Volcano Challenge 1.0

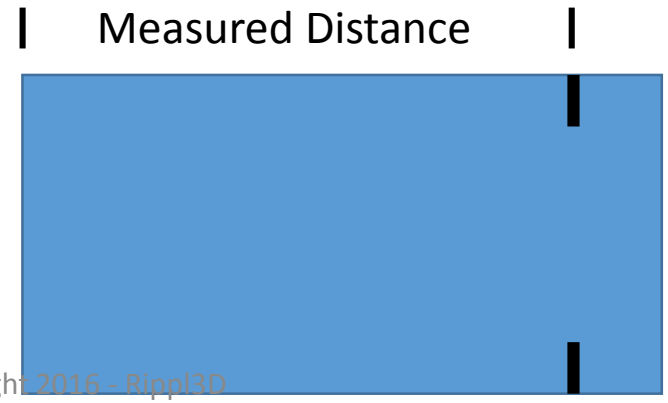
Test Stand Fabrication and Assembly

Tower Assembly

- Parts Required
  - 5 Acetate Sheets 0.010”x25”x40”
  - 5 12” Dia Embroidery Hoops
  - Measurement Graphic
  - Test Basin

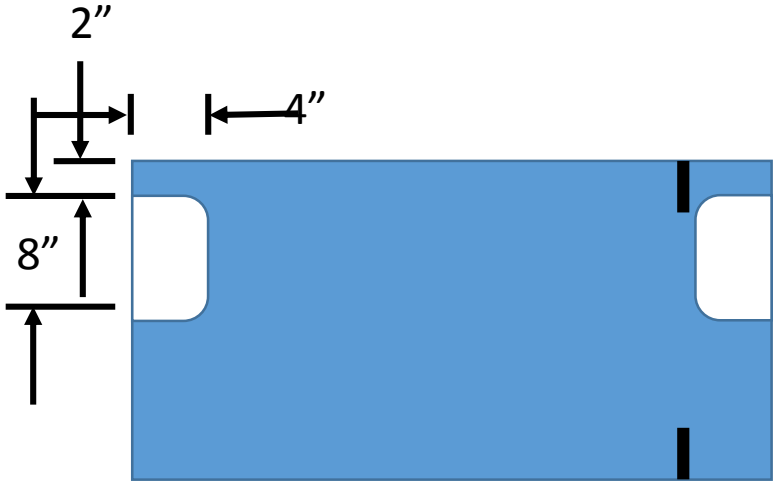
Mark Inner Tube Sheets

- With a flexible measuring tape, measure the outer diameter of the center embroidery hoop
- With permanent marker, make two marks in the acetate sheets with this dimension along the 40” length
- Repeat on a second sheet (only mark two sheets to this dimension)



Mark Sheets

- Using one of the two sheets previously marked
- Modify the sheet for an access into the test tower by cutting the patterns below in two places



Roll Sheet

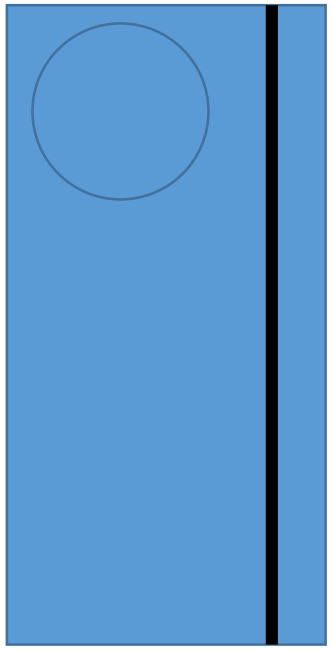
- Roll sheet into a tube along the 40” length
- Align the edge of the sheet to the marks on each side
- Using tape (scotch tape suggested) secure the sheet in two places
- Repeat tape on outside of tube

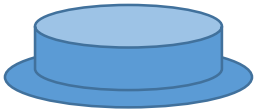
Mark Outer Tube Sheets

- Using the center embroidery hoops
- Slide one inside the taped Inner Tube Sheet at each end, forming a tube section
- Measure the outside diameter with a flexible tape measure
- Mark two more sheets with this dimension just like you did in Slide 3
- These will be the Outer Tube Sheets
- In a subtle manner, label all four sheets as outer or inner

Building the Test Tower Cap

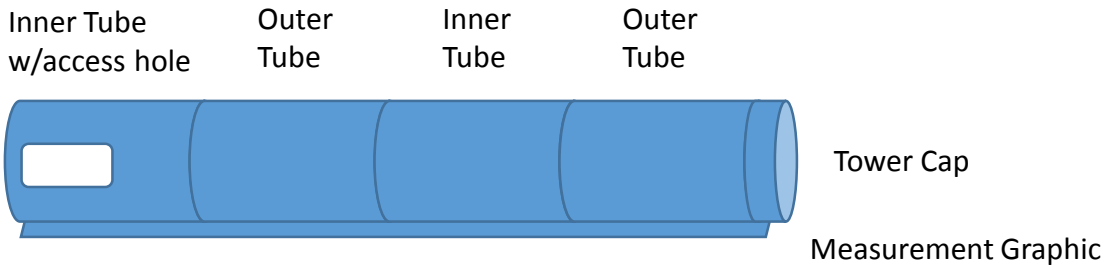
- Cut a 3” tall strip off of the 40” length of acetate
- Mark with the Inside Tube measurements
- Roll and secure with tape
- Using a center hoop, mark a circle on the remaining sheet of acetate.
- Offset the circle to make it 1” larger on diameter and cut out the part
- Reinforce 3” tall tube with center hoop
- Center on round cutout and secure with silicone caulk around outside diameter
- When caulk has set, remove center hoop and apply caulk to inside diameter





Test Tower Assembly

- Lay the Measurement Graphic down lengthwise on an 8’ long table
- Place bottom Inner Tube (has access hole cutout) on the graphic lengthwise
- Fit with embroidery hoops and secure bottom end
- Assemble a Outer Tube end to end over the Inner Tube
  - Overlap approximately 1”
  - Secure with embroidery hoop
- Repeat for addition tube sections
- Incorporate Tower Cap on the final section

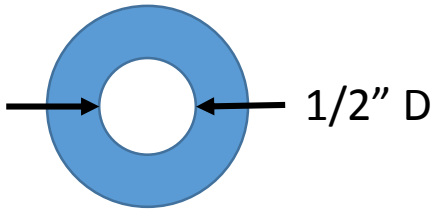


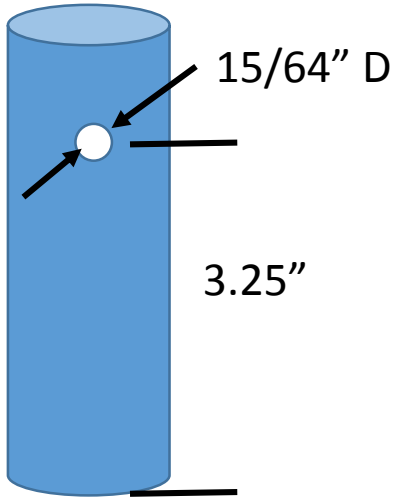
Mixture Chamber

- Parts Required
  - 50ml Centrifuge Tube with cap
  - 6 inches of 0.25 inch outer diameter vinyl tubing
  - Injector fitting (Cole-Parmer Female Luer Style 200 Barb)

Centrifuge Tube Modification

- Cap Modification
  - Drill 0.5” Dia in hole in center of Cap
  - Suggest using a mortise bit for this operation
- Tube Modification
  - Drill 15/64” Dia hole in tube
  - 3.25” from the bottom
  - If 1/4” Dia tubing will not force into hole, open hole to 1/4” Dia





Centrifuge Tube Modification

- Install 6” Long Vinyl Tubing
  - Force ¼” Dia tubing into hole
  - Feed enough tubing that it makes a 90 degree turn and is facing directly towards the bottom of the tube
- Install the Injector fitting to the external end of the tube