

# Southern Turners Project Sheet

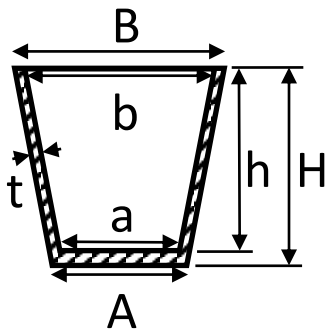
## Cooks Measuring Cups



This is a fairly simple exercise to make a set of nested measuring cups for use in the kitchen. Who knows, it may even win you some brownie points with the person in charge of that domain.

They are based on a cup volume of 250mL – although not calibrated to an Australian standard they will nonetheless be useful for the cook. They can be made in matching wood or a variety of timbers.

I think it is better to start with the smallest one and work up, as that way you can check that they fit inside one another satisfactorily without jamming etc. The intention of this exercise is to complete the first two sizes during the meeting and then for you to continue with the other sizes at home. Please bring completed sets to Show & Tell.



Here is a drawing of the basic design and measurements. In the following tables a side-wall thickness ( $t$ ) of 2mm has been used for the calculations but the bottom is 3mm thick. Table 1 provides the internal dimensions of each cup so you get the “correct” volume of each. Table 2 provides the outside dimensions.

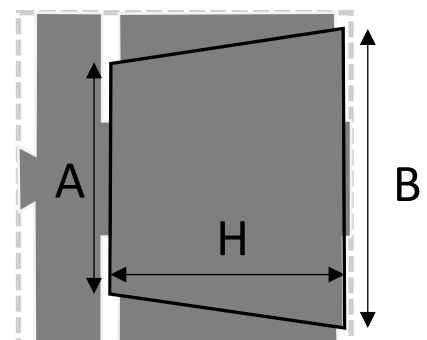
First I turn the outside dimensions so that I have a frame of reference for measuring the inside as I turn it.

Start with one piece of close grained wood that is approximately 6.5x6.5x15cm. You will need your chisels, a 6-10mm drill and abrasives.

- Mark centre at each end and pop.
- Mount in lathe using spur-drive and with live-centre in tailstock.
- Turn to round. Turn tenon on spur-drive end.
- Transfer from spur-drive to the chuck (tighten securely while supporting the other end with the live-centre in the tailstock).
- Square off the tailstock end to a diameter of about 2.5cm using the parting tool. Mark out for smallest measuring cup (**1/8 cup = 2 tablespoons**). The squared tailstock end will be the top. So, from Table 2, the bottom is 3.5cm ( $H$ ) back from the squared tailstock end. Mark this with a pencil. Using the parting tool, turn down the tailstock end to 4.4cm diameter ( $B$ ) and at the bottom, on the waste side, turn down to about 2.5cm and then on the cup side of the bottom, turn down to 3.4cm diameter ( $A$ ). (See figure on right and example provided at the meeting)

	mL	$a$ (cm)	$b$ (cm)	$h$ (cm)
<b>1 cup</b>	250	6.0	8.0	6.5
<b>3/4 cup</b>	187.5	5.4	7.2	5.9
<b>1/2 cup</b>	125	4.8	6.4	5.1
<b>1/3 cup</b>	83.3	4.2	5.6	4.4
<b>1/4 cup</b>	62.5	3.6	4.9	4.3
<b>1/8 cup</b>	31.25	3.0	4.0	3.2

	$A$ (cm)	$B$ (cm)	$H$ (cm)
<b>1 cup</b>	6.4	8.4	6.8
<b>3/4 cup</b>	5.8	7.6	6.2
<b>1/2 cup</b>	5.2	6.8	5.4
<b>1/3 cup</b>	4.6	6.0	4.7
<b>1/4 cup</b>	4.0	5.3	4.6
<b>1/8 cup</b>	3.4	4.4	3.5



- Now remove the remaining wood between the **A** & **B** diameters to form the straight outside wall of the cup. I found a wide painters scraper was a good way of getting a nice straight edge with a fine finish.
- Remove the tailstock support and drill a 6-10mm diameter hole to a depth a little less than 3.2cm (**h**).
- Carefully remove the bulk of the wood from the inside of the cup, bearing in mind that you are working at some distance from the chuck.
- Keep checking the thickness of the wall (**t**). I find it useful to get it right at the top using a skew and then work from there. You can do the finishing cut to the inside wall of the cup with a skew. Ensure that the internal depth of the cup is 3.2cm (**h**) and that it is flat across the bottom.
- Sand to the desired finish if needed.
- Part-off this first cup (**1/8 cup**).
- Now repeat the exercise using the dimensions supplied for the **1/4 cup**.
- If the bottoms of the two cups need further tidying up, or decoration, then it is possible to use the remaining stub of wood in the chuck to make jam chucks for both (do smallest first). The jam chuck should be a 'female' to avoid the risk of splitting the cup.
- Once the full set is completed you could make a lid to keep the set together and make the cook even happier!
- It's also probably a good idea to keep the cooks sanity by labelling each cup on the outside. I guess this can be done using a permanent black pigment pen prior to applying any finish or if you are any good at pyrography then you could burn a label on each.
- I have chosen to finish the measuring cups with grapeseed oil, letting it dry thoroughly before use.

Images below are of my prototype which is a five cup set.

