The Photogravure Process Guide

Robert Brown

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Process Overview

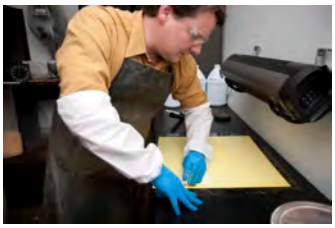
At its core, photogravure is just an aquatint controlled by light-sensitive chemistry. The action of UV light on salts like potassium dichromate had been known for 50 years by the time Karl Klic perfected the process of etching copper plates with photographic images and drawings. In this process an acid resist is treated to become photo-reactive and then applied to the copper plate. After carbon tissue is soaked in a weak solution of potassium dichromate and allowed to dry on the plate, the gelatin is exposed to a positive photo-transparency. The exposed potassium dichromate crystals grow to interlock adjacent gelatin cells, which creates a strong acid resist; areas of the gel not exposed to light will remain soft and permeable to ferric chloride. In this manner, a continuously variable depth is achieved on the plate where darker areas of the positive transparency correspond to weaker acid resist and a deeper etch, carrying more ink to produce a darker shade. What makes this process visually unique is the wide range of values that it is capable of. In addition, the continuous tone image that is etched onto the copper plate can be edited, added to or combined with other processes. The resulting print is stable and will last as long as the ink and paper it is printed on.

Sensitizing the gelatin

Finding your gelatin size depends on the size of your image. The size of the gelatin and copper plate will be "nested"around the image size. A good standard is one inch around the image, and an extra half inch for the Stouffer scale. Smaller margins can be used but problems can arise from small boarders from the frilling and bubbling that often happen around the edges. The image should be wrong reading emulsion side up. The relative densities of the image should be closely controlled in order to achieve the correct exposure to the gel.

Carbon Tissue is composed of a layer of carbon tissue attached to a layer of paper. The material tends to curl based on the relative humidity of the room. Cutting the tissue will require some ingenuity to keep it flat. I use weights and rulers to keep everything in line.

To sensitize the gelatin, brush it with a %4 solution of potassium dichromate in the darkroom. Potassium dichromate is dangerous and must be handled and disposed of according to safe standards. After 1.5 minutes flatten the gel onto a clean piece of Plexiglas. Turn the gel over and squeegee the front of the gel leaving no droplets behind. Blow dry the surface then store in a dark area with moving air for 1-3 hours. Expose the gel immediately or store it in the freezer for up to two days. It is always best to expose immediately.



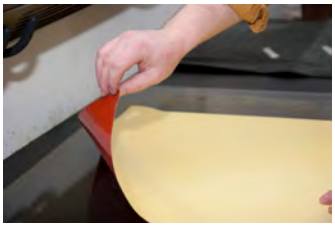
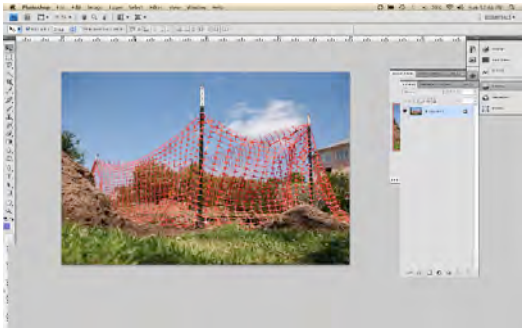
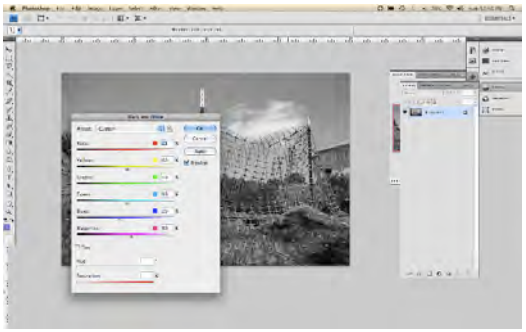


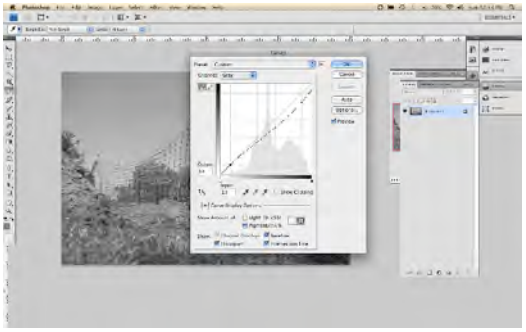
Image preparation



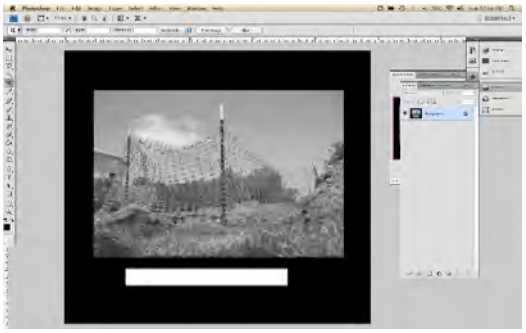
Digital images are a great source for transparencies. For one color preparation the file will need to be converted to black and white, adjusted in curves for the correct densities and placed on a black template for exposure.



Converting the file from RGB can result in a flat image. There are numerous strategies for conversion, my favorite is the black and white conversion tool in the image adjustment menu. This tool gives you control over how each color range converts in the process. Small adjustments can bring out textures and depth in the image. After the image is adjusted to look like you want the final on the screen, apply the final curves to the image.

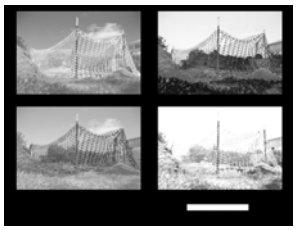


Of course all monitors are calibrated differently, so I tend to read the percentages in the information menu to get an absolute idea of the value range of the image. In the Grey scale mode I drop the black point to %92, the %90 percent input to %80 output and then return the %10 level to %10. This curve will flatten the dynamic range of the image, but the process will bring it back.

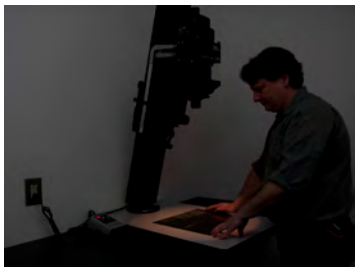


The final step is to imbed the image into a black boarder to create a safe edge. This will aid the adherence of the gel to the plate and protect the image during development and etching. Place a gradient at the bottom of the image in the safe edge. Apply a 22 step posterization to just the gradient. This stepped greyscale will aid the etching process. Number the steps either in the file or by hand later.

Separations and Analog Positives



Developing color plates from CMYK images can give interesting results. The most important factors here is uniformity of development and etch as well as avoiding gel stretch during adhering. I prefer to create a large document that includes all four images so they can be etched simultaneously. This will preserve the balance created in the computer.

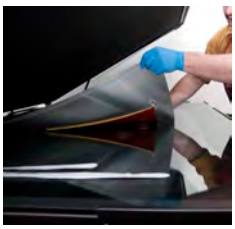


Although it is mostly personal preference, analog transparencies offer a grain and detail that is subtle, beautiful and hard to replicate in digital media. Positive transparencies can be created with enlargers and ortho-litho film. Just as with the digital transparencies, the densities of the blacks must be controlled. They should measure no darker than 1.7 on a transmission densitometer, or equal to step 12 on the Stouffer scale.

Plates can also be developed from drawings on frosted Mylar. The drawing will be reversed but subtle tinting and shading will come out with clarity. The density of the drawing material should be considered as well as the resilience. Be sure the materials will not smudge or transfer in the pressure of he exposure unit. Greasy materials can be destructive to the gel.

Exposing and Developing

Fix the image emulsion down to the gel.



Exposures units will differ but once you know the exposure for your curves the settings will be the same.

Submerge the gel in 60˚F water to adhere it to the copper plate.

Align the gel to the plate and lift from the water avoiding air bubbles.

Submerge the plate in hot water and peel back the paper backing.

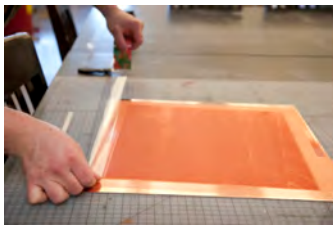
Rinse the gel to wash away all of the unexposed gel. The image will look developed before it is done. The plate is completely developed when the water rinses clean. Rinse with cold water.

Drying the plate is the most critical step. Place in front of a low fan and rotate until there is no more dripping water. Then let the plate rest for at least 3 hours.

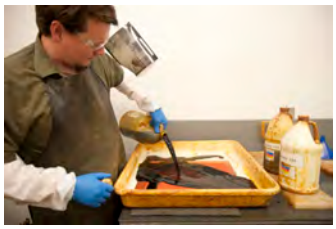
During a wet lay down the gel is submerged in 60˚ water and attached to the copper plate while avoiding air bubbles in between the gel and the plate. After it is out of the water squeegee the gel to adhere it completely to the plate. Burnish the backside of the gel and set it aside. Adjust the sink to 110˚ F and prepare a bath for the plate. Let the plate sit for 10-20 minutes before moving to the hot water bath. As soon as the gel softens (often less thant a minute) remove the paper. The gel is developed by rinsing in hot water. Toss the plate in water for about 5 minutes or until the gel is developed and crisp all the way into the highlights which will develop more slowly than the shadows.

Etching

The gel is a low relief semi-permeable acid resist. It is prepared either with an aquatint or a stochastic screen exposed to the gel in a second exposure. The permeability of the gel is controlled by the amount of water in the ferric chloride. The plate is introduced to the Ferric in successively "wetter" solutions. The ferric acts on the plate, but the water in the ferric acts on the gel. More water in the solution will more aggressively penetrate the thicker highlight areas of the gelatin.



The image should be prepared so that only the image will etch. The boarders can be protected with either tape or asphaltum. The back of the plate should be protected as well. Be careful in this stage, mistakes will result in images that are not square or fogging in the boarders.



Pre mixed baths of ferric chloride are measured out in an archaic measure of specific gravity called baumé. The ferric made by Fuji Hunt works best, because it is very dense and ph neutral. Any acidity will disrupt the gel. Use two baths to keep the etch moving at the correct speed.

The bath is agitated during the etch to was away the dark sediment. The timing of the etch will depend on the ambient humidity of the space and the density of the aquatint or screen. The etch will usually take about 15-30 minutes, alternating between 45° and 40° Baumés

It is important to etch the plate completely. Highlight detail is very difficult to imitate. The etch is stopped with water and the gel is removed with a weak acid solution (either vinegar or diluted muriatic) It is deceiving because if the plate is etching properly, the entire image will darken in order to etch the highlights.

Printing

To get ready to print I like to use a damp pack for the paper. I find that soaked paper can be too damp and oversaturate the felts. This will depend on your press. For the best results I like to use just the sizing catcher and the pusher felt.

Trim the copper to the desired size. By trimming down after the etch you can take some of the pressure off placement of the image on the gel. It is a trope to leave a boarder around the image. This is only a tradition, so I tend to trim according to what the image needs visually, although boarders do seem to preserve values towards the edge of the plate.

I tend to use a good deal of pressure for gravure so the bevels are very important.

Be careful during the inking phase of the plate. Scratches can be particularly difficult.

Finishing with a hand wipe tends to bring out the highlights of the image.

Proofs can be modified with polish, sand paper and any form of etching or drypoint. I always tell my students that this is Photoshop for the 19th century.

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Resources:
www.photograuve.com
Copper Plate Photogravure David Morrish and Marlene MacCallum

Vendors

Ortho-Litho film: Arista APH from Freestyle Photo

Inkjet transparency: Acorn OHP from Rennaisance Graphics

Ferric Chloride: FUJIFILM Hunt Chemicals U.S.A., Inc.
Lillian K. Janos
Product Manager, Graphics Markets
40 Boroline Road, Allendale, New Jersey 07401
Telephone 201.995.2211 Toll Free 877.385.4486
E-Mail LJanos@FujiHuntUSA.com

Fuji recently agreed to manufacture rotogravure iron again. In our shop we use it to mix our general etch solutions as well because it is high-quality, cheap, and comes in large containers that cost less to ship.

Copper: CG Metals, Inc.
Polished cold rolled full hard.

Presses: Conrad Machine Company