PVC Pipe Vertical Casting Mold for Pen Blanks 2.0

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Although there are several commercially available vertical molds for resin casting pen blanks on the market, I got started by making my own molds using PVC pipe which I still use today. It is relatively inexpensive, customizable, and in my opinion, more robust than some of the dedicated silicone molds that are available on the market. Here is how I made mine to get started.

Figure 1. Materials and Tool used to make the Mold Body

Materials:

- ¾” Inch Schedule 80 (grey) or Schedule 40 (white) PVC pipe (For my 8 ¾ inch mold, I used 5¼ feet)
- 3½” by 3½” inches ¾” thick hardwood like Maple (or UHMW Polyethylene if possible)
- 3½” by 3½” inches by 1/16” inch thick Silicone Sheet (Hobby Lobby, Pink Sunny Side Up Silicone Baking Mat)
- 12” inch long ¼-20 Threaded Rod.
- 8 each ¼-20 nuts (Note – the picture only shows 5, but I needed 8)
- 3 each standard ¼” inch washers (they should measure about 0.74” inches to fit inside Schedule 80 PVC)
- 1 each ¼ x 1” Fender washer
- Hot Melt Glue
- One 64 oz. Resin Mixing Cup or equivalent that will fit inside your pressure pot

Tools:

- Measuring Tape and Sharpie Marker
- PVC Pipe Cutter (or a saw that can be used to cut PVC pipe)
- Hacksaw to cut the ¼-20 Threaded Rod (or Rotary Tool with a metal cutoff wheel)
- ¼” Twist Drill Bit (to make a thru-hole for the ¼-20 rod)
- ⅞” Forstner or Spade drill bit (to make a counter bore for a washer and nut)
- Hot Melt Glue Gun
- 7/16” Wrenches (or adjustable wrenches)

Step 1: Build the Mold Body

For the **Mold Body,** I measured and cut six pieces of ¾" inch PVC pipe, each 8 ¾" inches long. Then I cut one piece a little shorter at 8½". This will be in the center and the shorter length is to accommodate the thickness of a nut and washer. The PVC can be cut with a saw, but using a PVC pipe cutter will provide a better, square and relatively burr free edge on the pipe. I prefer Schedule 80 Pipe because it saves resin. It is slightly smaller in inside diameter than Schedule 40 pipe. (Schedule 80 = 0.742" inches ID and Schedule 40 = 0.804" inches ID).

Figure 2. Six pieces of Pipe each 8 ¾" inches and one at 8½" inches.

I divided the six longer tubes into pairs with the print on each tube facing the other so the printing would be less visible on the finished Mold Body. I clamped each pair together and then ran a bead of hot melt glue down the seams to glue them together.

Figure 3. Six pieces of Pipe each 8 ¾" inches long made into pairs using hot melt glue.

Next, I flipped a pair over and applied hot melt glue in lines along either side of the center and placed the shorter, center piece of pipe on top making a **triangle**. I kept the short end of the tube to one end. The flush end will be the bottom.


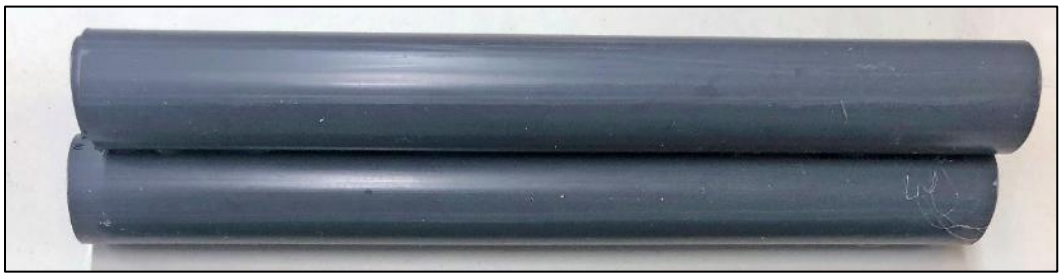

Figure 4. One pair with the shorter, center tube glued into place.

Then, I applied lines of glue on one of the other pairs and attached it to the triangle, keeping them flush with the bottom end.


Figure 5. Another pair glued on keeping the shorter tube in the center.

Next, I did the same thing to glue the final pair on to the stack, keeping things flush on the bottom end.


Figure 6. The final pair glued onto the assembly to complete the mold.

And, finally, to add extra strength, I applied hot melt glue down any of the sides that didn't have a nice bead.

Since I didn't get the bottoms of all of the tubes perfectly aligned, I used a miter saw to trim the bottom of the stack so that all of the tubes were perfectly flush on the bottom. This is important because it is the surface that will be pressed into the silicone gasket providing a seal to keep any resin from leaking out.


Figure 7. The Top and Bottom of the finished Mold Body.

Step 2: Build the Mold Base

After the Mold Body was glued together, I sawed a piece of ¾" inch thick hickory into a 3½" by 3½" inch square. (On previous molds I used a ¾" thick piece of UHMW Polyethylene instead of wood so that any spilled resin wouldn't stick to it but since there is a silicone gasket I didn't think it would be necessary). EDIT: After a couple of pours the spillage did get on the wooden base and made a mess of it. I highly recommend using ¾" inch thick UHMW instead, or at least cover the top, bottom, and sides of the wood with sacrificial blue tape so spillage can be cleaned off more easily.

I found the center of the square by drawing lines connecting opposite corners. I started by drilling a ⅞" diameter hole ⅜" inch deep in the center. This counter bore is so that the bottom nut and washer are recessed up into the Mold Base when the Mold Body is attached. (Otherwise the mold will not sit flat and level when it is standing up). After the counter bore was drilled, I put in a ¼" inch drill bit and drilled a hole the rest of the way through, keeping the bit as centered as I could. I am sure that using a drill press with the piece clamped down would have made the holes more accurate, but hand drilling them worked just fine.

At the same time, using the Mold Base as a guide, I cut a piece of the silicone (baking mat) to 3½" by 3½" inches and cut a small hole in the center. This is the gasket that will seal the bottom of the Mold Body. (Although not shown in the pictures, I sanded a small radius on the corners of the Mold Base so it would fit flat on the bottom of the 64 oz. container).

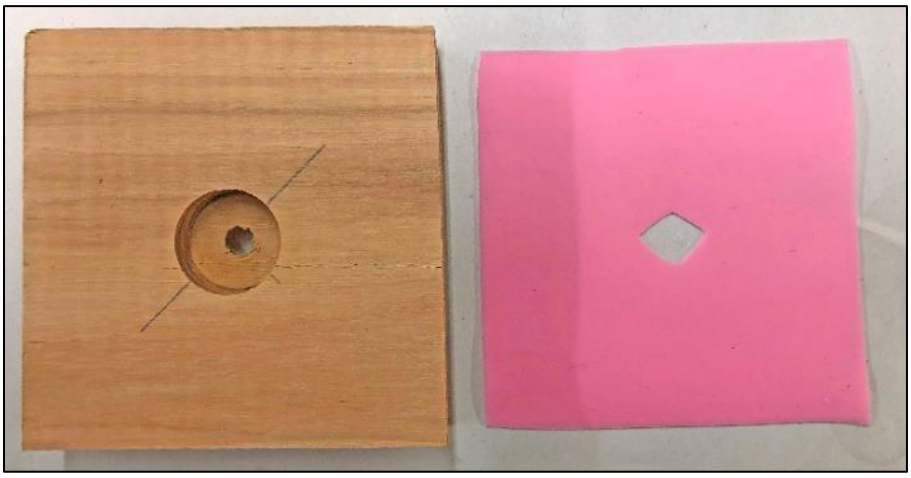

Figure 8. The Mold Base and Silicone Gasket.

Step 3: Build the Clamping Rod

Assembling the ¼-20 clamping rod wound up being more fidgety than I had hoped because there was too much clearance in the washers to make them naturally centered on the threaded rod. The top end of the rod is the most complicated. I started by threading two nuts onto the rod, then the regular (smaller) washer and the fender washer, followed by another nut at the very top. No threads should protrude from the top of the nut.

Once they were installed, I turned the bottom two nuts up until they met the washers and then used a pair of wrenches to lock the bottom two nuts together. Although it can't be seen in the photo, the top nut was left loose so that the washers could move about freely. This is important for fitting the Clamping Rod into the mold during assembly.

For the bottom end of the rod, I threaded two nuts onto the rod, positioned so they would wind up about an inch or so inside the center PVC pipe when the Clamping Rod is installed. Using a pair of wrenches, I locked these two nuts together. Then I slid on a regular washer followed by two more nuts. These two nuts were also locked together, but the washer was left loose between the two sets of locked nuts. This is so that the washer can move and center itself when the Clamping Rod is inserted into the pipe.

Figure 9. The Clamping Rod with Hardware Installed (Note: The position of the hardware and that the washers are loosely fitting).

I installed the Clamping Rod assembly into the center PVC pipe, adjusting the fit so that the small top washer went inside the pipe and the fender washer rested on top of the pipe. I put the silicone gasket and the Mold Base over the bottom end of the rod and installed a washer and nut on the bottom of the Mold Base and snugged it up. Then I marked the bottom of the threaded rod so that it would be flush with the bottom of the Mold Base. (I did this by starting a cut into the rod with a hacksaw held flat against the bottom of the Mold Base).

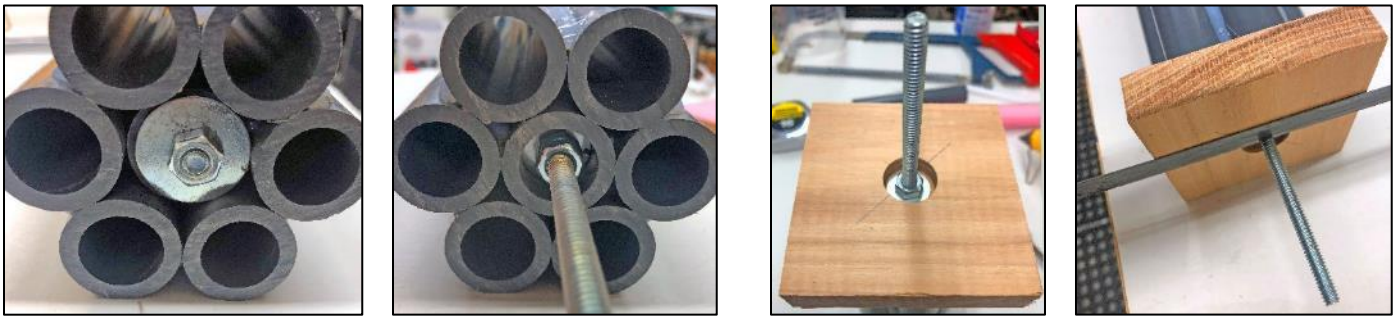

Figure 10. The Clamping Rod installed with the Mold Base and the excess being cut off of the threaded rod with a hacksaw.

Next, I took off the bottom nut, washer, silicone gasket, and Mold Base then removed the Clamping Rod assembly from the center pipe. At my workbench I finished cutting off the excess from the threaded rod. (Although I could have finished cutting it off with a hacksaw, for expediency, I opted to use my rotary tool with a metal cutoff wheel to get the job done). Then I used a file and a sander to clean up the cutoff end of the threaded rod leaving it with a slight chamfer so that the bottom nut could be threaded on easily without any binding.

I re-installed the Clamping Rod assembly into the center PVC Pipe and I hand tightened the top nut down onto the fender washer. After test fitting the gasket and Mold Base one more time, I piped hot melt glue into the recess around the bottom washer and nuts to help secure it in place. I did the same for the recess around the top washer and nuts.

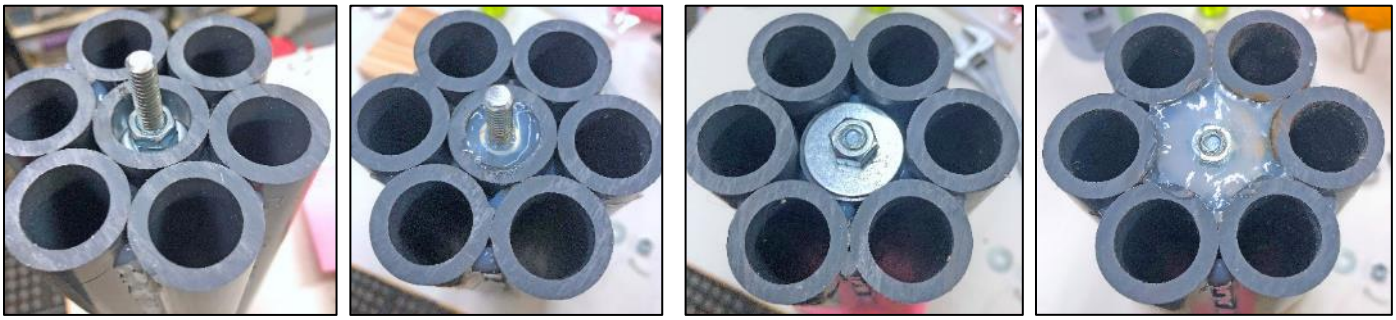

Figure 11. The Bottom and Top with the Clamping Rod installed and the recess filled with hot melt glue.

Finally, I cleaned any debris from the pipes using compressed air and by pushing a wad of cotton cloth through each pipe with a dowel. And before re-attaching the Mold Base I pre-conditioned the inside of the pipes by spraying them with mold release. (I use Alumilite Clear Slow, so the mold release spray I use is Stoner brand made specifically for urethane resins).

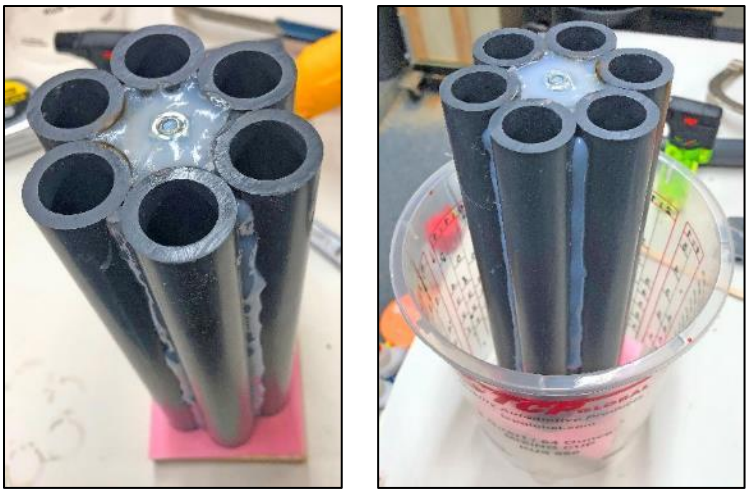

Figure 12. The completed mold with the Mold Body and Mold Base attached.

For Use:

Before each pour, I remove the Mold Body from the Mold Base and spray mold release into the PVC pipes. (I use Stoner for urethane since it is formulated for the Alumilite Clear Slow resin that I use). I hold the **Mold Body** above a 64 oz. Resin Mixing Cup when I am spraying in the mold release to help contain any overspray. Then I re-assemble the Mold Base onto the Mold Body and lightly tighten it using the bottom nut. I also place the mold into the same 64 oz. Resin Mixing Cup to contain any resin overflow or spillage. It also helps handling the poured mold easier and helps keep any drips or spillage from messing up the bottom of my pressure pot. After de-molding, I clean the blanks first with a wipe down of mineral spirits, then with denatured alcohol to get any residual mold release off of them.

Optional Parts:

Using a ¾" inch wooden dowel I turned and sanded it down to fit inside the Schedule 80 PVC pipe making an Ejector tool. Tapping this tool with a mallet makes it much easier to eject the blanks from the mold.

I also turned a stubby handle and glued in a 7/16" inch Magnetic Nut Driver to make a custom stubby nut driver to keep with the mold. It was much handier than having to retrieve a nut driver from my toolbox every time I needed to remove or install the nut on the bottom. Although I could have just purchased a 7/16" inch nut driver, I think the stubby version is easier to use in this application.

Cost of Materials - From Menards unless otherwise indicated:
(Priced in February 2025):

$8.99: ¾" Inch Schedule 80 (grey) or Schedule 40 (white) PVC pipe (For my 8 ¾ inch mold, I used 5¼ feet)
$4.17: 3½" by 3½" inches ¾" thick hardwood like Maple (Home Depot) – (Or UHMW Polyethylene / HDPE)
$1.99: 3½" by 3½" inches by 1/16" inch thick Silicone Sheet (Hobby Lobby)
$1.19: 12" inch long ¼-20 Threaded Rod.
$2.69: 8 each ¼-20 nuts (Note – the picture only shows 5, but I needed 8)
$2.69: 3 each standard ¼" inch washers (they should measure about 0.74" inches to fit inside Schedule 80 PVC)
$0.69: 1 each ¼ x 1" Fender washer
$4.37: Hot Melt Glue
$1.85: One 64 oz. Resin Mixing Cup or equivalent that will fit inside your pressure pot (Exotic Blanks)

Total Cost = $31.09