

Step-by-Step Guide: PROCESS CONSIDERATIONS for CMYK Copper-Plate Photogravure – Technical Steps as Used by Marlene MacCallum and David Morrish

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Four-plate CMYK photogravure demands a specific set of procedures and considerations in order to create a well-balanced final print. Registration of image/gelatin resist/plate/paper requires a different approach than a single plate image. The time and depth of the etch is unlike regular single-plate photogravure. The following points should be kept in mind when attempting to make colour-separation photogravures. This information is provided with the assumption that single-plate photogravure practice is understood. These methods are variations of that procedure. We have approached our research with the aim of achieving a high standard of technological control over the mimetic potential of four-colour photogravure. Once this level of control is reached, aesthetic and conceptual issues can then determine how the process should translate the source image.

HIGHLIGHT/SHADOW ADJUSTMENT AND THE PRINTER ADJUSTMENT CURVE:

- Generating the positives using an inkjet printer creates a reduced density range compared to traditional lith film positives.
- The four-colour image with its etching step-scale requires two adjustments. The Highlight/Shadow adjustment is used to ensure separation in the shadows (same as with single colour gravure) and add density to the highlights to ensure they etch within a timely manner. The printer adjustment curve adjusts the density of the tones to ensure that they will etch in a controlled and regular fashion. See the other documents on the creation and application of these adjustments to the file and the digital output.
- Note that it is also important to apply the printer adjustment curve and Shadow/Highlight adjustment in CMYK mode, or in some cases to the separations, but not in RGB mode. If the adjustments are applied to an RGB version, changes during the conversion to CMYK mode result in an incorrect application of the curves that creates colour and tonal distortions.

REGISTRATION:

- In order to achieve accurate registration in the final print, the set of separation positives must be registered before exposure.
- The film should be output with registration marks on all four corners.
- The four positives must be stacked and taped together with precision by using a loupe on a light table.
- Tape all corners together once perfect alignment is achieved.
- We sandwich the group of positives between thin sheets of aluminum litho plate in order to ensure a clean-edged hole when punched. When punching the film,

tissue and paper, all the holes should be clean and sharp. By using thin sheets of aluminum litho plate, top and bottom, we can ensure a clean-edged hole with no “hanging chads”. (see Paper Grain and Calendering, below)

- The same hole-punch system must be strong enough to also punch the copper plates.
- The two registration holes should be punched at least 2 cm from the edge of the image.
- Punch all four positives simultaneously.
- Punch holes in the plates before the exposure, but a little further from the edge of the plate.
- Cut the sensitized tissue to size. We find it useful to create a template out of mat board.
- Once the tissue is ready for exposure, it is also punched with the same set-up.
- Punch the tissue holes one sheet at a time, using stiff paper or thin aluminum to ensure a clean-edged hole.
- After calendering the paper three times in the press (2 times with the grain, one against), just seconds prior to printing, attach a strip of green painters’ tape to the back of the paper along the edge being punched.
- The printing paper is now punched, but *after* it has been soaked and calendered.

THE ETCH:

The total etch time is shorter so that maximum etch depth is shallower thereby avoiding an overly dense colour layer. A normal etch for a single-plate photogravure is 18 to 20 minutes from the point when the dark shadow detail begins to etch. The colour etch for the colour separation plates should be 12 to 16 minutes, maximum, from the point when the dark shadow detail begins to etch. The eight steps from the shadow detail in 80 – 90% step to the highlight detail in 10% step should begin with etching times of 2 minutes between percentage steps and then gradually decreasing to 1 minute each to progress to the end of the etch on time. The final step, pure white, should not be allowed to get any plate tone. The final 5% step may require only 30 second etch. All four plates should be etched in exactly the same manner, timing, etc. for tonal consistency and colour balance.

PAPER GRAIN AND CALENDERING:

Firstly, plan the orientation of the printing paper grain so that when positioned on the press bed the core of the roller is perpendicular to the direction of the paper’s grain. In other words, the direction of the paper grain must be parallel to the direction of travel of the press bed. The registration holes must also be positioned with that in mind, on the leading (roller) edge of the sheet. Secondly, because of the multiple passes through the press, the paper must be pre-conditioned so that stretch is avoided as much as possible. We recommend that the day before printing, the paper (we work with sized paper) be soaked for two minutes, drained, wrapped in plastic and placed under weight overnight.

Ink all the plates and immediately before printing, then calender the paper. Our method is to calender the plate over another blank copper plate, the same gauge and size as

the printing plates. We will refer to the edge of the paper that will have the holes punched as the leading edge. Place the paper and calendering plate on the press bed at so that the leading edge is perpendicular to the roller. Roll through once. Rotate the paper and plate again by 90 degrees so that the leading edge is now parallel to the roller and run through the press. Rotate the paper and plates 180 degrees so the leading edge is parallel to the roller again and run through a final time. This is needed to ensure that the paper is fully stretched in both directions.

Then apply the green painter's tape to the back of the paper leading edge and punch the registration holes. It is now very important to progress quickly through the next four printings before the paper has a chance to dry out. This means having all the plates pre-inked and by working in a room with reasonable humidity.

REGISTRATION DURING PRINTING:

Our method is admittedly finicky, but does ensure precise registration. First lay the inked plate face up on edge of the press bed. Insert the registration pins from underneath so that the pins protrude above the plate. Lay the calendered/punched paper face down onto the plate. Tape the paper to the exposed edge of the plate using green masking tape. **Remove the pins**, taking care to avoid any disruption of the paper/plate registration. Lay the plate on the press with the punched hole-edge (leading edge) parallel to the roller. We hold the blankets tightly against the roller to ensure that the blankets do not move the paper. Take care during printing so that the paper/plate registration is not jarred when the roller hits the plate. Roll off the paper, remove the tape and paper and repeat the process for each of the remaining plates. **ALWAYS** remember to remove the registration pins before printing.

INK MIXES:

Standard process colours of intaglio inks are available from Graphic Chemical (student grade) and Handschy (higher quality). Specific colours can be found from other manufacturers with similar colour qualities. One can use regular Gamblin Bone Black (with a small amount of Portland Black) for the K plate. The Gamblin colours that come closest to process colours are Hansa Yellow Light, Quinacridone Red and Prussian Blue (although the blue is not quite cyan and is very dense). These colours may require a lot of transparent base to make them usable. We have also experimented with the new line of process color water-miscible Caligo Inks. While these inks wipe well and are very easy to clean, we have discovered that the nature of the ink additives creates registration difficulties, as the paper will continue to stretch throughout the printing even after calendering.

Mix the inks so that they are easy to wipe quickly and cleanly with the viscosity decreasing as you progress through the plates. The first plate printed should be the most viscous, the next is less, the third is even less and the fourth (usually the black) the least. Use a low number plate varnish such as #00 or #000 to reduce the viscosity for the third and fourth plates. Use a higher number plate varnish in addition to magnesium carbonate if you need to increase the viscosity of the first plate. We rarely need to raise the viscosity, but always reduce it for the third and fourth plates. If your inks are tacky and resist wiping easily, you can use a small amount of EZ-Wipe. Use a

separate piece of cheesecloth for each colour. Hand wipe with magnesium carbonate to ensure clean whites, leaving no colour casts from plate tone. Wipe on a hot plate with plate kept warm (but not hot).

We have found the printing order can vary depending on the strength needed for each colour. The first plate to be printed may be the dominant colour cast since the paper can easily trap all the ink. This first colour, however, will also be offsetting three times during the printing, which may reduce its final intensity. The third plate may dominate the second. Changing the printing order can offer creative control and variations of the final image result. The black plate (K) should always be last. These adjustments are for fine-tuning a colour cast after ink transparencies and densities have been adjusted to get the image as close to one's goal as possible. Do not depend on wiping *style* to control colour balance. All wiping should be thorough and consistent, with no plate tone.