

How to Make Photopolymer Plates

by Maggie Bergman

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Photopolymer plates, or Solar plates as they are also known, are used in the Flexographic printing industry. They have also been used by Artist Printmakers for many years. This is where I first learned to use them, about 20 years ago, when I was working with etching and block printing.

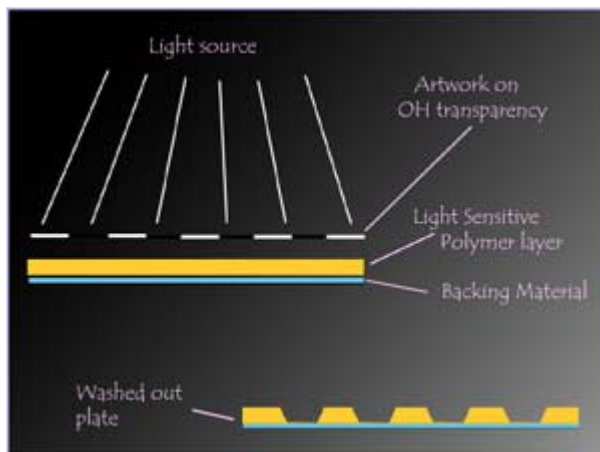
Making the plates is easy and can be done in the home, no harmful or dangerous chemicals are needed and the equipment used is easily and cheaply obtained.

Plates are available on steel, or plastic backing material and in different thicknesses, making them suitable for a number of processes, such as Keum-Boo, Enamelling and general textures & designs.

I like to use steel plates for anything that needs fine, clean lines, and plastic plates where the design is less demanding, such as master plates for carving, where a lot of work is done to the clay after impressing, or some of my enamel designs, where the lines are thick and bold.

And, sometimes, where very sharp, clean lines, would not be appropriate for the design.

So here's a description of the process, the way I've been doing it, I hope it'll be helpful.



Solar plates are made up of 3 layers:

- 1- A steel or plastic backing plate.
- The light sensitive polymer layer that will form the impression. This is the layer that hardens where it is exposed to UV light.
- A cover film. This protects the plate and is removed before exposure.

Here's a brief overview of the process:

1. Remove the cover film.
2. The artwork, on overhead transparency film, is placed on top of the plate. During exposure, the black areas in the artwork block out the UV light and the plate underneath will remain soft, the clear areas will let U.V. light through and will harden the plate below.
3. Scrub the plate in warm water washes away the soft parts of the plate.
4. Dry the plate and post-expose.

Making the Artwork

Drawing

If you have the ability to draw, use pen & ink for your designs.

Strong black & white is required, this is known as 'line art' in the printing industry. You can also draw in pencil and have the resulting drawing photocopied to make a high contrast drawing.

Computer:

If you are proficient on the computer, using a graphics program, you could scan a drawing and convert to a high contrast drawing. Or if you want to do the complete artwork in a drawing program like Adobe Illustrator or Corel Draw, make sure the line width you use is no thinner than 1 pt (= 0.5mm - 0.02") or 2 pt (= 1 mm - 0.04") for deeper impressions.

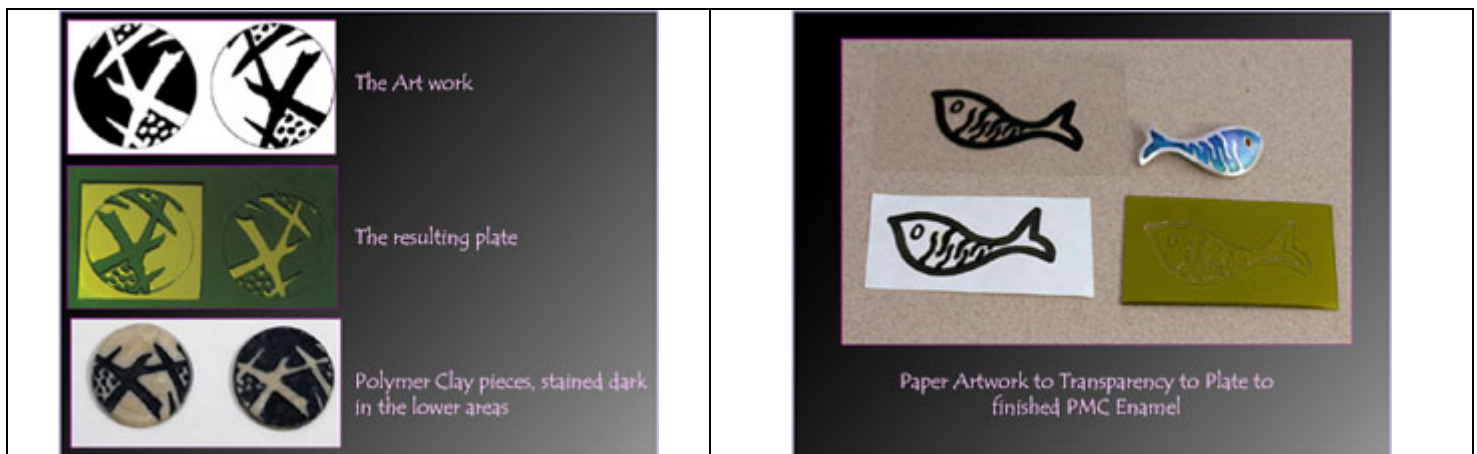
Other design sources:

- Any picture has potential; try playing around with a photo on a photocopier, changing contrast settings, multiple passes through the machine will give different results.
- Look at found textures, which could include maps & charts, newspapers, letters, wing dings.
- There is also a lot of copyright free art available for artists, look at 'Dover' books and crafter's motif sheets.

All these methods are indirect; they have to be transferred to an overhead transparency (OH) before they can be used to make a plate.

You can do this by printing your design onto OH Transparency material using a laser printer through your computer, or get a copy centre to make a laser copy for you. Check that the image on the OH transparency is nice and black, not grey and partially see-through. You can also draw onto the OH Transparency directly, using permanent markers, or pen & film ink. Make sure the markers are for use on film and very black so no light can seep through.

Another possibility is direct exposing materials onto the plates, with no artwork being done. As long as the materials do not damage the light sensitive layer of the plate and are sufficiently solid to block out the light, they should work fine. Think of paper cut-outs, maybe skeletonised leaves etc.



Light Sources

Sunlight:

Not easily controlled, even half an hour from the time you started you could need a different exposure time. Test strips are vital here, at least to start, you develop a sense of timing after doing this a while.

Halogen desk lamp (50 watt);

Long (and hot) exposure, the light I've used takes 7 minutes and gets very warm in that time. Heat is a problem with Photopolymer plates, I don't recommend them.

UV Fluorescent tubes;

These are the best exposure lights and in my opinion the only ones to use. They are available from most lighting shops. Use as many tubes together to suit the work you do. With multiple tubes, space them as close as possible, for even light, and to avoid 'hot spots'. Have your light source about 4" (10 cm) above the plate's surface, keep this as a constant.

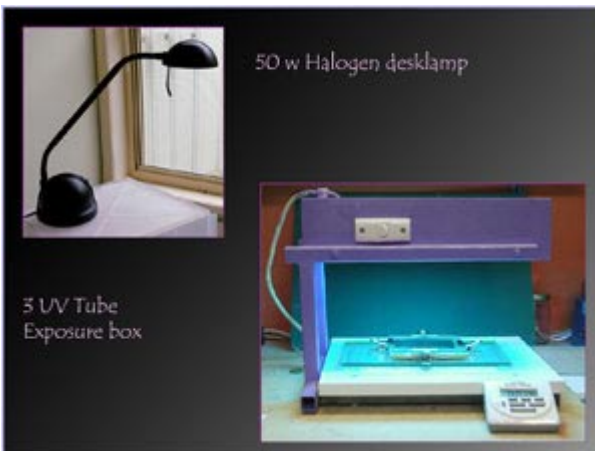
The tubes I use are the **white** ones, not the black, white tubes still produce 'black light'.

Black tubes produce heat and are also a different UV rating. They work okay for PPPs though, just not the best choice.

UV lights can be bought (or ordered) at any good electrical store. Check out lapidary supplies too, they use UV lights and have a range of models available. Some of the PMC suppliers have very nice exposure units for sale, check them out, I've included some addresses at the end.

Here is the one I use when traveling. It is a plastic light fixture that is sold for use in caravans & trailers. I replaced the tube that came with the light with a UV tube.

The plywood sides lift the light 10 cm (4") from the plate surface, it attaches with Velcro and is easily dismantled.



Cutting the plates



A plastic backed plate can be cut with heavy duty household scissors.

Steel plates can be cut with metal shears. Invest in a good pair of shears, they'll save you a lot of trouble when you use them, as well as saving your hands.

I bought some cheap Bench Shears, they make very light work of cutting the plates, and, they also cut my copper and silver sheet.

The draw knife. Make many cuts along a steel ruler, the plate will then just snap off. This method is much harder to use than the metal shears, but will work in a pinch.

The Exposure frame

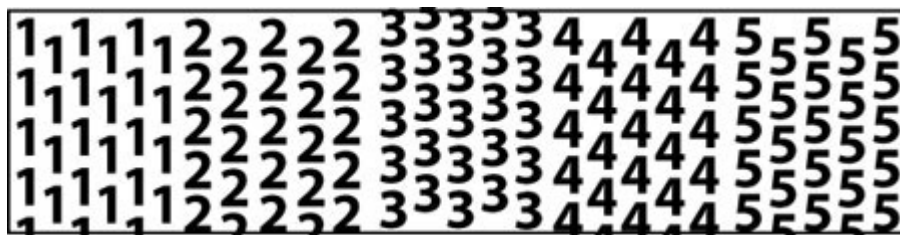


A simple piece of thin MDF board for the backing, a piece of foam or bubble wrap to even out the pressure, and a piece of glass the same size as your backing board, make up the frame.

Buying a small, inexpensive photo frame will give you the glass and backing board, check that the backing is wood board, a lot of photoframes are backed with stiff cardboard these days.

You'll also need 4 bulldog clips.

The Test strip



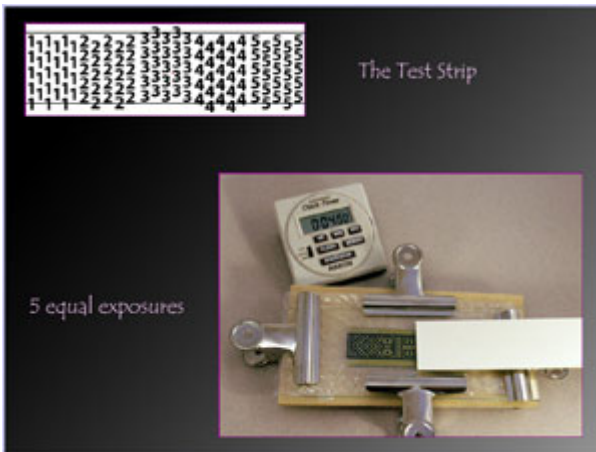
This is the test strip I use, it has numbers to allow me to see where the 1st, 2nd, 3rd etc. exposures were.

If you'd like to have this image, go back to my web page: <http://www.silverclayart.com/ppplates-instr.htm> you'll find the image there, right-click on it and save it to your computer.

Plates can be handled safely in any non-UV light, fluorescent tubes are fine. Just keep them out of sunlight or have them near any UV light source.

Please note the exposure times mentioned are a guide only, you might have to do the test strip 2 - 3 times to get the optimum exposure for your light source. The times given, are for UV Tubes, if you are using a 50W Halogen light, use 1 minute increments ISO 20 seconds per exposure.

Determining exposure times by making a test strip



1. Cut a strip off the plate to the size of your test strip. Remove the cover film from the plate and position your artwork on the plate, with the printed side touching the plate. Position the plate in the centre of your exposure frame, cover with the glass sheet and position the bulldog clips so they keep away from the design itself.
2. Cover the plate with some heavy card for all of its length except the number 1's on the artwork.
3. Set your timer for 20 seconds, switch on your UV light source and expose for that length of time.
4. Switch off the light, reset the timer for another 20 seconds, move the cardboard to uncover the number 2's and expose again.

Keep on doing this until the whole strip has been exposed. The very last exposure will have only received 20 seconds of light, the next 40 seconds etc.

Trouble Shooting

Lack of detail in the image:

Contact between transparency & plate not tight enough, make sure to use an exposure frame to keep the film tight on the plate during exposure.

Polymer layer is cracking or lifting off:

The plate has been exposed to too much heat,

- At exposure - raise the light, keep exposure time as short as possible under a hot lamp.
- When drying after wash-out - Keep the dryer on medium or low, or keep a close eye on the plate when drying in the sun.

Plastic Plates are curling:

The plate has dried out too much. A quick dip in warm water, then let the plate absorb it for a minute, dry and post expose for the same length of time as when you first made the plate.

What size to use

These are the four main sizes I use:

Medium Plastic Based Plates 1.14 mm (0.04")

This is a useful size to have, it works well for low relief text & patterns and all general texture plate making. It can be washed out to a shallow depth only and used for Keum-boo. Cut with heavy duty household scissors.

Thin Steel Backed Plate 0.8 mm (0.03")

This very thin plate is great for Keum-boo textures, where you don't want a lot of depth to the texture.

Medium Steel Backed Plate 1.5 mm (0.06")

The emulsion of these plates is a little harder, they make a crisper image than the plastic backed plates, making it especially suitable for lettering and images that must have very sharp detail. Cut with metal shears, bench shears or guillotine.

Thick Plastic or Steel Based Plate 1.75 mm (0.07")

Available in plastic or steel base, these make a very deep impression, but it can be a little harder to get PMC out of small details. This plate is very useful for Champlevé enamelling and lettering where a higher relief is required.

Suppliers

This is just a starting point, there are many suppliers to the printing trade, check your local Yellow Pages.

Most PMC suppliers are now also stocking plates, here are a few of them:

Whole lot of Whimsy

<http://www.wholelottawhimsy.com/>

Cool Tools

<http://www.cooltools.us/>

Artclay World

<http://www.artclayworld.com>

Box Car Press

<http://www.boxcarpress.com/>

Photopolymer Plates by Gene Becker

<http://www.photopolymerplates.com./>

My thanks to South Australian, Dianne Longley. Her book 'Printmaking with Photopolymer Plates' was invaluable to me when I initially learned about the plates, and again while preparing this presentation.

This book is still available. To order, go to [Dianne's web site](#): and download the PDF order form