

SCREEN PRINTING ON FABRICS

INSTRUCTIONS

INTRODUCTION

Screen printing, sometimes called silk screening or serigraphy, has long proved its worth as a fine arts and commercial medium. While our screen printing materials meet the high quality standards of professionals, our hope is to bring the satisfaction and enjoyment of screen printing to both the hobbyist and the student.

Our range is comprehensive and enables you to produce screen stencils in a variety of ways and produce prints with water-soluble ink, acrylic ink and textile inks.

STENCIL EMULSION

1 Preparation

This is one of the most exciting methods of screen printing because it offers the widest range of possibilities. It allows the printing of fine line drawings, commercial lettering techniques as well as photographic half-tone positive. Use polyester or another suitable synthetic fabric or screen material. Do not use silk or organdie if you wish to reclaim the screen.

All methods of photographic screen printing require three things:

A screen prepared with a light sensitive coating

A film positive or equal

A light source that will enable you to transfer the opaque images on your positive to the light sensitive screen you have prepared

Follow the mixing instructions given for sensitised emulsion. Store the sensitised emulsion for a maximum of four weeks if not refrigerated and four months if refrigerated. In both cases wrap the vessel holding the sensitised emulsion in a bin liner to keep the light from it.

2 Coating the screen

Coat the screen by pouring a bead of the solution on one end of the underside of the screen (where you will apply the ink later on in the process). Spread it evenly and thinly using a squeegee or the plastic spreader. Use more solution where necessary. Turn the screen over the spread the solution again, taking care to remove the excess but ensuring that there is an even coating on both sides of the screen fabric. Any excess can be returned to the mixing container.

3 Drying the coated screen

Away from light and heat, set the screen to dry horizontally, with the underside down. This will give the most even, flat film on the underside of the screen. You will need to elevate the four corners of the frame during the drying stage. Try using push pins or other suitable devices such as an empty drawer, a cupboard or under a cardboard box.

Allow the screen to dry thoroughly.

If more than 300 prints are to be run then it is best to apply another coating of the sensitised photo emulsion to the underside of the screen after the first coat is dry. Ensure you achieve a thin, even coating. Repeat the drying process away from heat and light.

Once the sensitised screen is dry, it must remain in a darkened area until you are ready to expose it. A fan in a dark area will greatly speed up the drying of the emulsion on the screen.

The maximum time that can be allowed between application and exposure of the sensitised emulsion coated screen is approximately four to six weeks if kept at room temperature.

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4 Preparing a positive

A 'positive' is any opaque image (usually black) on any transparent or translucent surface. There are many ways you can choose to prepare them.

You can produce a positive through a photocopy machine that has the capability of reproducing opaquely on film and tracing paper, etc. In order to produce a positive using a copy machine, the following conditions must be met:

Black and white line work must be opaque

Photographic prints must have a high contrast

The photocopy machine must have the capability to reproduce opaque designs on film

Photographic images can be accurately screen printed. Clarify what type of photocopier is available.

Due to the half-tones or continuous tones which are present in all photographs, a special type of positive must be prepared. This must be done by someone with photographic expertise and with the necessary equipment. Essentially, the photographer will photographically transfer the half-tones to Kodalith Ortho film. A dot patterned half-tone screen will be placed between the lens and the Ortho film. These half-tone dots will be exposed to the film simultaneously with the photograph. The resulting half-tone negative will then be converted by the photographer in to a half-tone positive. This is the type of conversion that is made during the preparation of photographs for newspaper and magazine printing. The dot pattern breaks up the continuous tones into a half-tone interpretation that can be printed.

5 Exposure preparation

Before you remove the sensitised screen from the dark, drying area, ensure that you have everything you need to print. Set up your exposure lamp as outlined in point 6. Positives can be fixed in place with cellophane tape. Do not let two layers of tracing paper or film overlap. A better alternative to taping the positive to the screen fabric is to lay a piece of glass, Lucite or plexiglass on top of the positive placed on the screen. If using a design with fine lettering or lines then one of these methods must be used. Which ever method you choose to use, once you are sure that the positive is in place and flat against the fabric, you are ready to expose the screen.

Exposure Chart

Please note that this chart is an approximation and has been prepared using information obtained from the use of an aluminium foil pie-plate reflector as indicated in these instructions. More sophisticated light sources, reflectors and equipment can be used but the exposure times and distances will have to be adjusted. Therefore experimentation will be required using test strips or other light testing devices or procedures.

When using a 150 watt bulb...

Screen Size	150W Bulb Height	Exposure Time
8 x 10"/203 x 254mm	12"/305mm	45 minutes
10 x 14"/254 x 356mm	12"/305mm	45 minutes
12 x 18"/305 x 457mm	15"/381mm	1 hour 14 minutes
16 x 20"/406 x 508mm	17"/432mm	1 hour 32 minutes
18 x 20"/457 x 508mm	17"/432mm	1 hour 32 minutes

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When using a 250 watt bulb...

Screen Size	250W Bulb Height	Exposure Time
8 x 10"/203 x 254mm	12"/305mm	10 minutes
10 x 14"/254 x 356mm	12"/305mm	10 minutes
12 x 18"/305 x 457mm	15"/381mm	16 minutes
16 x 20"/406 x 508mm	17"/432mm	20 minutes
18 x 20"/457 x 508mm	17"/432mm	20 minutes

Once your positive is securely in place than you can switch on the light source but make sure you note down what the time is when you begin to expose your screen. It is a good idea to produce some test strips first so it will give you an idea of how long you need to expose your screen for. The chart above is only a guide.

After exposure, turn off the light and remove the positive. Take the exposed screen to the sink.

7 Post exposure

Apply a forceful spray of water to both sides of the exposed screen. **DO NOT USE HOT WATER.** Concentrate this spray on the top side of the screen. After a few minutes these areas will become 'open' and the design will become clearer. Continue spraying until all the unwanted emulsion has gone. After the screen has been washed, let it dry thoroughly in a flat, level position.

Once the screen has dried, hold it to the light and check for pin holes. If present, the pin holes can be covered with Screen Filler or pieces of masking tape which should be stuck to the underside of the screen. If Screen Filler is used, then the filler applied will need to dry before the screen is used.

NOTE: Photo stencil emulsion should not be left on a screen indefinitely unless a permanent stencil is required. It should be washed out as soon as the print run is complete. See point 9 for advice concerning cleaning.

8 Textile prints

For the most part, screen printing on fabric is as simple as screen printing on to paper. Only use on fabrics that can be subjected to temperatures of 275 – 325F/135 - 163°C. Do not use on non-porous fabrics such as nylon. Test all fabrics that you intend to use. It is advisable to wash all fabrics prior to printing, especially fabrics with sizing. This will ensure proper adhesion of the textile ink to the fabric.

Some important points:

On articles of clothing such as t-shirts, a piece of cardboard or paper must be placed **INSIDE** each garment to act as a barrier.

To obtain a transparent shade of an ink, or to improve the lubricity (slipperiness) of the ink, you could add Transparent Base which will produce an infinite variety of shades and tones.

To slow drying, help ink flow or to prevent screen clogging, add Ink Retarder.

Wash-up of screens and tools must be carried out immediately after use. If left, substances such as ink or emulsion will be almost impossible to remove.

After the textile ink has dried on the fabric, use a household iron on a medium heat (275 – 325F / 135 - 163°C) to fix your design, placing a piece of cloth or paper between the iron and the printed material. Iron for approximately five minutes. This will make the ink withstand repeated washing.

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IMPORTANT: EXPERIMENT WITH SAMPLES PRIOR TO ALL PRODUCTION RUNS!

9 Cleaning up

An organised work area will make cleaning up easy. Here is the recommended procedure.

When using textile ink...

WASH IMMEDIATELY AFTER THE LAST PRINT IS PULLED. Use warm water and a soft brush.

If the ink does become dry on the screen, it can be removed by washing acetone or a lacquer thinner. When the ink is removed, wash with a mix of warm water and dishwasher detergent using a soft brush. Rinse with warm water.

CAUTION: Both acetone and lacquer thinner are toxic and flammable chemicals. You must not use these unless your work area is extremely well ventilated and away from flame or sparks. We recommend that when these chemicals are used, the user should wear a protective mask specifically designed to protect from these fumes. The necessity for either of these materials can be avoided by observing the recommended printing and cleaning procedures.

10 Cleaning up of Photo Stencil Emulsion

Photostencil emulsion should be washed out of your screen as soon as your print run is complete UNLESS you require a permanent stencil.

Adult supervision is recommended for the cleaning of screens which have been exposed using photostencil emulsion.

Wear protective clothing – rubber gloves and smock.

Bleach Removal Method

Be certain that all the screen ink has removed from the screen fabric. Soak the screen in fresh, full strength household bleach for exactly ten minutes. At about the five minute interval, scrub both sides with a soft, nylon bristle brush. Complete the ten minute total soaking time and then use a maximum pressure hot water spray to remove the emulsion from the screen. Using a soft bristle brush and dishwasher detergent, scrub both sides of the screen. Rinse with maximum pressure hot water spray.

If there is any emulsion residue after the screen has dried, scrub with a strong solvent such as acetone. Acetone is available at many paint and hardware stores. Read the manufacturer's cautionary statements regarding the use of acetone. See the caution written in point 9.

You should exercise extreme caution in the use of bleach. Wear protective clothing and rubber gloves and avoid splashing. If you accidentally get bleach on yourself, wash thoroughly with cold water.

DO NOT EXPOSE SILK FABRIC TO BLEACH.

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TROUBLESHOOTING

Screen Stencils

Problem: Photo stencil emulsion will not adhere to the screen

Possibilities:

- Art work not prepared with a visually or photographically opaque material.
- Heat as well as light will 'set' the photo stencil emulsion. There must not be any heat build-up (above 105F / 41°C) on the stencil during exposure.
- More than 12 hours at 70F / 21°C elapsed before the sensitised screen exposure.
- The sensitised screen was exposed to too much light or heat before exposure to art work.
- Overexposure – the instructions list exposure times and heights for a 'disposable foil pie tin' reflector. More efficient reflectors will require a higher bulb height and/or less exposure time.
- Art work did not make proper contact with the screen.
- Incomplete washout

Problem: Emulsion has washed out after exposure

Possibilities:

- Incorrect mixing of the emulsion and sensitiser.
- Underexposure.
- The tracing paper or film was not sufficiently transparent.
- Washout temperature was too high – DO NOT USE HOT WATER.
- The screen was not dry before coating.
- The screen was not dry before exposure.

Problem: Small detail on the exposed screen did not wash out properly

Possibilities:

- Failure to use a black, non-reflective background under the screen during exposure.
- Using a more intense light source will reduce the required exposure time and resultant light bounce-back. This will improve detail wash-out.

Problem: Inks drying in screen

Possibilities:

- Use the flood stroke technique given in the instructions.
- Keep squeegees sharpened.
- For textile inks, mix with Ink Retarder .
- Use a couple of humidifiers or 'sickroom' vaporizers in the printing area

Problem: Textile inks not opaque enough

Possibilities:

- Use a coarser screen fabric.
- Make multiple passes.
- Use a rounded squeegee.
- Use a soft base under the fabric to be printed.
- Use a hairdryer to flash dry the print immediately after printing and then re-print over the top in exact register.

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