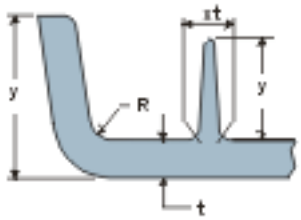
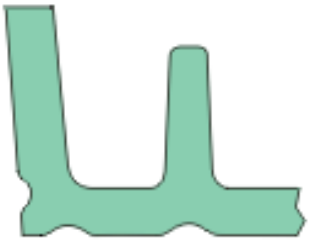
Polymer Shrinkage Characteristics Group Module: 27	TEL 204: Polymer Molding & Forming Department of Technology	Students Names: (PRINT)

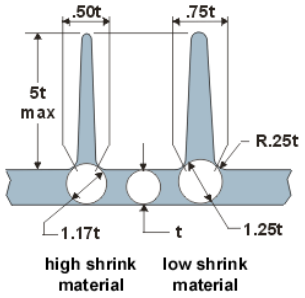
Overview:

Most plastic materials shrink as they cool. This has a huge impact on the design of extrusion dies and injection molds. This requires that mold designers create molds that are actually LARGER than the molded parts need to be! Further complicating the process is that each specific polymer exhibits unique shrinkage characteristics. You will plan a layered injection mold. Build the mold. Mold three different types of plastic. Calculate the shrinkage of each material.





sink marks



Plastic 1: _____ Percent Shrinkage: _____

Plastic 2: _____ Percent Shrinkage: _____

Plastic 3: _____ Percent Shrinkage: _____

Module Grade:

Cavity Plate Construction (50)	Mold Finish (50)	Fully Formed Parts (20)	Calculations (50)	Lessons Learned (30)
Instructor Signature:			Date:	Grade:

Mold Construction Procedures:

1. Use a piece of thick acrylic, 1/8" hardboard, formica, aluminum, etc. and cut and drill to correct size on the bandsaw **(if using aluminum use only hand tools!)** to fit support plates.
2. Cut a sprue, gate, and cavity using a jewlers saw or the scroll saw.
3. Keep plenty of mold material around the cavity (don't put the cavity too close to any edge of the mold)! Pressure from the injected plastic will tend to break the cavity layer.
4. Stack your cavity plate between the mold cheeks to mold parts.

Molding Procedures:

5. Wear safety glasses.
6. Wear gloves and do not touch hot molds, hot plastic, hot molder surfaces.
7. Preheat molder(s) to 350 – 380 degrees.
8. Spray mold with release.
9. Mold several parts using **clear styrene, LD Polyethylene, and one other plastic**.
10. Remove and retain several parts and perform calculations.

Shrinkage Calculation Procedures:

11. Measure mold cavity using centimeters.
12. % shrinkage is *X*

$$\frac{\text{Mold Size}}{100} = \frac{\text{Part Size}}{X}$$

Example:

$$\frac{3.9\text{ cm}}{100} = \frac{3.75\text{ cm}}{X}$$

$$\frac{375}{3.95} = \frac{3.95\,X}{3.95}$$

94.9 % of original = 5.1% Shrinkage

Lessons Learned:

List the most important lessons learned from this polymer module.

1. _____

_____

_____

2. _____

_____

_____

3. _____

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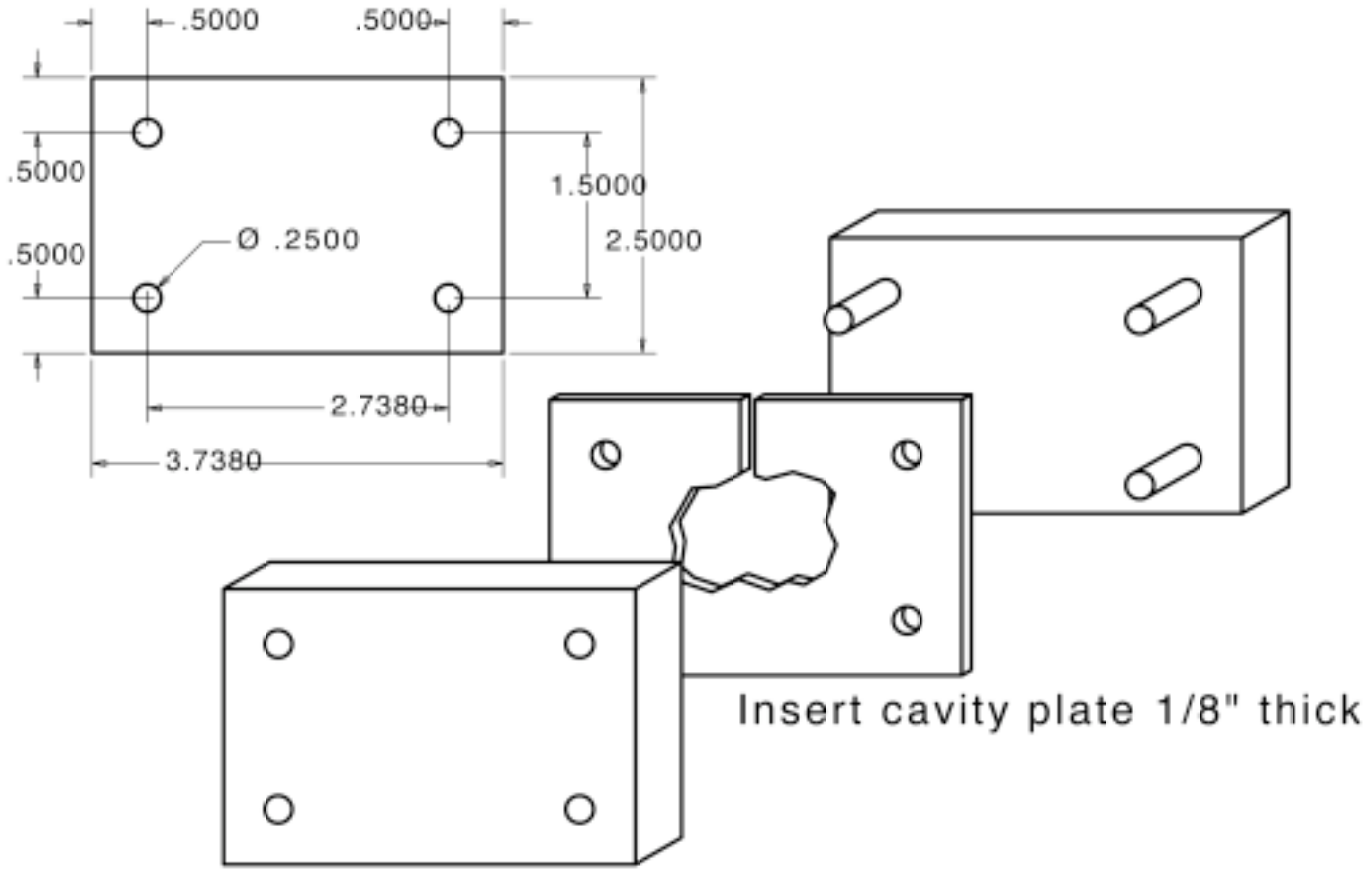
Notes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Insert cavity plate 1/8" thick