

Working with Photoetched Parts ... Or: Don't Panic, it's only metal foil

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Background

What is photoetch?

Photoetched parts are metal foils with portions “eaten” away by acid. A light sensitive emulsion is covered with a photographic negative and any unexposed areas of the emulsion are washed away – these areas can be eaten by the acid. By properly designing the artwork, extremely detailed parts can be made.

What's it good for?

- Typically, photoetch is used for cockpit detailing and other fine detail that is generally too small for injection or resin molding.
- It is also ideal for use as a light block in small or tight areas of a model that will be lit, such as a grid or other area that would be difficult to mask effectively.
- Even small people can be made in photoetch!

Here are some example photographs courtesy of Dave Prosser and Amazing Figure Modeler Magazine. Used by permission of the author and publisher.





Tools & Materials

You'll need three tools for working with photoetch. Most of these are already in your toolkit:

- #17 blades or photoetch snips
- Glass cutting board
- Photoetch file – such as Tamiya's diamond file

Optional tools:

- Flat nosed pliers (without "gripping" ridges)
- Stiff to hold parts during assembly – the "fun tack" type of post tape works especially well
- A folding tool

Adhesives:

In most cases, you'll want to use CA / Cyanoacrylate / Super Glue to hold parts in place. There are some times when alternative adhesives will come in handy – if attaching large surface-mount pieces that will be subject to large temperature changes (say for R/C submarines) you'll want to use the blue RTV gasket making material. For quick test-mounting, white glue or Crystal Clear work very well – just be very careful with very small or thin parts that you do not damage them taking them off.

Adding a Photoetched Part

For all intents and purposes, adding a photoetched part is no different than working with an injection molded plastic part. You cut the piece from its fret or tree, file off the excess bits, and glue it in place. Seriously, it's that easy ... most of the time.

Adding an Easy Part

Step 1 – Cut the Etch

When cutting out the parts, I like using the #17 blade and glass cutting board approach instead of the snips. It's mainly that you can get in much closer with the blade (especially if you grind it down), but also there's less chance of bending the part when you're cutting it out. The #17 blade can also get into places where the etch and fret are very close together.

Step 2 – File off the Excess Fret

Just like with a plastic part, it's nearly impossible to get all the fret off of the part when you cut it off. Just file off the excess – a random grit file such as Tamiya's makes this much easier.

Step 3 – Attach the Photoetched Piece

Glue the piece in place the same as usual. TIP: Using an adhesive applicator and super glue accelerator will make attaching pieces much easier.

Photo courtesy of Dave Prosser and Amazing Figure Modeler Magazine.



Advanced Photoetch – again, don't panic!

Folding

Folding a piece is very easy. In general lines are etched half-way through the part to indicate where it should be folded.

The tough way: take a solid straight edge and hold it in position over the fold line. With your other hand slip a razor blade under the part and lift up, being careful not to shift the straight edge or slice yourself with the razor blade. After the fourth time the straight edge shifts scream in frustration.

This scenario is especially true when working with very small pieces, such as the 1:128 scale furniture that finally induced me to get an EtchMate so I could fold ...

The easy way: put the piece on your EtchMate or Hold and Fold and clamp it so that the fold line is right in line with edge. Slide the hand tool under the piece and lift up. Unclamp the piece. You're done!

These tools are also great for folding very large pieces that might be difficult.

The really easy way: it is *sometimes* possible to fold a piece without any tool whatsoever. It all depends on the size of the piece, the thickness of the base material, and the width of the etched folding line. (The piece shown at right could actually be folded very easily by hand, but is being done with the Etch Mate for demonstration purposes.)



Annealing

This is the major panic inducing item ... and it shouldn't be. First a quick explanation of annealing: this is heat treating the metal so that it becomes ductile. Oops, there's the panic inducing stuff – in non-panic terms, you want to heat up the metal and let it cool slowly so that it loses its springy-ness. This means it can be molded to different shapes without snapping back to its original flatness.

Annealing couldn't be easier. Just heat the piece (you may not get it to glow, but get it as close to glowing as possible) then let it cool **slowly** ... don't drop it in a bucket of water or you'll end up making it more springy not less.

There are a couple of different ways to heat the metal.

- You could use a torch, which has the advantage of being able to heat the entire piece of metal very evenly when done with easy strokes. The problem here is holding the piece while nailing it with fire ... and you have to have a good torch as a lighter won't do the trick.
- You can put the piece under the broiler. This is kind of a pain just because you need to get the piece up close to the element and then move it about so that it gets evenly heated.
- You could put the piece right on the stovetop and turn the burner up to high. You still have to move the piece around a bit for even heating, but you can do that with a pair of pliers quite easily. This is my preferred method, and it really doesn't matter whether you have a gas or electric range.

Tip: I like to use a \$10 portable single-burner hotplate so that: a) I don't have to run half-way across the house just for the 5 minute operation and b) my stove is one of those glass-topped ones that I'm sure my wife would think I'd scratch all up (even though I wouldn't).

Tip *part deux*: Make sure to get a coil-type hotplate like the one shown above. The new-style ceramic ones just don't get hot enough to properly anneal photoetch.

Once the piece has been heated and cooled, you can carefully form it over a mandrel to the appropriate shape.

Note that the piece will become discolored when heated. Some metal polish should remove most of the discoloration if the piece will not be painted.



Repairing Bent Photoetch

Sometimes you'll get a piece of photoetch that's been bent. All is not lost – 9 times out of 10 you can fix the piece using a wallpaper seam roller.* Just place the etched piece on your glass cutting board and roll over it with the roller. You may have to flip it over a couple of times repeating the rolling, but you'll generally be able to return it to serviceable condition in only a few minutes.

* If you can still find one, a wooden roller is better since you don't have to worry about the injection location. If you have to get a plastic one, inspect it well to make sure that the injection site is smooth – you may still have to do some filing and /or sanding, but at least the roller won't introduce any nasty creases.

