



Multi-Puck Powder Die



Figure 1: Splitting a segment of 4" PVC.



Figure 2: Laminating plywood disks to form the rammer.



Figure 3: Making separation disks from soda cans.

Introduction:

A powder die is basically a sleeve and piston arrangement that is used to compress milled black powder into hard, dense cylinders often called "pucks." These pucks are later granulated to make black powder grains of various sizes, a process described [here](#).

While many black powder hobbyists seem to be pressing one puck at a time, the powder die shown here is designed to press up to 8 or 9 3/8" thick pucks at a time. When pressing many pucks at once, a 12 ton hydraulic press is required. However, the same die can be used to press single pucks with less powerful hydraulic jacks if a longer rammer is made.

Construction:

The sleeve used for this project is a segment of 4" PVC that is 7 or 8 inches long. The wall thickness should be about 1/4" to handle the pressure generated. The sleeve will also need to be split down one side to make removal of the pressed powder possible. This is easily done by clamping the pipe in a vice and using a Japanese type pull saw to cut along a straight guideline as shown in Figure 1. The pipe will want to collapse in on the cut as you get near the end, so using a chisel or screwdriver to hold it open will help prevent your saw from binding.

Using the thin pull saw or other hand saw to cut the pipe is the easiest and safest way to make the slit, as the binding problem can be dangerous when using power saws (pipe grabs blade, blade throws pipe!). If you want to use a power saw, you will need to make two cuts down the length of the pipe. For the first cut, set the depth of cut to slightly less than the wall thickness of the pipe and make a cut down one side of the pipe. Now set the saw to cut all the way through and make another cut down the opposite side of the pipe. The first cut will have created a "hinge" which keeps the pipe from binding on the blade.

The rammer can be made as done for the 4" comet pump shown [here](#) (minus the center hole), but an alternative method is to simply glue together a bunch of 3/4" thick plywood disks as shown in Figure 2. First measure the I.D. of your sleeve after slotting the side, then make the disks about 1/8" less in diameter. Wood glue is placed between each disk



Figure 4: Powder die components.



Figure 5: Slots on sleeve bottom to drain water.



Figure 6: Powder die in operation.

and then the lot of them are clamped together using a bar clamp. The rammer should be at least 6" long, otherwise make it as long as the PVC sleeve. When dry, a belt sander or lathe can be used to trim up any uneven edges where the disks didn't quite line up. The finished rammer should be at least 3-3/4" diameter. Sealing the finished rammer with epoxy or polyurethane will help prevent water carrying saturated nitrates from absorbing into the rammer during use.

When pressing more than one puck at a time, it is necessary to insert separation disks between the powder layers so that the pucks can be separated after pressing. These are best made from soda cans, since the coating on the thin aluminum used in cans is very resistant to adhesion or corrosion from the nitrates. Figure 3 shows a scribe being used to make circles on sheets of the soda can metal, which was cut using regular scissors. The diameter of the disks should be very close to the I.D. of the sleeve, such that when you drop one into the sleeve it slowly floats to the bottom without binding. If the disks are cut too small, then powder will bind around the edges and make the pucks difficult to separate after pressing. You will get two disks per can, and 12 disks should be all you need.

You will need to obtain at least three pipe clamps that fit around your sleeve, as seen in Figure 4. These clamps will be evenly spaced apart along the sleeve during pressing, and tightened down to prevent the split sleeve from opening or bulging during pressing.

Figure 5 shows the bottom of the sleeve, which has been slotted around the perimeter to allow water to seep out around the edges during pressing.

Lastly you will need a thick aluminum plate to use as the bottom for the sleeve to sit on when pressing. A small scrap of 1/2" thick aluminum scrap can usually be found in metal scrap yards and will do the job nicely.

The die is charged by first tightening the pipe clamps and placing the sleeve on the bottom plate. A powder charge of about 1 cup is added, followed by a disk. This powder/disk sequence is repeated, manually pressing with the rammer every four increments. When fully charged to within an inch or two from the top (after manually pressing), the die is charged and ready for pressing.

For more information regarding the use of this die for making black powder, click [here](#). 🔥

