

BASIC TRAINING: PARTS I, II, & III

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Applications Training Specialist

There are basically three areas in the screen making process that account for most of the problems that run rampant in the screen making room:

- Coating
- Exposing
- Reclaiming

Sure, there are lots of problems in all the other areas but these are the biggies I'd like to concentrate on.

Part I

Let's cover coating first. With any photostencil system, it is imperative that you start with a well-prepped screen. The screen must be in top-notch condition to accept the emulsion system. It should be the proper tension, the proper mesh count, and clean. How you coat your screen depends on whether direct emulsions or capillary films are used.

Direct Emulsions:

A Clean Coat

Direct emulsion requires the use of a coating trough or scoop coater (two names for the same thing). Keep this piece of equipment in tip-top condition; any nicks or burrs must be smoothed out to insure a good coating of emulsion. If they can't be smoothed out, get rid of it and get a new one. By the way, don't assume that just because it's new that it's ready to use. I made that mistake while giving a demo. The coater had a small burr near the end plate. I proceeded to slice the screen wide open and dump a pint of emulsion all over a table. Oops!

Shelf Life

If you're using diazo based emulsion, use fresh emulsion. The manufacturer will give the recommended shelf life of the mixed emulsion. Plan to use it up well within the shelf life and avoid using it if it's old. Chances are it may work fine, but why take chances? All the time and effort taken to produce a quality screen is wasted if it doesn't work.

How can you tell if the emulsion is old? The easiest way is to write the date that the emulsion was mixed on the bucket. When the shelf life is reached and there is some emulsion left don't use it. Mix up a new batch and date it. If you don't date it you must start guessing. Sometimes old emulsion will get lumpy, stringy, or darker in color. These are symptoms of old emulsion. Take a spatula and mix the emulsion up a bit, if you see any signs of aging don't use it. Important: don't confuse dye separation with old emulsion. Old emulsion will look browner than fresh emulsion.

Coat Count

Keep track of how many coats of emulsion are going onto the screen. Every time you put another pass on the screen the emulsion becomes thicker. If you don't keep track of the number of coats, determining the correct exposure is impossible. Some scoop coaters are double edged where one edge is rounded and the other is sharp. The sharp edge will deposit a thinner coat of emulsion on the screen than the rounded edge. You must keep track of which edge you use for the same reason you must keep track of the number of coats.



Looking for insight on the wonderful world of screen making? Consult the writings of Chromaline's Technical Guru, Mick Orr, Applications Training Specialist.

Mick has been in the screen printing industry since 1970 with printing experience in a wide range of applications from membrane switches, to textiles, specialty graphics to faceplates and more. His hands-on seminars have been appreciated by screen makers around the world.



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Drying Range

Once the screen is coated be sure to dry it squeegee side up. This will allow the emulsion to flow through the mesh to the print side which is the side that will determine your print quality. Be sure to dry the screen in total darkness with a minimum amount of heat. Too much heat will harm the emulsion. How much is too much? Don't exceed 100o F. When the screen is dry, use it or store it in a dark, cool, and dry area until you need it. Do not store the screens in the drying cabinet.

Capillary Film: All the Facts

Capillary film doesn't require a scoop coater or sensitizing by the screen maker, because it is coated to a specific thickness and it is presensitized by the manufacturer. Because of its ease of use, capillary film can be applied many different ways and can yield excellent results.

Capillary film still requires a properly tensioned and cleaned screen. Like direct emulsion, capillary film requires proper drying temperature settings but it can be dried vertically, horizontally, or any position you want.

Because capillary film is supplied in different thicknesses, it's easy to keep track of the coated screens. You don't have to worry about "how many coats" were put on a screen.

Typically, capillary film yields superior print quality to direct emulsion because it isn't as influenced by the mesh as direct emulsion. Direct emulsion shrinks and conforms to the contours of the mesh. The film stays flat because it's supported by the carrier (backing).

The next article in the series will focus on determining correct exposure time and the effects of using different light sources.

Basic Training: Part II

The second big area where screen problems arise is the exposure area. To the novice screen maker this is THE MOST MISUNDERSTOOD AREA. He knows light has something to do with making a screen, and it has to be bright. It's not how bright the light is, but how much ultraviolet energy is given off by the exposure lamp. As a matter-of-fact, most of the energy used to expose the stencil is not visible. Photo emulsion systems can only be hardened by ultraviolet light.

The Source

Where the problem comes in is that almost all lights we use give off some degree of ultraviolet energy sun lamps, grow lights, cool white fluorescent, quartz halogen, photo flood, parking lot lights, pulsed xenon all put out some ultraviolet light and will expose a screen; but they aren't very efficient. The best bet is to stay away from home- made exposure units and to use a professionally made exposure unit that uses the correct ultra- violet exposure lamp. They will give you the fastest, most accurate exposure possible and they are made with safety in mind.

The Art of Exposure

OK, now that you have the proper exposure unit, what good is it if you don't know how to use it? If the lamp isn't in a fixed position to the vacuum frame, learn how to determine the proper distance between the screen and the exposure unit. Get an exposure calculator and use it to determine the proper exposures for every mesh/emulsion combination. I've heard a few screen makers say that they don't have the time to do an exposure test. The fact is they don't have enough time not to do an exposure test.

Patience is a Virtue

Always, always, always expose your screen for the longest possible exposure. Avoid shortening the exposure times. The shorter the exposure, the weaker your stencil. It is a myth that in order to do fine details you must underexpose the screen.

Any time you underexpose the screen you are only partially exposing the emulsion. The part that wasn't exposed just washes down the drain during developing. The emulsion that isn't properly exposed is in contact with the mesh.

The Whole Loaf

Think of an underexposed screen looking like a piece of bread. The hardened part of the emulsion would be the crust and the underexposed emulsion as the soft center of the bread. A properly exposed screen will be hardened all the way through the stencil from print side to the squeegee side. Exposure latitude refers to how far you can expose a stencil before it is either over or underexposed. Don't be afraid to expose a screen longer than you think is right. Virtually everyone is on the verge of underexposing their screens. When in doubt use Chromaline's Exposure Calculator. It will help you determine the exposure latitude of a given emulsion system.

If your screens are falling apart, pinholing, or getting sticky during printing, check out the exposure time. It may be the reason for the stencil breaking down.

Basic Training: Part III

In earlier articles, we have covered proper stencil coating and determining correct exposure times. The final major area that screen makers have difficulties in is the reclaiming of stencils. After the job has been printed you have two choices: you can either save the screen and hope for a repeat order somewhere down the line with a screen that is taking up space in the shop, or you can reclaim the screen and use it for another job. Reclaiming makes more sense than keeping the screen for a particular job. By reclaiming the screens, you will have a smaller, more manageable inventory of screens to use.

I've been in shops that have literally thousands of already coated screens in inventory waiting to be used again. They not only take up space but they take up much needed time due to continuous "cataloging" of the inventory. And even when the pre-coated screens are found, many need to be reshot anyway because of rips, saggy screens, pinholes, or slight changes in the artwork. When the screen is reclaimed after printing, it's easy to assess the condition of the mesh. If it's in bad shape, punch the screen out of the frame and restretch it with new mesh.

Reclaiming is really a simple, time-saving step that will give your screens longer life. I have a couple of tips that I guarantee will make reclaiming a regular and easier part of your screen making procedure.

The Clean Scene

Clean screens are essential for making quality stencils. Any oils or ink residuals on the mesh will impair the bonding of the emulsion to the mesh. This can lead to pinholes and weak screens which take a lot more time to fix than coating a clean screen for each job.

In the reclaiming part of screen making, quality degreasers are needed along with pressure washers and water hoses. Commercial dishwashing detergents have skin conditioners and perfumes in them which can adversely affect adhesion of the emulsion to screen fabric. Are pinholes worth the few cents you saved on detergent?

The Pressure

My big tip on reclaiming screens: use a high pressure washer that is at least 1000 psi, and a water hose. A garden hose just doesn't have enough pressure to blast out the residual emulsion and ink trapped in the knuckles of the mesh. But a pressure washer will blast the dissolved emulsion. Pressure washers also work great with Chroma/Haze? because you need the high pressure to completely remove the dehazer from the mesh.

A water hose is used to flood the screen with clean water to wash away the particles that the pressure washer has loosened from the screen. The pressure washer creates a cloud of mist that contains the material just blasted from the screen. As it settles, some of it falls back onto the mesh.

When using a reclaimer, never let it dry onto the stencil. It will lock the emulsion into the screen, making it next to impossible to remove the stencil.

The articles in this series have only covered three basic areas of screen making. Many more problem areas can evolve and usually you can't tell if there is a problem until after the fact. However, it is possible to minimize the problems by taking the time to eliminate the variables:

1. Learn proper coating procedures and keep track of mesh/emulsion combinations for future jobs.
2. Learn and log proper exposure guidelines for every different mesh and emulsion system.
3. Learn and practice proper reclaiming techniques.

Every improvement made, no matter how basic, is a step toward total quality control.