THE BENEFIT OF CAPILLARY FILM OVER DIRECT EMULSION

Larry Tywater asks can you really afford not to use it?

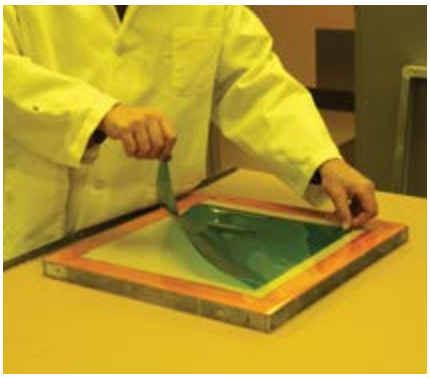
Anytime I suggest a customer should be using capillary film instead of direct emulsion their first reaction is usually the same. "That stuff is too expensive." Unless the customer is a high end graphic shop the benefit of using capillary film is usually dismissed for a variety of reasons. Generally the overriding reason is cost. It may be a little more expensive as a product, but the difference in quality and repeatability is unmatched. The most tangible difference that you will see is the savings in time. That said, you must determine what is that time worth?

SIDE BY SIDE COMPARISON

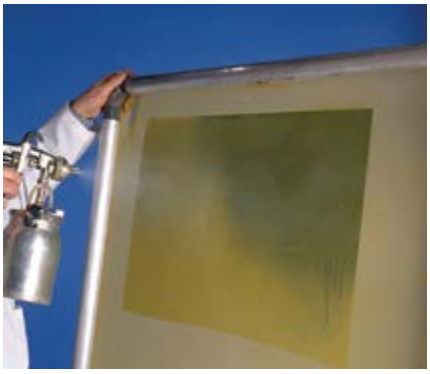
Direct emulsion, as we all know is a liquid emulsion coated onto a screen while in the liquid state. There are a lot of emulsions on the market today, from a pure photopolymer, dual cure, diazo, or a hybrid. You can use either an automated coating machine or do it manually using a scoop coater. Either way, you are simply loading the mesh with the direct emulsion. You can coat the mesh any way you like but keep in mind, your final coat must be on the squeegee side of the mesh so it forces the emulsion to the print side. This is the EOM and is what will create your 'gasket' which will determine print quality on your substrate. EOM stands for emulsion over mesh and means exactly what it says. It is the measured layer of emulsion that protrudes above the mesh on the print side of the screen.

Capillary film on the other hand is an emulsion that is coated by the manufacturer onto a polyester carrier. It is coated in different thicknesses to be used with specific mesh counts. Since the capillary action draws the film into the mesh you typically use thicker capillary film for lower mesh counts and a thinner capillary film for higher mesh counts. For instance, if you have a 50 micron capillary film and place it on a 110 mesh, after the capillary action is complete you should have about 15 microns of EOM. This means that 35 microns of the film was 'pulled' into the mesh by the capillary action. With direct emulsion you must coat multiple times to first fill the mesh. Only after the mesh has been filled can you then create EOM. Multiple coatings of direct emulsion can take a considerable amount of time especially on the lowest of mesh counts when you may end up needing to do face coats of emulsion. With capillary film you simply use the film thickness needed for a particular mesh. All capillary film manufacturers will have a mesh selection guide.

The roll down method for applying capillary film to the mesh



The capillary film contacts the screen, ending with the corner of the film being held



The sprayer, from the squeegee side of the mesh, saturates the film starting from the bottom

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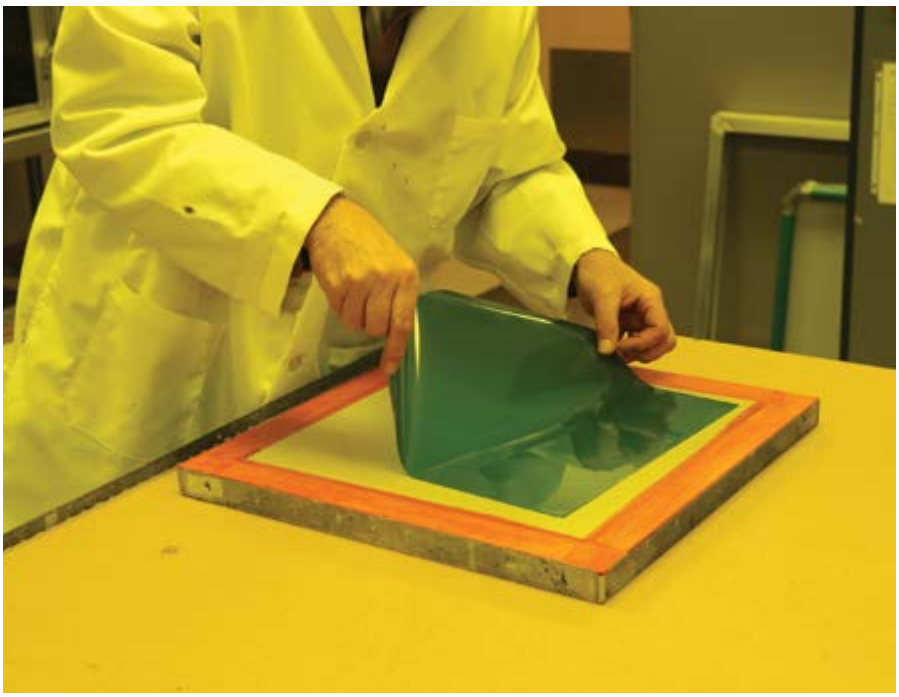
Film Thickness	15 & 18 microns (0.6 & 0.7 mil)	20 microns (.79 mil)	25 microns (1.0 mil)	30 microns (1.2 mil)	38 microns (1.5 mil)	50 microns (2.0 mil)	70 microns (2.8 mil)
Mesh Count/Inch (per cm)	380 & finer (150 & finer)	380 & finer (150 & finer)	305 & finer (120-150)	205-305 (81-120)	205-305 (81-120)	205 & coarser (81 & coarser)	76 & coarser (30 & coarser)
Heavy Deposit	Not Applicable	Not Applicable	Not Applicable	Adequate	Good	Excellent	Excellent
Apparel/T-Shirts	Halftones	Halftones	Halftones	Solid	Solid	Puff	Puff/Glitter
Four Color Process (per cm)	up to 150 line (59)	up to 150 line (59)	up to 120 line (47)	up to 100 line (39)	up to 100 line (39)	up to 100 line	Not Applicable
Banners	Adequate	Adequate	Excellent	Excellent	Good	Good	Good
Posters/Signs	Adequate	Adequate	Excellent	Excellent	Good	Good	Good
Decals	Excellent	Excellent	Excellent	Excellent	Good	Good	Not Applicable
Solder Mask	Not Applicable	Not Applicable	Good	Excellent	Good	Good	Adequate
Primary Imaging Nomenclature	Adequate	Adequate	Excellent	Excellent	Good	Good	Not Applicable
Bottles/Containers	Excellent	Excellent	Excellent	Excellent	Good	Good	Not Applicable
Glass Decorators	Excellent	Excellent	Excellent	Excellent	Good	Not Applicable	Not Applicable
Ceramic Decals	Excellent	Excellent	Excellent	Excellent	Good	Not Applicable	Not Applicable

XXX= excellent resistance XX= moderate resistance X= some resistance 0= no resistance

Capillary film mesh recommendations

The film is reverse rolled with the emulsion side out



The drop on method is easiest on small sheets

As in any shop, time is very expensive as well as personnel. For some people learning how to coat a screen correctly with direct emulsion can take days, weeks or even months to become proficient. With capillary film it is possible to master mounting the film in less than 15 minutes. Training personnel is a snap and the end result is the same no matter who applies the film – consistent high quality screens every time!

Advantages of using capillary film;

1. Repeatable and easy to master.
2. Very durable stencil.
3. Best edge definition and sharpest lines.
4. Zero pinholes.
5. Totally reclaimable.

If you track the time it takes for the complete process of preparing a screen from start to finish with direct emulsion vs capillary film, the capillary film will win every time. Whenever you can save time and still produce a high quality stencil you win.

DIFFERENT WAYS TO APPLY CAPILLARY FILM

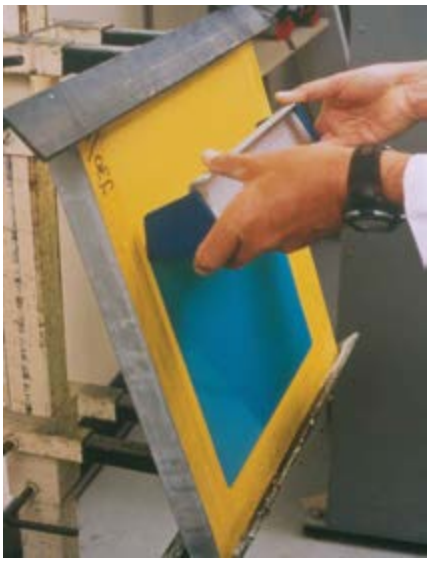
There are several different ways to apply capillary film to the mesh. The three methods that I teach are as follows – roll down method, spray gun method, and drop on method. All three of the methods start out with first degreasing the screens that are to be used. With all of the methods the film should go on with no air pockets or bubbles and should be a smooth and defect free coating on the mesh.

THE ROLL DOWN METHOD:

Have a cut sheet of film ready to place on the screen. While the screen is still in the sink and wet you may want to apply a wetting agent for the roll down method only. The wetting agent actually changes the surface tension of the screen making it hold more water. This will aid in the even application of the capillary film. Reverse roll your film with the emulsion side out in your hands. After that is done place the rolled up film at the top of the print side of the screen and 'roll' it down. Next, squeegee off the excess water from the squeegee side only and allow the screen to dry print side up.

SPRAY METHOD:

Use an air driven sprayer that ionises the water when activated. Spray a miniscule amount of water onto the print side of the dry screen. Place your cut sheet of capillary film onto the print side of the mesh and the small amount of water will hold it in place. Then use the sprayer, from the squeegee side of the mesh saturate the film starting from the bottom and working your way up. This will cause the capillary action to take place and the film will be 'pulled' into the mesh from the print side. You then simply squeegee off the excess water from the squeegee side of the screen only and let it dry print side up.



Learning how to coat a screen correctly with direct emulsion can take time

DROP ON METHOD:

With the screen still wet, lay it down flat with the print side up. You then take your cut sheet of capillary film and hold it by a single corner between two fingers. Place it on the screen starting at one corner. With a single smooth and fluid motion, allow the capillary film to contact the screen ending with the corner of the film that you are still holding. This method is easiest on small sheets but, once mastered, it is the fastest way to apply the film.

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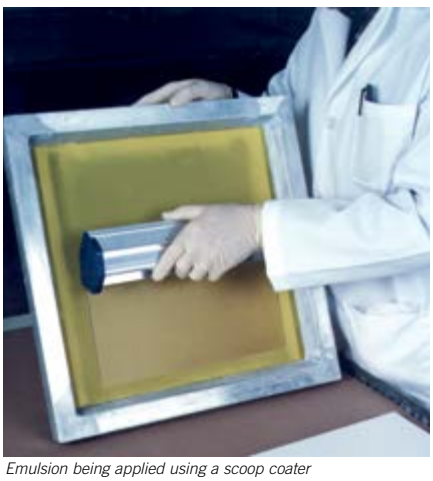


Emulsion being applied using a scoop coater

CLEANLINESS

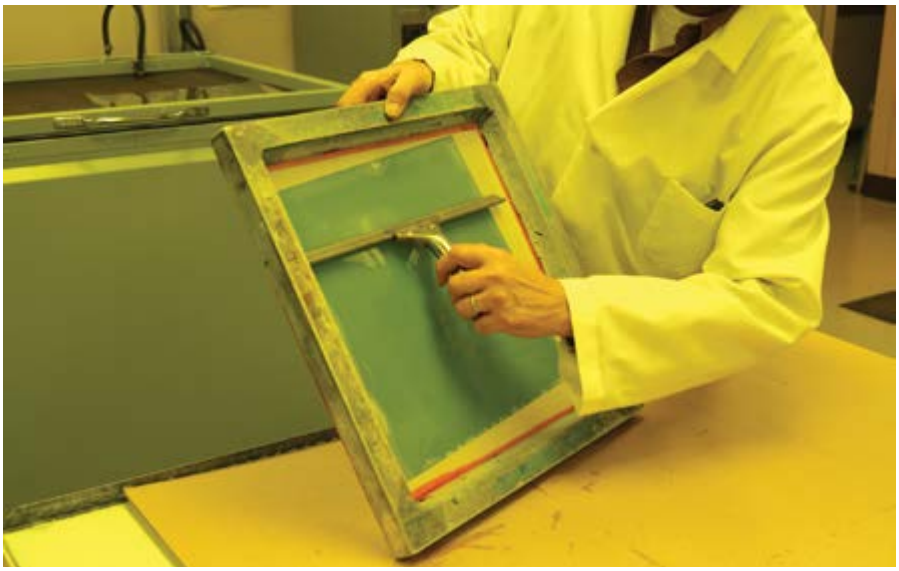
The ease of use and cleanliness of using capillary film is night and day from liquid emulsion. With liquid emulsion you are have to deal with pouring from a container into coating trough. You then must coat the screen and watch for drips or runs that are always a part of coating. You must be ever vigilant not to tip the coater while not paying attention causing you to spill and drip emulsion all over the floor. (We have all done this!) If you have an automatic coater there is always the layer of stalagmites that begin forming underneath the trough holders. As we all know, with liquid emulsion you are going to spill some.

Capillary film on the other hand is much cleaner and user friendly. You are generally dealing with cut sheets that fit exactly onto your screens. You are also dealing with clean water to apply the film. You are using a squeegee to remove the excess water from the screen after the film is applied. Once the screens are placed into the rack, the drying time for the capillary film and the screen is usually about one-quarter of the time it takes to dry a screen with direct emulsion. The drying time plus the clean-up time that you are no longer involved in will speed your process up by a minimum of 50%.

PROPER EXPOSURE

Proper exposure for many seems to be as elusive as Bigfoot! People spend their days preparing screens and, when it comes to exposure, they chase it like an elusive creature. A lot of times when I ask a customer how they came up with a particular exposure time they simply say: “This is the way that the guy that I replaced trained me.” Well, that guy could have been a maniac or he could have known that you were about to replace him and feed you bad information. It is always best at least to understand the basics of proper exposure so that you are capable of reaching that proper exposure alone. In very simple terms proper exposure is when the emulsion that received 100% of unfiltered UV light has cross-linked, and the only unexposed emulsion on the screen is what was ‘hidden’ by your positive or negative image.

All three methods of applying capillary film require degreased screens



With capillary film it is possible to master mounting the film in less than 15 minutes

REPEATABLE EXPOSURE

When using capillary film the EOM is always the same on any particular mesh count. That is because the capillary action will draw the film into the mesh the same every time and is always constant. You should have a light integrator on your exposure unit. This will assure that your screens get the same amount of UV energy because the light integrator will compensate for the age of the bulb. You will no longer struggle with holding half-tones or having to deal with under or over exposed emulsion once you get your times set properly.

The drop on method for working with capillary film

PRINT QUALITY

When you are trying to achieve great print quality there are a few things that must line up in order for you to achieve that. I will put these in order of use as I believe all are equally important when it comes to a quality screen.

1. Properly tensioned and clean mesh.
2. Quality film positive with a 3.0 density reading or above.
3. Proper EOM for a particular mesh count.
4. Proper exposure for the mesh type and emulsion that you are using.
5. Proper washout after exposure.

If any of the above is lacking then that is the weak link in your process from a quality point of view. It doesn’t matter how good your artist is or how proficient your printer is, your print quality will suffer if any of these are not 100% accurate.

After looking at all the variables, using capillary vs direct emulsion is no contest from a quality and ease of use standpoint. Capillary film is the much more precise way to go if you are trying to achieve the best possible screen, reproduce the best possible image and keep a clean screen room all at the same time. If you take into consideration all the prep time that you use for direct emulsion, refilling the troughs, clean-up and dry time. The capillary film will win hands down. How many times do you have to re-burn a screen because it has pinholes or you are not holding detail in the image? How much time and money is actually spent on the re-burning of screens? That is a question that I will leave for you to decide. ■

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