

PHOTO PLATE LITHOGRAPHY – POSITIVE WORKING PLATES

INTRODUCTION

Lithography literally means stone writing. Traditionally lithography employs limestone as the matrix. Greasy mediums are drawn on the surface of the stone. The stone is then treated or etched with a solution of gum arabic and nitric acid. The stone is then rolled up with a hand roller or brayer and sponged with a solution of gum arabic and a mixture of other ingredients called fountain solution. Lithography is a flat surface or planographic method instead of a raised (relief) or recessed surface. The nonadherence of ink to the nonimage areas of lithographic plates depends on the antipathy or repellent action of grease and water and must be chemically controlled. Stone lithography is still taught in most schools along with the contemporary technology of photo lithography or offset lithography (on a mechanized press).

Photo plate lithography is a very versatile medium. The aluminum plates are coated with a photo sensitive surface. A film positive is used to expose the image on to the plate with a light exposure unit. You can create a hand drawn positive on mylar or you can create a digital image and output to a transparency. You can also combine the 2 approaches, although this can often prove challenging for the beginner.

For hand-drawn positives you simply draw on textured mylar; velvet tone drawing film (available for sale in the shop) or Denril (available in pad form in most art supply stores). The Denril has a finer tooth to it and is more suitable for washes and fine line drawings. The velvet tone film has a rougher texture for drawings that incorporate heavier coverage with the drawing materials. The texture on these films breaks up the medium into a dot pattern of sorts, much like a half-tone pattern. This allows for the necessary separation of ink and non ink areas that is essential for lithography.

HAND DRAWING MATERIALS

- Frosted Mylar or Grained Mylar (Velvet tone or Denril)
- Stabillo Pencils #8046, Litho Crayons, opaque markers or pens, rapidographic pens and ink work the best
- India Ink, Gouache, Acrylic Paint
- Toner Washes (photo copier toner mixed with alcohol)

DIGITAL IMAGES

You can create an image by using photos or vector art, including text. The image must be output to a transparent or translucent medium. Continuous tone art work has to be converted into a halftone to be able to be printed. If you wish to combine vector and photographic images together it is best to output these films separately. These two types of images need different methods of output for optimal reproduction. If you wish to combine them the best approach would be to collage the films together and/or do separate exposures for each.

WHAT IS A HALFTONE DOT?

Halftone is the reprographic technique that simulates continuous tone imagery through the use of equally spaced dots of varying size. Where continuous tone imagery (film photography, for example) contains an infinite range of colors or greys, the halftone process reduces visual reproductions to a binary image that is printed with only one color of ink. This binary reproduction relies on a basic optical illusion—that these tiny halftone dots are blended into smooth tones by the human eye. If you wish to use a photographic image you must convert the image to a halftone or dithered pattern before printing. See the handout on halftone images to make any adjustments to your image.

HALFTONES SETTINGS

It is critical to get the correct halftone setting. If the lpi setting is too high, (more smaller dots per inch) the ink sitting on top of all the very tiny halftone dots can run together, or 'bridge'. To prevent this from happening, lower the lpi to maintain a balance between the amount of ink that is needed to print and the space around the dots to hold water that repels the ink. As you gain more control over your printing, the easier it will be for you to print higher lpi images. For your first lithograph I would choose a lower lpi such as 65-75 or even lower.

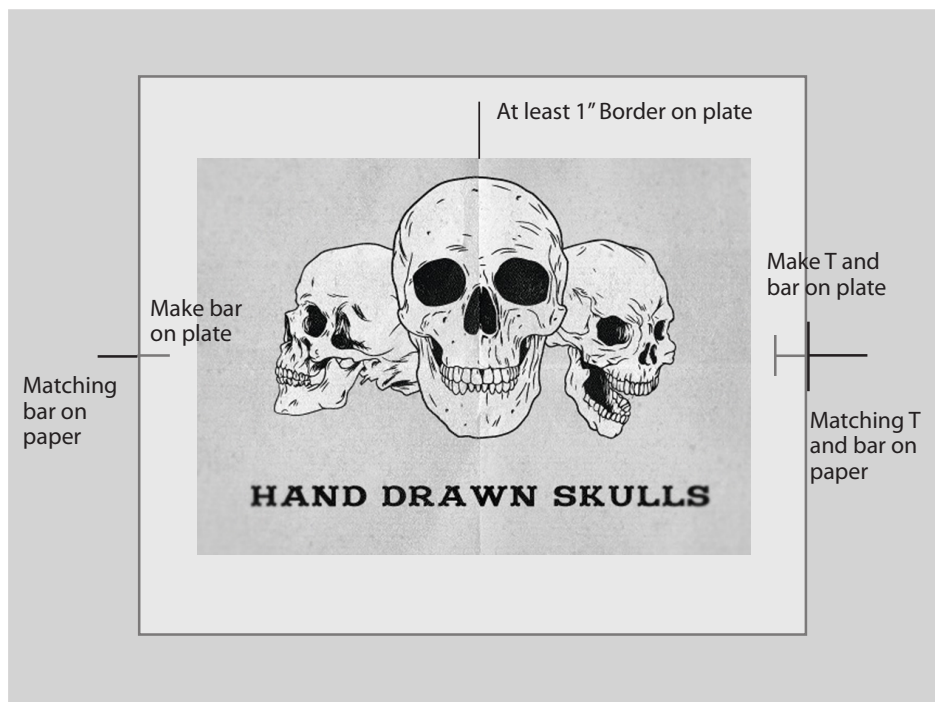
PLATE SIZE VS. IMAGE SIZE

It is essential to plan out the plate, paper and image size before you start. Although the plate size may be 13 x 19" it can be difficult to ink an image that covers almost the entire plate. You must keep at least 1" margins on each side, but recommend that you make them 1.5" margins. This means printing no larger than an 10 x 16" image on an 13 x 19" plate.

SETTING UP MARGINS AND REGISTRATION

In general it is best to make your paper slightly smaller than your plate. By doing this you can prevent the embossment the plate edges might otherwise leave in your paper. If you do need to use a larger piece of paper you can get rid of the embossment by flattening the print when it is finished. If your paper is smaller than your plate, you can make indications for your paper placement by incising T and bar marks on the plate itself. Add the 'T' and Bar registration marks on the back of the paper. Mark the center line on your paper so you can line up the two sets of marks (one on the paper and one on the litho plate).

Photo litho plate 13 x 19



EXPOSING YOUR PLATE

You will need to test your drawing or film to determine the best exposure time. Clean the glass on the exposure unit thoroughly. Divide the test plate up into equal sections (around 5-6) and mark with a Sharpie. Place the film or drawing emulsion or drawing side toward the emulsion side of your test plate. Carefully tape your film to the test plate avoiding any drawn areas. Use a section of your film or drawing that has a wide range of tonalities.

Close the cover of the exposure unit. Close the fabric around the unit. Start with an exposure that is on the low side like 8.0 or 9.0 units. Engage the vacuum and allow it to reach 22-25 psi. Enter your exposure time and start the exposure. When it is finished turn off the vacuum and open the cover. Use a piece of golden rod and block off a section of the test plate. Expose again for an additional .5 units. Repeat for as many steps as you would like for your test plate advancing the block out material further for each exposure. For example if you did an initial exposure of 9.0 units and did 4 more exposures at .5 each, you would have exposures ranging from 9.0, 9.5, 10.0, 10.5 and 11.0 units. One of these times will hopefully be the optimal time. You will develop your test plate next.

DEVELOPING YOUR PLATE

1. Put your gloves on.
2. Pour out a portion of developer in a beaker and put in the same amount of water and mix.
3. Pour some of the developer onto your plate. Use the paint pad and move the developer over your plate. When you feel that the developer is depleted add some more and keep moving the developer over your plate. Make sure you hit the edges of your plate. Repeat development until you have used all the developer. This should take around 3-5 minutes. It is extremely important to make sure you completely develop the plate so take your time.
4. Rinse both sides of plate well with water. Rinse out the developing tray and pad.
5. Blot your plate or fan it dry. Apply a thin layer of the Finisher/Cleaner to the plate with your dirty sponge or a piece of cheese cloth and buff it dry. Make sure you wash out the cheese cloth when you are finished.

MIXING AND MODIFYING INKS

Lithography plates print best with inks that are moderately stiff with a fair bit of length. True lithographic inks for hand printing are very stiff and moderately short. An ink such as Daniel Smith's Crayon Black is a good ink to start with and modify with a bit of #8 varnish and some magnesium carbonate. Color Litho inks, all vary in their consistency and will often need to be modified with Magnesium Carbonate and varnish or setswell. Slowly fold the mag it into your ink until it is mixed in well and then check the consistency to determine if it is correct. Each color of ink has a different consistency so amounts and types of ink conditioners will vary. A properly conditioned ink should hold its shape as it sits on the slab rather than immediately relaxing into a blob. If the pigment 'bleeds' from your ink while printing adding #8 varnish to the ink will help greatly.

PRINTING SET-UP ON LITHOGRAPHY PRESS

When printing on the Lithography press you will ink your plate on the press. This means that you will be the only person using the litho press. You will set up your bowls on the press and use the ink slab next to the press.

- Find a scraper bar that is narrower than your plate but wider than your paper. Raise the pressure bar by turning the wheel counter clockwise. Align the center mark on the scraper bar with the central tightening nut on the press. Insert scraper bar and tighten the nut.
- Center your plate on the press and tape it down securely with a few pieces of duct tape.
- To set the pressure on the press use enough packing newsprint to simulate the thickness of your paper. Place the newsprint and the tympan on top of your plate and advance the press so that the forward plate edge is under the scraper bar. Lower the pressure bar until the wheel is fairly tight. Release the pressure bar and give the wheel and additional quarter turn.
- Grease your tympan. Set up your start and stop points on the press by putting masking tape marks on the side of the press. Be certain that the scraper bar will not start before the edge of the plate or run off the end of the plate.

PRINTING CHEMISTRY OR FOUNTAIN SOLUTION

Get two bowls. Fill one bowl about 3/4 full with water add 1/2 - 1 ounce of fountain solution, 1 ounce of gum arabic and a small amount of glycerin. This will help reduce the Ph of the water. The other bowl should be empty and is used to discard dirty water. You will need 2-3 cellulose sponges. Rinse sponges before using. One sponge will be the wet sponge, one the dry sponge and one the dirty sponge (the only one that comes in contact with the FPC and is never used for printing).

INKING AND PRINTING

Roll out your ink with a brayer so you have a satiny ink surface with a slight sizzle sound as you roll the ink. Start with very little ink, or what is referred to as a 'lean slab'. If you have too much ink the surface of the ink will look velvety and make a loud sizzling sound.

Remove the FPC from the plate by using your dirty sponge. Do not put the dirty sponge in your fountain solution, keep it totally segregated from your bowls of water.

Dip your wet sponge into the bowl of fountain solution and wring out the majority of the water. Sponge the plate all over. Follow up with your dry sponge to decrease the amount of water on the plate. You want to ink the plate only when it is damp, not wet and not dry. Start inking the plate by methodically rolling over the plate with moderate to light pressure. Stop inking when the plate has started to dry. If you ink when the plate is dry you will get extreme scumming.

Continue inking your image by charging your roller, sponging and inking. The two most important things to control are the amount of water on the plate and how much ink you apply. Keep a very thin, streak free film of water on the plate when inking. Carefully count the number of passes of ink you make. Do not over-ink your plate. Water control is critical with photo plates and is usually what causes inconsistencies between prints. Pull a proof after 2 or 3 passes. Pull at least two proofs before switching to good paper.

Before printing on good paper for the first time, add ink. You can control print quality primarily through inking. Pressure should be fixed, but if you have added ink several times and the image remains 'salty' or light, increase the pressure. If your image is printing very dark, and filling-in in dark tonal areas, or the ink on the paper looks very heavy and glistens, you most likely have too much ink on your slab. You should Scrape 1/2 the ink off the slab, roll out the roller and print one newsprint without inking your image before continuing.

PRINTING

Dry plate with fan after last sponging. Sponging streaks may show if you print wet. Place your paper on the plate, place 3-4 sheets of packing newsprint over that and put the tympan on top. Engage the clutch of the press, unlock the press and crank the press forward to your first tape mark. Stop. Lower the pressure bar, crank press forward to the second tape mark. Stop. Raise the pressure bar. Remove the tympan and lean it grease side up on the press bed. Crank the bed back or disengage the clutch and pull the press bed back to the starting locked position.

PRESS SETUP ON AN ETCHING PRESS

To print on one of the etching presses, set the pressure to the appropriate setting, so the roller is just in contact with the press bed. It is easiest to ink your plate on a separate glass slab before printing. Once it is inked, place the dried plate face up on the center of the bed and your paper face down on the plate. Cover the plate and paper with 2 sheets of newsprint. Place a tympan on top and run them through the press. Blankets are not needed.

CLEAN UP

If you are not finished with printing and want to print again, print it several times without inking it to remove the excess ink. Clean the plate with FPC and buff down with your dirty sponge or cheese cloth. To clean up your ink and brayers, etc:

1. Put on your Gloves.
2. Scrape the excess ink off the slab with a razor scraper and wipe it onto phone-book pages.
3. Pour a small amount of mineral oil onto the slab. Roll the brayers in the oil until the ink begins to dissolve.
4. With a dirty rag, wipe up the oil and ink on the slab and then use the same rag to wipe down the brayers and ink knives.
5. Pour a small amount of solvent or soy solv onto a fresh rag and thoroughly clean your brayers until they are spotless.
6. Use simple green and a fresh rag to clean up the oil and ink residue on the ink knives and glass slab. Also clean down the press bed and tympan with simple green. Put the tympan away. Remember to remove the scraper bar and clean it.
7. Rinse out your sponges with water and clean out the bowls with a powdered cleanser if needed. If your sponges have absorbed a lot of ink, rub some Lava soap into them and lather and rinse until the water runs clean.