



Solar Plates

FUNDAMENTALS

To make a print using a solar plate you firstly create a piece of artwork on a transparent or translucent film. This is overlaid on a solarplate and exposed, with the film and plate together to the sun, much the same way as you would produce a contact print in photography. The surface layer of the plate is composed of a light sensitive polymer which is also soluble in water. Wherever UV light hits the plate the polymer is hardened while the other parts of the polymer blocked from the light by opaque lines and marks of the drawing remain soluble. By scrubbing the plate gently in tap water the soluble residue washes away, leaving a plate with lines and grooves. The plate can then be used to either print in intaglio or relief.

- Unlike traditional relief and intaglio methods there is no need to compose your image in reverse.
- It is possible with intaglio techniques to get 75-100 prints if using gentle wiping back and many more for relief
- Remove the plastic film from the surface of the plate before exposure
- Poor contact is one of the most common problems encountered
- Generally the thinner the plate the thinner the polymer and the shorter the exposure time and washout time required.
- It is generally better to use the thicker plates for relief printing. Melbourne Etching Supplies stock the Torelief plates And Printight
The WS95HY Torelief plates and Printight 95GR are thicker and both good for relief and intaglio and the Printight 73GRs which are thinner, are more suited for intaglio printing.
Printight plates wipe clean and end result is sharp and clean, a more photo gravure finish than the Torelief plates which give a pitted finish, leaving plate tone .
- Plates can be cut using a guillotine – available from Melbourne Etching Supplies

SUITABLE IMAGES

Possible ways to obtain images

- Draw directly onto transparency film using opaque materials, no light must be allowed through. Black materials are best. Pens, crayons, inks, paint, anything that will block out sunlight
- Scratch through opaque film using variety of tools. Scalpels, sandpaper, razors, drypoint needle, lino tools etc.
- When working with intaglio images the solar plate will capture light pencil marks and subtle marks drawn onto the transparency

Texture and tone

- Soft B+ pencils, litho pencils, litho crayons, graphite sticks, oil crayons
- Smooth lines and marks
- Opaque and semi opaque felt tip pens, rapidographs, pen and india ink, liquid opaque pens, soft B+ pencils

Painterly marks and tonal washes

- Dissolve tusche, lamp black powder, gouache or drawing ink in water. Apply oil based paints and inks with brushes and dilute with baby or vegetable oil.
- Use a digital image from the computer and printed onto special inkjet transparency film
- Use a photocopier

MAKING A CONTACT FRAME

can also be purchased from Melbourne Etching Supplies

1. Cut a base from MDF about 5cm larger than your plate
2. Cut a piece of foam at least 0.6cm thick the same size as the base and secure it to the wooden base with tape.
3. Cover it with a piece of glass the same size as the base. Only use glass that is free of scratches and make sure it is spotless.
4. Finally to keep layers together tightly, clip spring clamps on each of the four sides. Make sure they do not cover the solar plate. The thicker the glass the better to assist in weighing down the plate.

Note: dusting the polymer surface very lightly with talc will prevent the film sticking to the polymer during exposure.

MAKING AND PRINTING A PLATE

There are several variables that will affect the final plate

- the opaqueness of the image
- the density of the drawing media
- the exposure time
- the intensity of the UV light
- the length of washout during the development stage

MAKING A TEST STRIP

With the test strips you can experiment with different exposure times, test the darkest and lightest part of the image, or examine a significant part of the image and envisage the look of the print with much greater accuracy. The test strip will show you if you need to modify printing techniques, increase or decrease exposure time, alter opaqueness of original drawing, or shorten or lengthen washout time.

The intensity of UV light varies greatly depending on where you live and the season. The greatest problem with under exposing is that the polymer will not harden and will wash out completely. A rough exposure guide for the Southern parts of Australia is 1 minute in Summer, 3 in Spring and Autumn and up to 15 minutes in the Winter months. These will vary depending on where you live and the intensity of the UV light. To determine the UV intensity test with a stouffer wedge(see below)

1. Produce an image on transparency
2. cut some test strips approx. 5 x 7cm or enough to cover significant part of image
3. remove the cover film from the plate and lightly dust the polymer with talc to stop film sticking to glass
4. Position plate on the base of your contact frame with the polymer face up and arrange the transparency with the worked surface face to face with the plate. Check the cover glass for marks and clean any spots.
5. Place the glass over the transparency and sandwich the layers together with spring clamps
6. Cover the frame with a piece of lightproof material – cardboard, black plastic and carry the frame to light source (outside or lamp)
7. Move the cardboard to expose about a quarter of the plate in full sunlight for an initial testing time of around one quarter of the relevant times above. Cover another quarter of plate for another quarter of time and so on until you have exposed the plate for eg. 2 minutes in Summer 15 minutes in Winter. These times will vary depending on the intensity of the UV from the sun. Make sure the frame receives the direct rays of the sun at all times.
8. At the end of the exposure, cover the frame with the cardboard and take the contact frame to the developing tray
Please note Printight plates need 25% to 30% longer exposure time compared to Torelief plates.

DEVELOPING

If developing outside do not wash plates in direct sunlight as it may completely harden the soluble parts of the plate

1. Remove the transparency and examine the plate surface.
2. In the bottom of the developing tray it is advisable to secure a piece of magnetic sheet to keep it in one place.
3. Put the solarplate in the tray/sink and put on gloves
4. Pour a little water onto the plate and gently scrub with a soft brush as evenly as possible over the entire surface. Occasionally add more water and continue to scrub. Although at this stage you are unlikely to see much, periodically lift and examine the plate for signs of grooves forming. Learning to read the plate and judging how far to go with this step will come with experience
5. Keep scrubbing for 3 – 5 minutes for relief plates since washing away as much of the soluble polymer as possible creates deeper grooves, and when printed this type of plate will give a distinct relief image. For an intaglio print scrub for around 1-2 minutes as you are aiming to create shallow grooves.
6. Give the plate a final rinse before drying
7. Lay the plate face up on a clean lint free towel and blot the surface. For each blotting use a fresh part of the towel as the polymer may be transferred to another part of the plate
8. Dry the plate with a hairdryer
9. Return the plate to the sun for around 5 minutes more to harden the remaining polymer. If the polymer is still tacky return it to the sun. You can do this for a couple of hours without any adverse effects.

PRINTING

The entire work area must be clean.

Place the magnetic inking board onto some newsprint. Place the solar plate onto the magnetic board.

Ink up and print as either a relief plate or intaglio plate. You can use either traditional oil based inks or the new Akua Colour water washup inks to avoid the use of solvents.

ALTERING THE WASHOUT TIME

Experiment by increasing and decreasing the washout time. Washing away more polymer will create a deeper relief structure and may result in a print with more contrast. By reducing the time to as little as 30 seconds or 1 minute, more

polymer will remain in the grooves and lines and therefore greater surface area will print and is more suited to intaglio. On short washouts it may be necessary to post-expose for up to 30 minutes

MAKING AND PRINTING AN INTAGLIO PLATE

Making an intaglio plate is very similar to a relief plate but is much more sensitive to timing of exposures. For an intaglio print you usually use 2 exposures. Beautiful results are achieved using the double exposure method. You are able to capture much of the tonal range of drawing and painting. By careful control you are able to control the depth of grooves in the polymer layer and hence the quality of line. Using double exposures you are able to expose all kinds of transparencies in the sun from drawings, photocopies to photographic films. To perform a double exposure it is first sensitized with an aquatint screen (a high resolution transparency film covered with random minute, opaque dots) the plate is then exposed with a positive transparency for the second exposure.

The subsequent steps, developing, drying and post exposing the plate are almost identical to relief printing.

The screen is available from MES

DOUBLE EXPOSURE AND AQUATINT

The double exposure technique can be very sensitive to changes in the exposure time and even a few seconds can make a difference. Accurate timing when exposing test strips and plates is essential. Initially it is preferable to keep the exposure times of the screen and the transparency the same.

EXPOSING IN THE SUN

The sun gives out a wide range of UV light. Solar plates have a wide latitude of exposure, meaning that if a cloud momentarily passes in front of the sun while exposing the plate the slight decrease in UV light will have no effect on results. However if the cloud was to darken the sky for a long period the plate may be underexposed. It is best to expose on constant days, sunny or constantly cloudy to then see a consistency in exposure. It is best to expose in early morning or late afternoon

STOUFFER WEDGE

A stouffer wedge (also known as a step wedge or greyscale) may be purchased from Melbourne Etching Supplies to assist in measuring the fluctuations in solar UV light or if you need to test the intensity of UV light exposure units. To perform the test cut a small strip of plate slightly larger than the stouffer wedge. Expose the greyscale for a set time say 2 minutes. Develop for around 3 minutes. Under the most opaque blocks or steps the polymer will completely wash away, under the lighter steps the polymer will harden while several steps in the middle will be only partially washed away. The reading is in the middle eg. If you find the steps 2-9 are solid, steps 10 and 11 are partially washed away and 12-21 have completely washed away then the reading is 11. It is suggested that drawings and photocopies are best in a range between 9 and 11 and more opaque film work well in the 12-14 range.

Generally speaking Torelief plates reading is 11 to 12 as Printtight plates need about 25% to 30% more exposure time, there reading is about 13 to 14

USING AN ARTIFICIAL LIGHT SOURCE

A UV light source that emits UV-A light of 360 nm is ideal for solar plates

STORAGE

Store solar plates even processed ones out of heat and humidity as it will affect the polymer

It is suggested to store completed plates – apply a thin film of oil (baby oil etc.) wrap them in tissue paper and then seal in plastic bags. This will stop the polymer becoming brittle with age. Keep in a cool dry dark place

It is good practice to keep plates wrapped in lightproof paper as much as possible away from sunlight. It is ok to work for limited amounts of time under normal room lighting as long as no daylight penetrates the room. It is best to keep any plates covered if not immediately in use.

EQUIPMENT AVAILABLE AT MELBOURNE ETCHING SUPPLIES

- Torelief plates WS95HY
- Photo Sunplates KM73GR
- Guillotine/paper trimmer
- Magnetic board for developing and inking
- Stouffer wedge
- Aquatint/dot screen
- Transparency, wet media, inkjet printer, acetate
- Drawing materials
- MDF cut to size
- Tape
- Plastic foam
- Developing trays
- Talc
- Bristle brush
- Newsprint
- Gloves
- Baren for relief printing
- Press for Intaglio printing
- Etching blankets for press
- Etching and relief inks

SUGGESTED READING

"Printmaking in the Sun" – Dan Welden and Pauline Muir

"Printmaking with Photopolymer Plates" – Dianne Longley