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POLYMER PHOTOGRAVURE

Jan Strijbos – Presentation April 15th, 2018

1 - The polymer film.

Preparing the copper plate:

Cut to size a 0,6mm thick copper plate. Polish the plate with wet sandpaper, P1200 grit followed by P1500, and finish with the finest steel wool for the highest possible smoothness.

Strictly avoid using any metal polish such as Sidol, as it would leave a greasy layer on the plate.

Make sure the edges are straight. The film will stick better to the plate. It will come off more readily when edges are slanting or rounded.

After the steel wool treatment, the plate is well polished and the highlights will be rendered by beautifull whites.

Rinse with water and wipe the plate with a clean cloth.

Be careful not to have fingerprints on the plate (use gloves).

The copper plate is then immersed for 15 seconds in an anti-oxidant bath (one liter of demineralised water and two spoons of salt).

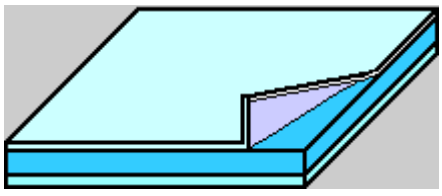
Dab with paper towel or cotton cloth.

The plate must then be degreased. For this, we use soy sauce. Put a few drops on the plate and then wipe carefully with a small sponge that you will use only for this. Do not wet the sponge.

Rinse the plate under running water; let a little water flow on the degreased plate while holding it horizontally. The water should form a plain mirror on the plate. If the water contracts to leave dry places, the plate has not been sufficiently degreased. You will have to start it over again.

When the plate is completely degreased, water can be absorbed between newspaper sheets and then wiped with a clean cloth. Then place the plate in the dryer (± 40 ° C) for 15 minutes.

The film



Open the film pack in the darkroom (red light).

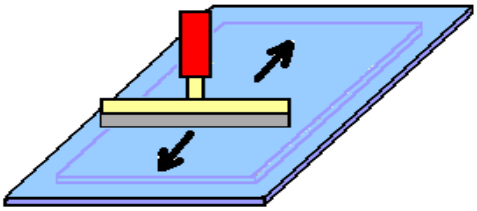
The film is composed of three layers: a transparent plastic sheet on both sides, and the photo-polymer layer in the middle. The film is delivered in a roll. The inner side is the one on the inside of the "loop".

Cut a piece of it so that it protrudes by one cm on all sides of the plate.

Check carefully for any impurities, dust or air bubbles.

Laminating the film on the copper plate.

Method 1:



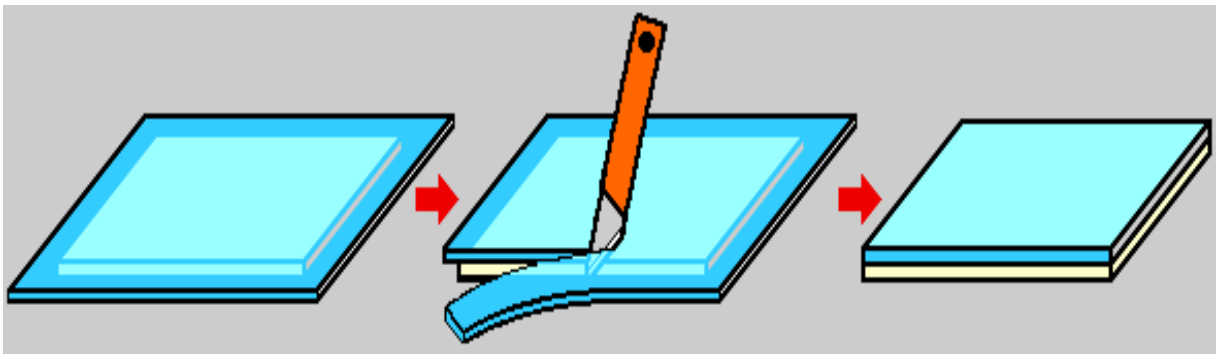
Place the plate, clean and degreased face above, on a clean work surface. Using a plant spray, thoroughly wet the plate with deionized water (to avoid any impurities between the plate and the film).

Remove the protective plastic layer from the inner side.

Carefully place the film on the plate with the "outer side" face up. If there are still air bubbles between the film and the plate, carefully lift one side of the film, then gently put it down again, making sure that there are no more bubbles.

Thoroughly spray the upper face of the film with water.

Use a squeegee to secure the film and remove all the water, going from the middle to the edges. Proceed quickly, but carefully and with increasing pressure, until the film is evenly coating the plate, without air bubbles or wrinkles. Then press well with a wad of paper, insisting on the edges. Make sure that front and back are free of any drips, as every drop remaining on the plate will leave a mark on the print. Remove the protruding edges of the film with a cutter while the plate is still on the worktop. Reserve this cutter for this purpose: if it was used to cut paper, the cut of the film will not be clear. Place the film for 10 minutes in the dryer at ± 50 ° C.



The laminated plate is now ready to be exposed.

For the exposure time and the making of the positive, see the second part.

Method 2 – With an etching press :

Open the roll of polymer film only under reduced light.

Cut the film to size, always a little larger than the copper plate (1cm on each side).

For copper plates protected on one side by a self-adhesive layer, this side can be used directly to lay down the polymer film; otherwise, treat the plate as explained on p.1

Be sure to have on the press a clean plexiglass, on which the film will be placed.

Remove the protective layer from the film by incising and pulling it from a corner, using a knife!

It is the inner protection layer that has to be removed from the film (the inner side is inside the roll).

Lay the film on the press, with the second protective layer face down, and then carefully lay the copper plate on the film, polished side down.

If the air humidity is very low, spray a mixture of water and alcohol on the film.

Put a felt on everything and pass the whole through the press, at normal pressure.

Remove excess film with a cutter.

The laminated plate is now ready to be exposed.

For the exposure time and the making of the positive, see the second part.

Processing after exposure.

Take the plate out of the U.V. light box and remove the protective sheet.

Immerse the plate in the developer (20 ° C).

The developer is a 10% sodium hydroxide solution (100g per liter of demineralised water). Commercial crystal soda is quite suitable. The best is to prepare about twenty liters of this solution. When it starts to turn blue, you will have to replace it.

Proceed with care as the plate scratches easily now.

The plate being in the developer, gently rub a sponge on it for two minutes, with small circling movements.

The aim is to free the unexposed parts of the plate.

Just rinse with tap water ; using the back of your hand, carefully check if a raster structure can be felt.

If this is not the case, redevelop in the soda for 2 minutes; repeat as needed until the film is fully developed.

The image should appear in copper red on the blue polymer film.

Proper exposure gives the darker parts a matte coppery color. If the copper is shiny, the plate was overdeveloped.

Rinse the plate under running water.

The plate being developed thoroughly, spray vinegar on the plate and rub with fingertips until the film is completely hardened.

Rinse with water.

Mop up most of the water between sheets of newspaper and finish by dabbing the plate with a dry cloth.

Then pass for ± 5 min. in the dryer.

Finally, re-expose to U.V. light until the plate is dark blue.

2 – Digital Positive and Exposure Time for Photopolymer Printing

A. Test with the aquatint screen

- *A test must be made first with the auqatint screen, to determine what exposure time has to be applied with the screen used.*
- *The aquatint screen is placed on a laminated copper plate and a test strip is made with U.V. exposure times of 5-10-15-20-25-30-35-40 seconds. After exposure, the protective layer is removed from the film and the latter developed in a $2^1/_2$ % soda bath. At 20 ° C, the processing takes about 2 minutes. With older film, processing will take longer. It is important to constantly pass a sponge on the plate to obtain a homogeneous development.*

Next thing to do is to check the correct development of the film: the copper should have a matte look. If it looks bright, the plate was overdeveloped.

The development is then stopped with vinegar.

The plate is thoroughly rinsed with water and dabbed with paper towel: there shouldn't remain any waterdrop. The plate is then put in the dryer for about ten minutes (15 minutes at 60°C.).

Once the plate is dry, it must be hardened. For this, it is posed for about ten minutes under the HPR lamp.

The plate is now ready to be printed on engraving paper, which will determine the exposure time of the screen by examining the black parts. A correct exposure time is giving a black just a little lighter than full black.

See Fig. 4.

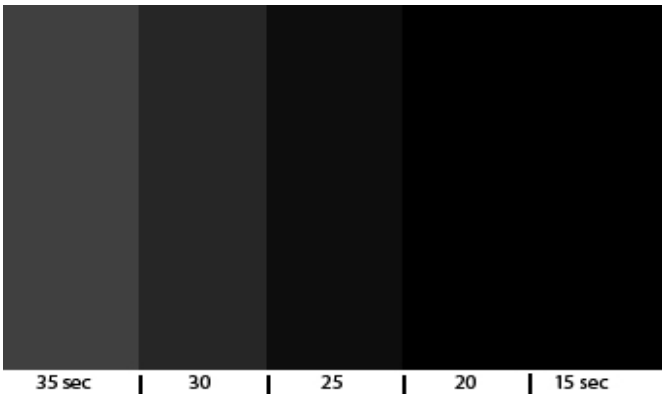


Fig. 4. Test strip of the screen – correct exposure time

- *The developer is a solution of soda : 10g per liter of water (might be increased up to 25g of soda for 1 liter of water). To be used at 20°C.*
  To strip the plate, use 200g of soda per liter of water.

B. Test with step wedge.

- *Start exposing the step wedge (see fig. 5).*
- *This step wedge has to be printed with the printer and on the transparency that will be used later.*
  - *A test print is made on a laminated copper plate. We first expose the screen (see fig.4: in this example, the exposure time is 20 sec.) and then, on the same plate, the step wedge with a ± 20% longer exposure than for the screen.*
- *After development, drying and a second exposure, a print is made on engraving paper.*
- *Now the result can be assessed:*

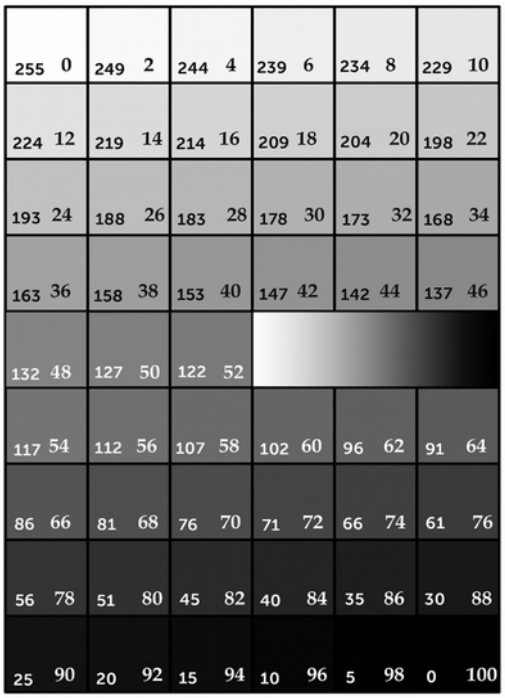
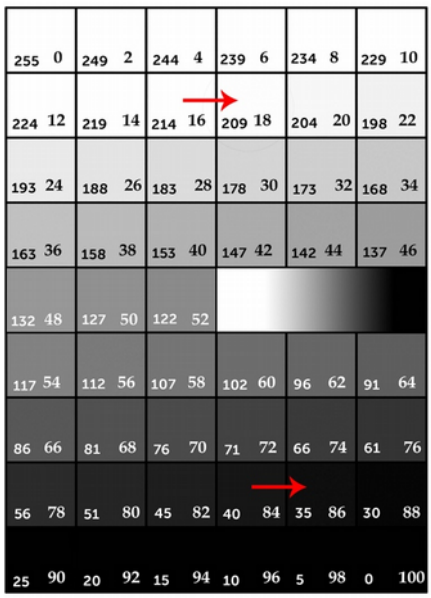


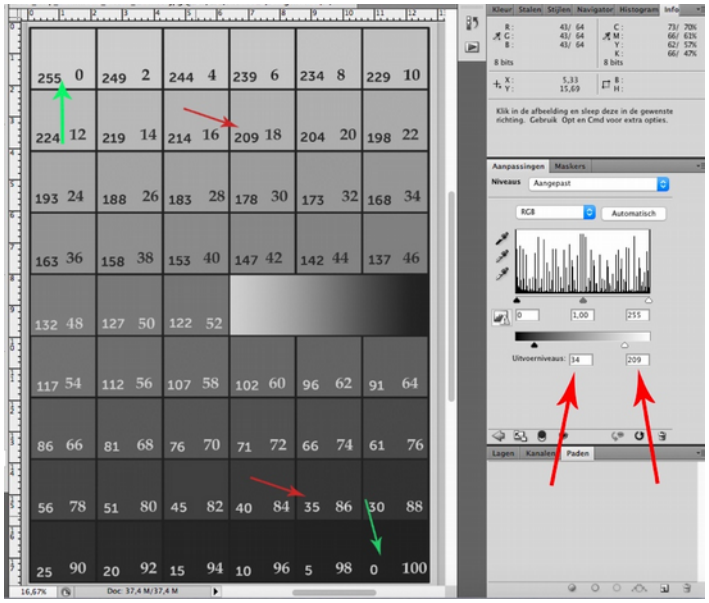
fig. 5: 051_Step_Gamma2,2_Levels_Positive.jpg

✗ *When the print gives the following result (fig. 6) a correction has tot be made. For this purpose, an image processing software is used: with the 'levels' tool, all the channels (the whites and the blacks) are placed in their correct position (see fig.7).*

- *The new step wedge is printed once more on a transparecy. This time, the impression will be much lighter than the first.*
- *This new step wedge is printed again on a laminated copper plate.*

fig. 6 *fig 7*





- *The aquatint screen is exposed first, with the time found previously (20 sec.). Then the new step wedge, but with the same time as for the first test.*
- *After development, drying and re-exposure, a print is made on engraving paper.*
- *If all went well, it will be possible now to determine the correct exposure time and settings.*
- *These data will remain valid for the whole photo-polymer film roll.*
- *If another (or a new) film is going to be used, all the tests will have to be started over again.*

C. From photo to digital positive.

- *The photo is first adapted, using an image processing software, to make it ready to be printed on transparency film.*
- *These values (black 35 and white 209 – fig.6 / 7) are used to print the picture. See also the test result with the step wedge*
- *To make the transparency, the same film as the one used for the tests has to be taken.*
- *We can then make a final print on transparency.*
- *This film will be used to expose the laminated copper plate with the screen.*
- *Next, the plate is developed, dried, re-exposed, and printed on engraving paper.*

In principle, the outcome should be a perfect print.

D. Equipement and info:

Polymetal	*http://www.polymetaal.nl/*
Henrik Bøegh	*http://www.grafiskeksperimentarium.dk/*
Kamer 108	*http://www.niet-toxische-grafiek.org/*
Inktopus	*http://inktopus.squarespace.com/*

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