

Build-it Day Vacuum Chamber Construction

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What you will be doing

Building a vacuum chamber for you and your students is a fun and straightforward task.

You will have materials already cut for you and (almost) ready to assemble. You will have plastic and brass parts, and a hand pump of plastic, brass or steel.

You will finish surfaces for proper sealing and fasten components using glue or threaded pipe fittings.

Once completed, your vacuum chamber can be used to illustrate effects due to differential pressure. Have fun.



Instructional use of tools provides guidance and insures safety

Make the threads in the grooved top plate using the tap and handle. Tapping the grooved plate is done starting from the UNgrooved side of the top plate.

Use firm pressure while slowly rotating tap or piece. Back out the tap (counter clockwise) for each turn inward to break the forming chip, otherwise the buildup will crack the plastic plate.



Be careful and keep the tap axis at a right angle to the plate surface.



The edges of both ends of the cylinder must be smooth. Use coarse, medium, then fine wet/dry silicon carbide paper fixed to a flat surface and a circular motion of the cylinder to achieve a scratch-free surface. There should be no scratches across the wall surface, this would cause a leak. Using water on the silicon carbide paper will speed the process.



The smoothed cylinder surface will be glued to the UNgrooved acrylic plate. Remove the protective paper from one side of the plate and center the cylinder on this side. Using a glue top syringe place some acrylic glue #4 at the joint where the cylinder and plate meet. The glue is thin and will seep into the interface by capillary action. Do this in several locations around the cylinder. Allow 15 minutes for the glue to set adequately.

All of the threaded hardware must have a 3-4 layers of Teflon tape added to ensure an airtight fit. Wrap the tape, clockwise looking into the fitting end, so it does not come loose during fitting assembly.



After the cylinder is glued to the base and the hardware is connected in the top, place an o-ring into the groove and place the top onto the cylinder. Attach the hand pump, evacuate, and leak check. Be sure the valve is in the open position for this step.



A completed vacuum chamber ready for a small balloon or marshmallow.

A gaggle of chambers pumped down and holding steady.

