

The Pneumatic Piston 2002

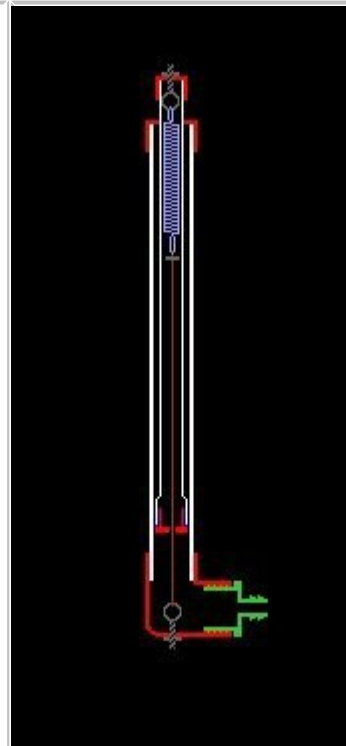
If you're looking for a fairly inexpensive way to build long throw pistons (12 inches or more), then the PVC pneumatic piston is the way to go. They're powerful enough to lift about 10-15 lbs at 40 psi and only take about 1/2 hour to make if you have the proper parts & tools on hand.

I designed the PVC pneumatic pistons for the animated skeleton and grave jumpers

If you can't wait until I get an exact parts list, just test fit the inner plug and make sure that the smaller pipe slides smoothly inside the larger pipe while you are at the hardware store. The rest of the parts are standard PVC connectors and miscellaneous hardware, so just get the right size for whatever pipe you find that works.

Parts

- 0.5 inch (thin wall) PVC with flared end (usually sold in 10ft lengths)
- 0.5 inch PVC end cap
- 0.75 inch PVC end plug (with "lip" ground down to the same diameter as the flare on the inside pipe)
- 1.5-2 inch long small eye bolts and appropriate sized nuts (2)
- 4-6 inch gate spring (the spring should not have a lot of pull to it, just enough to close a light screen door, and it should stretch to at least the length of the finished piston throw)
- 1 inch (thick wall) PVC
- 1 inch PVC end cap
- 1 inch PVC elbow (one side should have 0.75 inch female thread)
- 0.75 inch nylon threaded male to 0.375 inch hose barb
- 0.5 inch hose clamp (not shown on image)
- Small metal washer (optional - if you just want to let the knot in your string limit the throw you can get away with that at the low pressure I have been working at)
- 2 ft piece of (heavy weight) nylon string or cord



- 3 inch piece of "t-shirt" material as the piston seal

Instructions

I built my pistons to be about 20 inches long with a 14-16 inch throw. If you want a shorter or longer piston, just modify the length of the inner and outer tubes by the same amount and it should still work (up to the maximum that your spring will stretch)

- Cut the inner pipe to a length of 20 inches
- Grind the PVC plug so that when inserted in the flared end of the pipe, the "lip" is flush (around the edge) with the outside of the pipe
- Drill a 0.25 inch hole in the center of the plug for the return spring cord to pass through
- Put the piece of t-shirt material in the flared end and hammer the PVC plug so that it sandwiches the t-shirt material and pushes it into the end of the pipe. If you do it right, you should have an edge of t-shirt material hanging out of the seam where the pipe and the rim of the plug meet. Once you have the t-shirt material sandwiched in there, cut off the excess material leaving about 0.125-0.25 sticking out (depending on the fit of the inner pipe) all the way around.
- Cut the outer pipe to 18 inches in length
- Drill a 0.75 inch hole for the inner pipe to pass through in the center of the 1 inch PVC end cap and place it on one end of the outer pipe. The hole should not be a tight fit on the inner pipe, but allow for a little air to pass through as the inner pipe moves.
- (to be continued...)

I am not responsible for any damages if you decide to make one of these PVC pistons. If you do not assemble it correctly or run ridiculously high pressure through it (greater than about 40 psi) you run the risk of hurting yourself or others.

Pneumatic Piston 2005

The screen door closer I bought was from the local Home Depot and

made by Wright Products. It was just under \$8.00.

It came with an adjusting screw hole in the end that looked like a promising location for a pipe fitting.

One side of the hole had a piece of metal for the mounting bracket in the way, so the first task was to cut it off with the cutting wheel attached to my angle grinder.



Next step was to drill out the existing hole and tap it for a 1/8 inch pipe thread. I kind of guessed at the pipe size while I was at the store and it turns out that 1/8 inch pipe thread is perfect for the hole.



Once I had the end of the piston threaded I test fitted the elbow that I picked up while on my search for parts.

I had a lot of help from an employee at the local hydraulic fitting supply shop. He found me the perfect barb connector, but they were like \$10.00 or something. He came up with the idea to use just a threaded elbow which cost under \$2.00 - Thanks man!

The drill bit, tap and tap handle ended up costing me \$23.00, but I



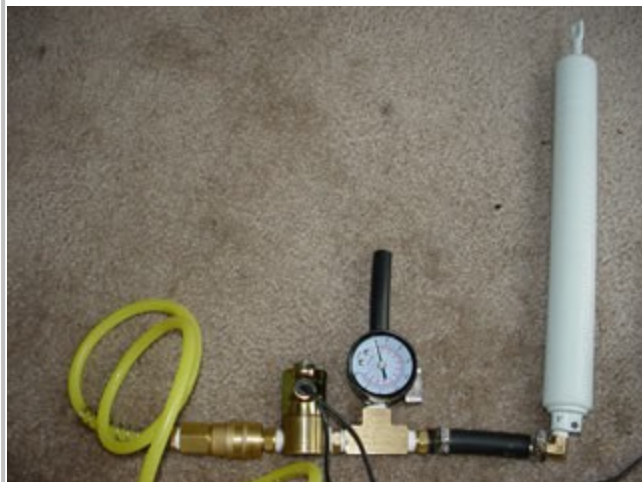
figured that now I have the tools to make as many of these pistons as I need.

For testing I put a small regulator in-line and started working up the pressure until I found a good action that was not too rough on the piston. Anything below 30 PSI was barely enough to move the piston. I ended up at about 55 PSI and it has a really good action.

I took it up as high as 65, but at that pressure the piston was really hitting hard on the top of the stroke. There is a danger of blowing the piston apart if I put too much pressure in it.

I do not know if the piston will hold up over time or not. If you decide to try creating your own piston this way, you are responsible. I am putting a pressure regulator right at the prop so that when the day comes where someone cranks up the compressor to 120+ PSI I won't blow something or someone up.

The assembly you see in the image to the right is what I ended up with. I connected the 55 PSI hose connector to a small electric valve that I picked up a few years back from a pneumatic supply shop. I attached that to a T fitting and ran it through to the piston. The pressure gauge you see attached to the T fitting is just there to release the pressure from the piston when the supply valve is closed. The released air will be used to operate an air horn or something similar to add to the scare. The final assembly will have a pressure regulator in line so I can fine tune for



the specific prop and protect the piston from any radical adjustments someone might make to the main supply pressure.

I have an X-10 switch hooked up to the electric valve. That allows me to use my X-10 remote control (or even my PC) on Halloween night to activate the prop.

