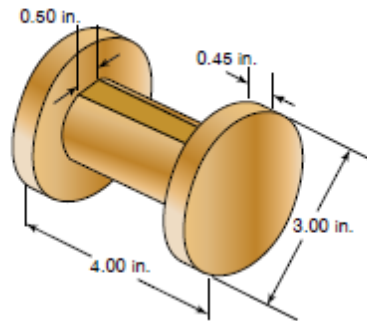
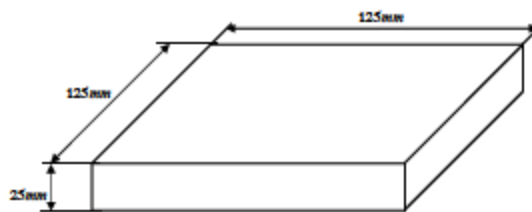


- 1- We know that pouring molten metal at a high rate into a mold has certain disadvantages. Are there any disadvantages to pouring it very slowly? Explain
- 2- How can you tell whether a cavity in a casting are due to porosity or to shrinkage?
- 3- A 75-mm thick square plate and a right circular cylinder with a radius of 100 mm and height of 50 mm each have the same volume. If each is to be cast using a cylindrical riser, will each part require the same size riser to ensure proper feeding of the molten metal? Explain
- 4- The blank for the spool shown in the accompanying figure is to be sand cast out of A-319, an aluminum casting alloy. Make a sketch of the wooden pattern for this part. Include all necessary allowances for shrinkage and machining.



- 5- A cylindrical riser must be designed for a sand casting mold. The part to be cast is a square plate with dimensions $125\text{mm} \times 125\text{mm} \times 25\text{mm}$. The foundryman knows from past experience that the total solidification time for casting this part is 5 minutes. It is required that the height-to-diameter ratio for the riser be equal to 1.0. (Note: it is assumed here that heat transfer occurs across all faces of the cylinder surface.) The solidification time equals to $c \left(\frac{\text{volume}}{\text{surface area}} \right)^n$



- a) Calculate the dimensions (diameter and height) of the riser so that its total solidification time is 25% longer than the casting. Explain any assumptions made.
- b) If a die casting process is chosen, will the dimensions of the riser change? Please list the necessary equations to justify your conclusion. No calculation is necessary.

Good Luck