Pewter Cast Coins From Laser Cut Molds

by **johngomm** on February 15, 2015

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Intro: Pewter Cast Coins From Laser Cut Molds

This is inspired by the TomCloss instructable Wood Molds for Pewter Casting

Wood makes a decent pewter casting material, but getting it the shape you want is the hard part. That's where laser-cutters come in. I've tried a bunch of woods, but the grain pattern comes through once you cut to any depth, so we need a wood without a grain pattern = MDF! Because MDF is made from binding essentially wood dust together, it imparts much less of its own pattern onto the laser etch. Plus it's pretty cheap - I use some 3mm thick stuff I bought at Home Depot for $15 for a 4 foot by 8 foot sheet, which will suffice for at least 64 molds of the size I made. (You can probably use matt board or the dense cardboard you get on the back of pads of paper, but I can't attest to the durability of the resulting molds). I've also tried acrylic for molds, but the pewter doesn't seem to like being next to it and the cast surface is all ripply, also the mold starts to warp with the heat.

Step 1: Materials

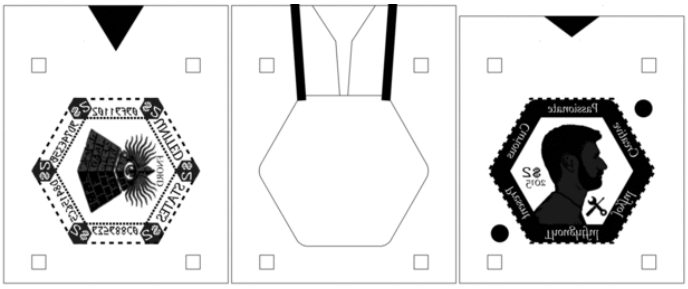
- Vector Drawing Software (I use LibreOffice Draw)
- Laser Cutter Access
- Medium Density Fiberboard (MDF, 3mm thick and about 30cm by 30 cm, but thick, dense card might work)
- Pewter (buy with the Hot Pot to save on shipping)
- Pewter melting equipment (I use Hot Pot 2, $60 from Amazon)
- Metal tray, clamps, wood scraps
- Safety glasses and gloves highly encouraged.
- Metal saw, side-cutters, files and steel wool.

Step 2: The Design (need vector drawing)

First thing you'll need is a design using your favorite software. Laser cutters generally either cut or don't, so greyscale images get dithered into a halftone pattern, which looks odd in 3D, so you should stick to pure black and white. The grey you see in my design is a second layer and was changed to black before etching. My coin design PDF is a mix of vectors for cutting and pngs for etching. I used LibreOffice Draw to create it, because it's free and is a lot less confusing than Illustrator. And I edited photos in Pixlr, also free. Make your cutting vector lines 0.25px or hairline. I've learned a bunch since making this file and I'd probably make a better job next time, so don't judge too harshly. My advice is to start simple so you learn the pitfalls before you spend a bunch of time on something. Early on I grabbed a Lincoln penny cartoon and tried that out, learning about reversing images in the mold to get right image in the cast etc. Using clay or silly putty to get a quick test cast is a great idea - note the backwards text in the clay impression.

The mold is three parts: core and two faces. You'll need a funnel cut into the core layer to get the molten pewter in and at least a couple of vent traces etched from your highest points to let the air out, or you'll get air bubbles trapped as you fill. The funnel in mine was a little narrow, but worked. If your funnel narrows too soon, there's a chance that your pewter will cool, solidify and block the path into the mold. I also put holes in each plate to use for alignment, but ended up not using them.

Output your design in a format that your laser cutter computer understands. I needed PDF.



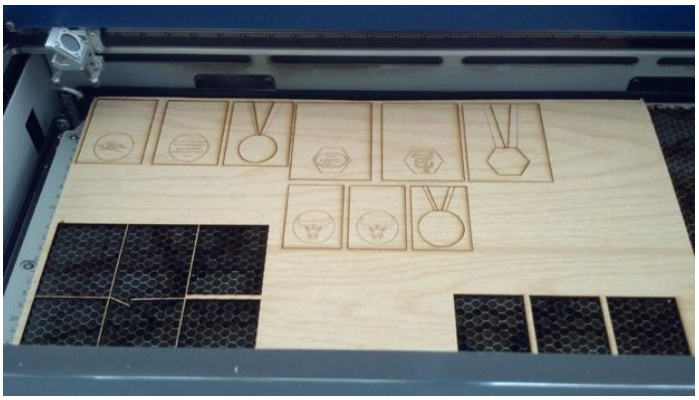
File Downloads

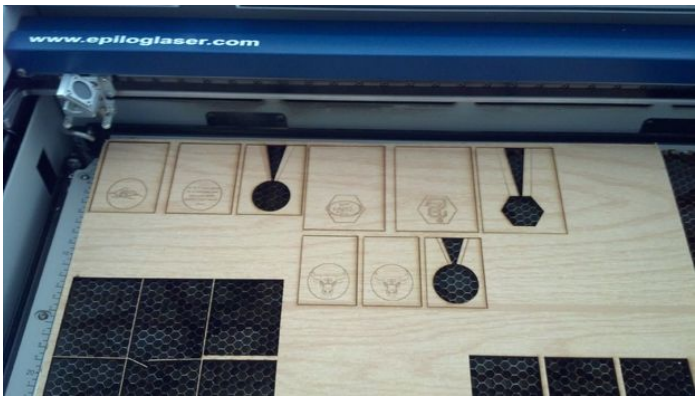
Coin Test Plates Reversed Open Vented.pdf (414 KB)
[NOTE: When saving, if you see .tmp as the file ext, rename it to 'Coin Test Plates Reversed Open Vented.pdf']

Step 3: Cutting the Mold

Here are some designs that my high school students came up with. It was their first run, so there's a skew toward simple sports designs that they could get done in 90 minutes. You will end up with a coin that is as thick as your MDF, so buy accordingly. Load your MDF into the laser cutter and do your etching. In my case I wanted to etch twice, putting a detail layer on a base silhouette. Some laser cutters have a 3D mode, so if you can get a 3D scan of the head you want to use, it can look really sweet when you convert it to a depthmap using Meshlab then etch with that. But the cheaper cutters usually don't have this option.

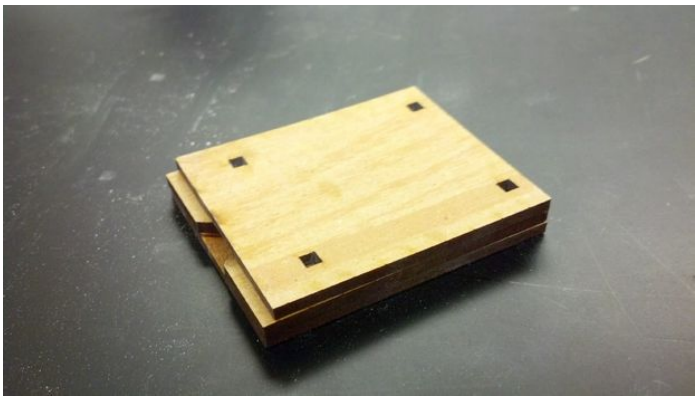
Etch and cut your mold using the settings appropriate to your MDF. The Epilog Mini 50watt I use needs speed 25%, power 100%, Freq 100% to vector cut 3mm MDF or ply. Raster etching settings are dependent on how proud you want the design to be on the cast, but 2 passes at 600dpi with settings of 100, 100, 100 is about as deep as I would want. The deeper you go, the more chance you'll get a lumpy surface as the laser encounters spots of the MDF that are harder to vaporize (the joys of 'natural' materials).





Step 4: Assemble the Mold

Use baby powder as a release to reduce the amount the pewter sticks to the wood. Get a good coating, then tap out the excess. Stack up your mold with the best alignment you can. I put holes for bamboo skewers to go through to align it, but they got in the way of clamping and I ended up not using them. They are probably a good idea though, if you can get them in the right place and the right size. Clamp your layers together using clamps and a couple of pieces of scrap ply to save your clamps getting pewter on them.

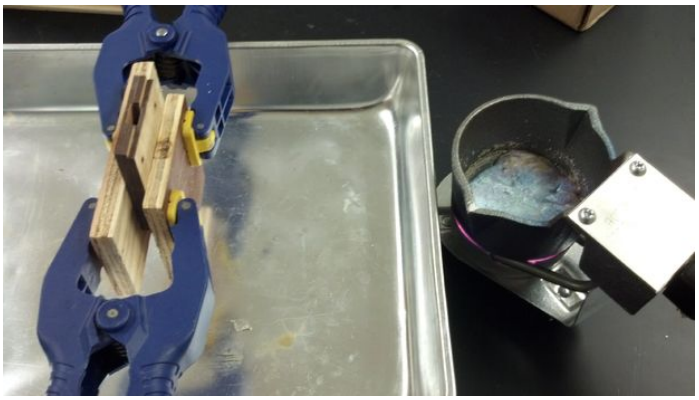


Step 5: Melt and Pour Pewter

Safety: Molten pewter is jolly hot and will cause a heck of a burn. Clear your area, pour over a metal tray to catch spills, everyone but the pourer stands clear and no distractions. The most likely place for accidents seems to be after the pour when the pot is put back on the stand, so make sure the pot is stable before letting go. Glasses and Gloves are a good idea. Know where your nearest fire extinguisher and first aid kit are.

Arrange your mold so it is vertical and stable in your metal container. Heat your pewter to casting temperature (I use the no-fuss Hot Pot 2, but there are many ways of home casting pewter). Pour your molten metal into the top of your mold smoothly until it overflows. It will probably smoke a little. After a few minutes you can carefully unclamp and pull your mold apart to reveal the cast. It will probably need more cooling time before you can handle it with bare hands.

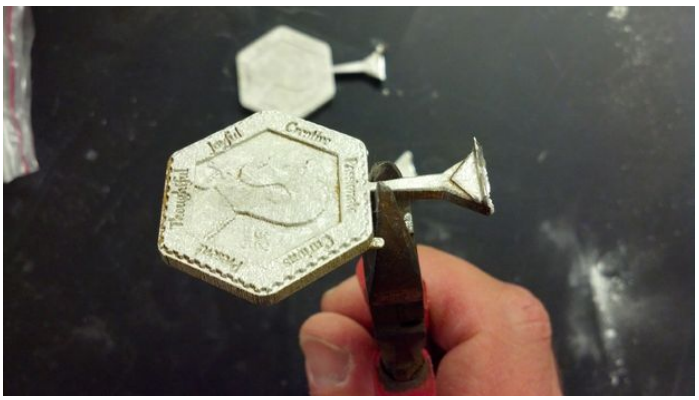
Reuse your mold to cast as many as you like before you let the pewter pot cool. I've cast ten coins from the same mold with little degradation of the mold, your mileage may vary. The first cast tends to pull off some brown wood residue (see lower left coin in the set of four) which can be tough to remove from the crevices. If anyone knows how to remove this residue from the wood before casting, let me know in the comments.



Step 6: Clean Up The Coin

Ok, it's time to cut off the funnel and vents, then file the nubs flush. You'll also want to rub it with fine steel wool to bring up the surface to a gleam. As you can see, the surface of the pewter is textured, which seems to be just a feature of this process and it adds character. If you need super smooth flat surfaces, then you might have to find another method.

And there you have it, your own custom pewter coins/pendants/buttons. Get creative.



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Using Lasers with Paper Molds & Pewter (Bologna Sandwich Casting) (Photos) by dipiazza

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