live centre removed from the tailstock, insert a Jacob's chuck and with a 25mm Forstner bit in the chuck drill a hole in the top as per the diagram below. Make sure the hole is drilled on centre. After drilling the hole, taper the inside of the hole towards the outside edges of the top as per the diagram below. Sand and polish the flower stem hole and the top to finish standard then remove the job from the lathe.



12. To remove the spigot from the bottom of the vase you will need to make a jam chuck similar to the one in the diagram on the next page, making sure that both the plug and recess for the top of the vase fit snugly.



13.
 - ▶ Fit the jam chuck in the lathe's chuck, with the chuck's jaws only lightly tightened to allow a little movement of jam chuck's spigot in the lathe's chuck;
 - ▶ fit the vase to the jam chuck; put a live centre in the tailstock and line it up with vase's bottom centre;
 - ▶ rotate the tailstock's handwheel clockwise to apply lateral pressure to properly seat the jam chuck into the lathe's chuck;
 - ▶ firmly tighten the lathe's chuck on the jam chuck's spigot;
 - ▶ at low-speed check that the vase is spinning on centre, especially the bottom end;
 - ▶ make adjustments as necessary, e.g., the live centre might be slightly off centre and may need adjusting.

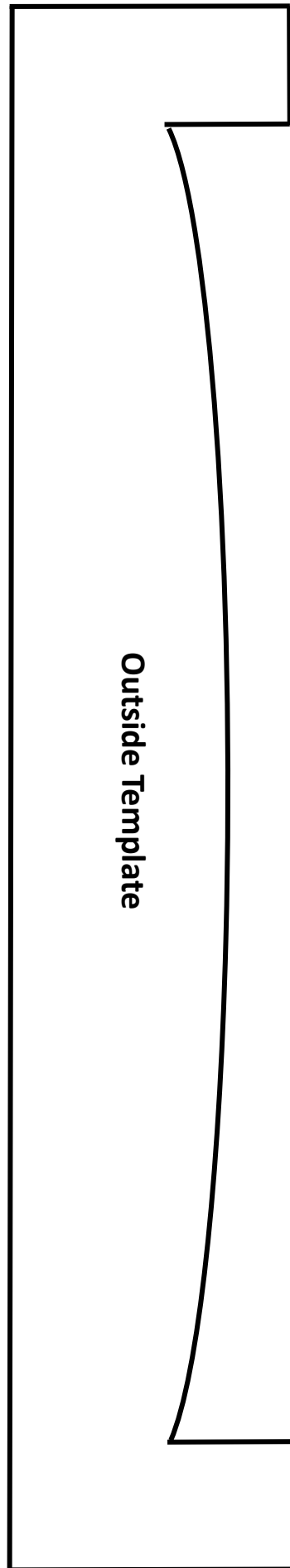
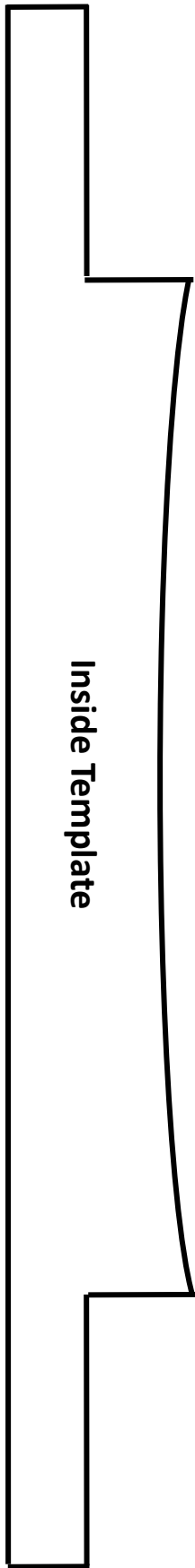
14. Turn off the bottom's spigot, turning the bottom of the vase concave as per the diagram on page 1.

15. On completion of (14), sand and polish the bottom of the vase to finish standard, then remove the job from the jam chuck and lathe.

16. All you need to do now is to find some suitable flowers.

If you're comfortable with the inside-outside turning process and looking to do more, then Exercise 2 on the last page is a good follow-up project.





INSIDE-OUTSIDE TURNING – EXERCISE 2

