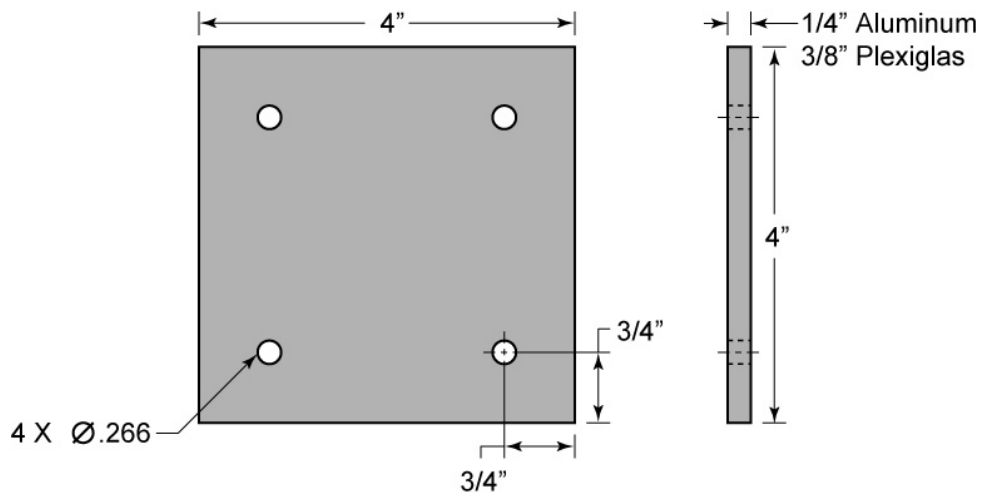
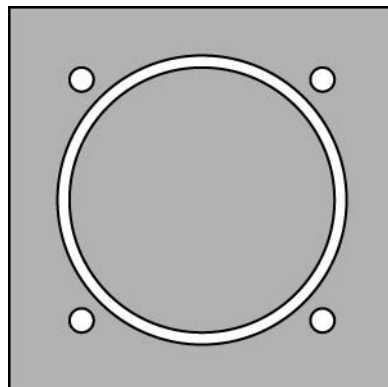


Pressure Hulls and Canisters 3
Cornerstone Electronics Technology and Robotics III
Pressure Hulls and Canisters Lab 2 – Making a Plexiglas Pressure Canister

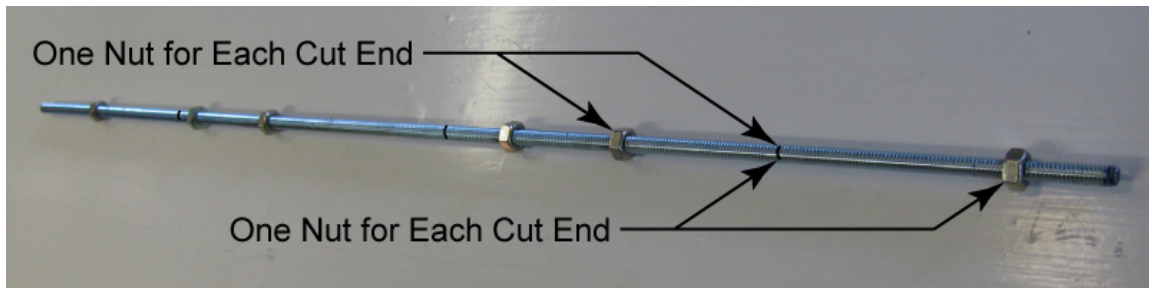
- **Purpose:** The students build pressure canisters for their class ROVs.
- **Apparatus and Materials:**
 - 1 – 4" x 4" x 3/8" Plexiglas (Lucite or Acrylic Glass)
 - 1 – 4" x 4" x 1/4" Aluminum
 - 1 – 3" OD x 2 3/4" ID x 4 3/4" Plexiglas Cylinder
 - 1 – 1/4-20 x 24" All-Tread
 - 8 – 1/4-20 Nuts
 - 8 – 1/4-20 Washers
 - 1 – 4" x 4" Piece of Rubber
 - Weld-on #3 Plastic Glue Cement for Acrylic
 - 1 – Plastic Glue Cement Syringe Applicator
 - 1 – Piece of Sandpaper or Emory Cloth 220 Grit
- **Procedure:**
 - Mill each edge of the 4" x 4" x 1/4" aluminum and file off burrs.
 - Layout the hole pattern shown below on both the Plexiglas and aluminum end caps.



- Use an H drill bit (0.266") to drill the four holes.
- Smooth each end of the Plexiglas cylinder on the 220 grit sandpaper placed on a flat surface.
- Center the 3" OD Plexiglas cylinder on the 4" x 4" Plexiglas. See below.



- Using the syringe, apply the Weld-on #3 plastic glue cement to the Plexiglas/Plexiglas junction inside and outside, allowing the cement to flow into the joint by capillary action. Allow a few seconds for the cement to soften the surfaces then apply weight on the cylinder to press parts firmly together.
- Follow the Weld-on #3 manufacturer's instructions for dry time before submerging the cylinder.
- Layout 4 – 6" pieces on the 24" 1/4-20 all-thread.
- Insert a nut for each cut end onto each 6" piece before you make the cuts. See the photo below.

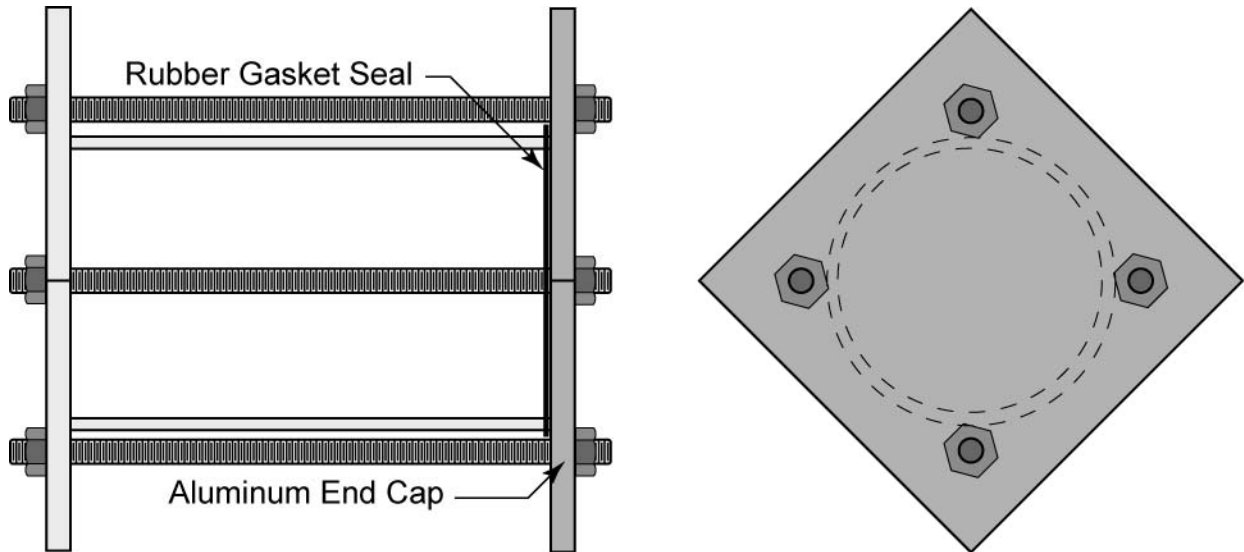


- Cut the 4 – 6" pieces of all-thread from the 24" all-thread stock. Be careful not to damage the adjacent threads when making your cuts.
- Using a bench grinder, grind the cut ends square then put a slight chamfer by rotating the all-thread end against the grinder stone.
- Now unscrew the nuts off each cut end of the all-thread pieces to remove burrs from the threading. See photos below.



- Cut the rubber gasket to a diameter slightly smaller than the hole pattern or leave it as a 4" x 4" square and punch holes where the all-threads will pass through.
- Insert weights into the cylinder. You may want to tape the weights so they won't scratch the Plexiglas.

- Place the rubber between the aluminum end cap and the cylinder then assemble the pressure canister as illustrated below. Tighten the nuts.



Final Pressure Canister Assembly Rotated 45 Degrees



Final Assemble of the Pressure Canister Housing

- After the plastic cement drying period, place the weighted cylinder into the test pond until the next class.
- **Results:**
 - Did the pressure canister remain waterproof for the duration of the test? If not, what are corrections do you recommend?