SCREEN PRINT PRECISION – PART 1

In part one of a two-part article, Kieth Stevens of International Coatings, offers his advice on the ideal materials – meshes, squeegees, emulsions and inks – to create cookie-cutter precision screen prints

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In the midst of setting up a screen-printing job, there are many processes to remember. I am often asked a screen-printing question that at first seems simple, with a straightforward answer. How hard or complex can it be to slather ink onto a shirt? Create the design, make a screen, find the right colours and types of inks, grab a squeegee and spread the ink through the screen like spreading butter onto toast. All printers want the process to be cookie-cutter perfect, but more often than not, it is quite the opposite.

It is easy to miss one of the many variable factors that influence our screen print results. Many printers specialise in a particular type of substrate – only black or white cotton t-shirts or athletic, numbered uniforms for example. Others may specialise only in bags or other speciality/promotional items. When a shop prints the same type of substrate every day, it can hone in on the variables that affect its particular material and become very adept. But the shops that can print successfully on all types of substrates, gain my utmost respect because of all the variables they have to navigate.

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Not only must the variety of fabrics be considered, such as 100 % cotton, an 80/20 or 50/50 blend or 100% polyester, but also the other variables that can affect print results. I have been to factories that print over 75,000 pieces daily. The screen-print operators consistently produce the highest quality and productivity all day, every day. They work like a well-oiled machine, making adjustments to every factor throughout the process. I rather liken screen printing to an art form, but let's not forget, if you are running a print shop, you are in the business of making money.

Let's now look at tried and tested processes that will help to achieve cookie-cutter perfection every time and the components that will positively affect your bottom line.

A HEALTHY MESH

The importance of the mesh in screen printing is something that I am passionate about, as it has a direct and measurable effect on the overall success of your screen-printing operation. The most common mesh comes from the filtration industry. The screen-printing industry uses these same products to make screens. There are a few high-end mesh suppliers that make mesh specifically for our industry, producing fantastic products that I love to use. The majority of mesh is not specifically made for printing but a much larger industry encompassing water, silt, etc. As such, it is possible to find cheaper types of mesh. Most ready-to-use screens are often stretched using these products and work for 80% of our needs.

Screen printers who have done their

Good emulsion coverage is vital to a great print

Art by David Edward Byrd printed using International Coatings' UltraMix PMS Color Mixing System plus Glow-in-the-Dark and Copper Shimmer special effects inks

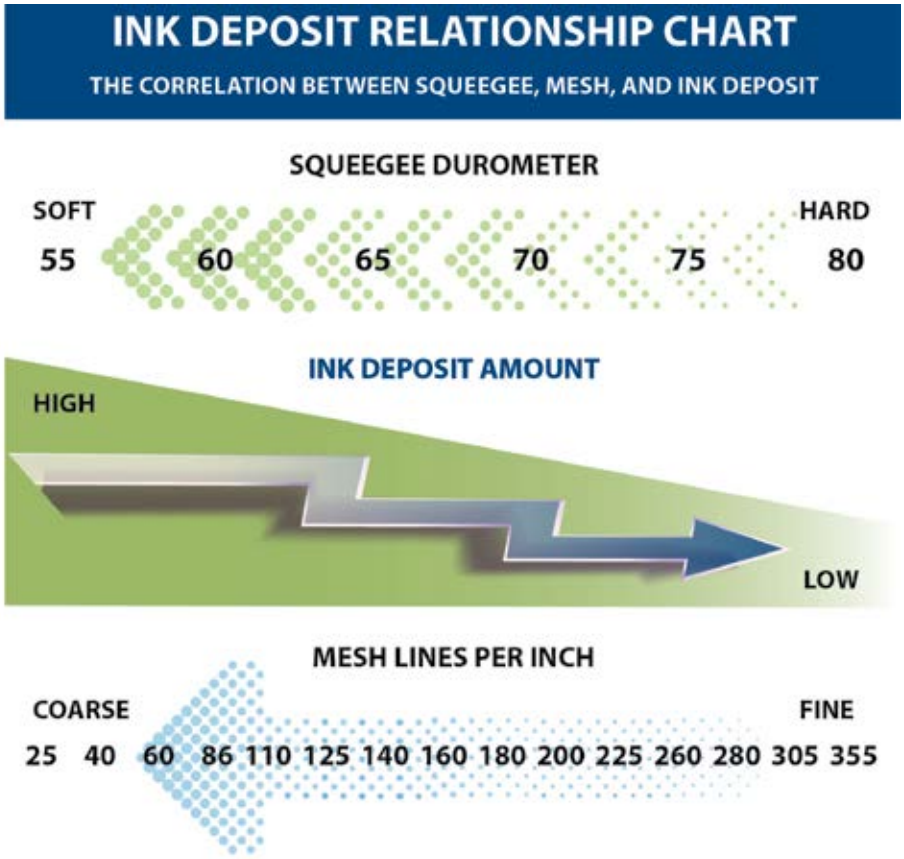

Chart showing the relationship between squeegee durometer and mesh size, and the amount of ink deposited depending on the hardness of the squeegee and the mesh lines/in. Image courtesy of International Coatings

homework will find – through trial-and-error – that there is a difference between the speciality mesh made specifically for screen printing and the more common varieties. The screen-print-specific mesh comes with a higher price, but there is a definite return on investment. The return can be substantial for the everyday printer and the mesh can be a must-have when printing speciality inks such as high density. The meshes, specifically designed for the screen-print industry, contain properties that can help maintain a higher tension over an extended run. This, in turn, helps maintain the proper off-contact and registration. With a higher tension, higher squeegee speed can be expected. Both are very sought-after, profitable attributes.

Different types of squeegees

Upon further research, you may find that the companies that make screen-print-specific mesh offer not only various thread counts (threads/ins/cm) but also the same mesh counts in different thread diameters. Mesh created with a thinner thread diameter

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means that the percentage of mesh that the ink flows through is larger. This can help the squeegee run a little faster and with less pressure. The ink remains on the surface of the substrate and is not pushed into the fabric. Be careful when handling these thinner meshes because, just like fishing line, you can get more bites with the thinner thread but, if you are not careful, the line will break. However, over the long haul, the thinner thread diameter will allow you to print more and earn more.

SQUEEGEE DUROMETERS

Squeegees are must-have basic tools for a screen printer. They come in many hardness levels (durometers). Typically, squeegees start at a soft 55 durometers and go up to a hard 80 durometers. There are also sandwich squeegee blades that stack a soft and a hard blade or sandwich a hard blade between two softer ones. In addition, squeegees come in different shapes. Some blade edges are rounded, while others are square or even pointed.

With all the various choices available, it is easy for a screen printer to get confused about which type to use for what application. A basic rule to keep in mind is that a soft squeegee lays down more ink than a hard squeegee.

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Blades of 50–60 durometers are considered 'soft' and will deposit more ink. Choose this durometer for heavily-textured fabrics, such as fleece or sweatshirt, or when using special-effects inks such as gels and puffs. This may also help with fibrillation.

A 65–75 durometer designation ranks medium on the hardness scale. This range is a good choice for general printing.

The hardest option is an 80-durometer blade. It will deposit less ink and is great for printing fine detail or four-colour-process prints. It is also a good choice to use whenever the least amount of ink deposit is required.

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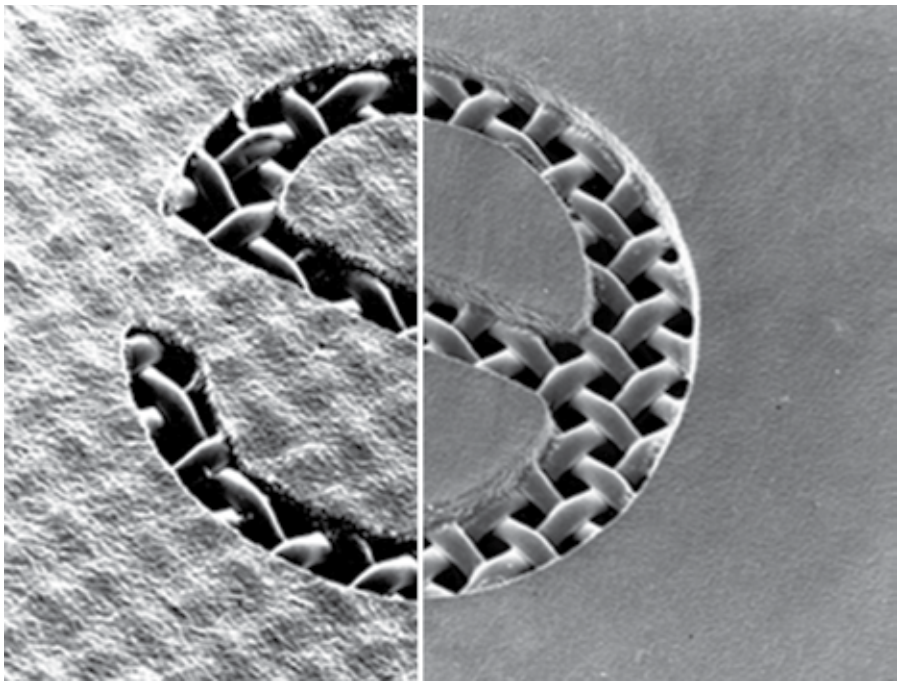

Insufficient emulsion coverage (left) compared to coverage (right)

SQUEEGEE BLADES

The 'sandwich' squeegee is made out of different durometer blades. This type of blade consists of dual or triple blades of varying durometers sandwiched together, such as a 60/90 or a 70/90/70. The benefit of using this type of squeegee is that the harder durometer gives the squeegee great support while still having the softer edge for printing. Some soft blades – when used on their own – bend over when pressure is added during the printing process. The triple blades help to prevent this.

For textile screen printing, there are generally three different types of blade profiles – square, round and V-shaped. Square (straight edge) blades are most commonly used by textile screen printers. They work well for standard or regular ink applications. Round (bull nose) blades deposit more ink.

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Try this type for special-effect inks such as gel or puff. V-shaped (single- or double-level) blades are typically used for printing on irregular or cylindrically shaped substrates. Most textile screen printers use either the straight edge or bull nose version.

Due to harsh cleaning chemicals and age, squeegees will become harder in durometer or even brittle in the long run. A straight edge may become rounded, or chinks may form on the blade. Blades are relatively cheap, yet can affect your print quality and productivity positively. It is advised to have fresh blades available, just in case. In general, a new squeegee will lay down less ink than a used one.

EMULSION THICKNESSES

Whenever I enter a shop, I run my fingers over the screens. This tells me instantly whether the prints will be good or bad. The amount of emulsion covering the screens is a tell-tale sign of print quality. A screen that does not have enough emulsion coverage can result in ragged or uneven print edges. Having a properly thick and even emulsion stencil also helps eliminate mesh marks while increasing opacity. It is important to have a thicker emulsion deposit on the bottom of the screen's shirt side. The more consistent the application, together with the right amount of emulsion, the better the quality. It is important to pay attention to how you dry your coated screens. The coated screens should lie with the substrate (e.g., shirt) face down to allow the thicker deposit on the shirt side. Purchase a dehumidifier (not a heater) as soon as possible for your screen room to allow the screens to dry faster and harden consistently.

Certain special-effect inks may also require a much thicker emulsion coating than regular inks, such as for shimmer or glitter inks. Certain texturing inks such as puff, gels or high-density inks may also require thick coats.

INKS – CHOOSE WISELY

When it comes to ink, choose a quality brand through a distributor who will assist you in making the best choice for your needs. Get the right ink for the job. For example, get ink for cotton – such as a cotton white – to print on a cotton substrate. Cotton inks may be lower in cost and can prevent ghosting on blends.

Use a low-bleed ink when printing on 50/50 polycotton fabric. Avoid using a low-bleed ink on dyed cotton fabrics, as there is a risk of ghosting. Keep in mind that low-bleed inks are more expensive, so only use them on 50/50 and 100% polyester fabrics. Expect to pay a little more for added benefits.

"The amount of emulsion covering the screens is a tell-tale sign of print quality"

Try a bleed blocker for fabrics that are prone to excessive dye migration. Use a grey or black bleed-blocking ink as an underbase. Bleed blockers provide superior dye blocking

White ink freshly poured into a bucket

and can save your prints and your reputation.

Use a low-cure ink for heat-sensitive fabrics. Low-cure inks are great for these fabrics, for example, polypropylene bags or certain nylons. Again, these inks may cost more but can save money in energy and returned jobs that bleed or garments that have shrunk.

"Try a bleed blocker for fabrics that are prone to excessive dye migration"

Use ink that can accommodate the stretch of stretchy fabric. Additives are available if you want to make standard inks 'stretchier'. Many athletic garments contain added Lycra-type fibres. A standard plastisol will stretch 100% (a 1in-sized print can stretch to 2ins for example).

Stir ink prior to use. The shearing effect will make the ink more printable and easier to use. It will also help to ensure that all the components are mixed well.

Flood the screen with ink before actually printing. Flooding will ensure even distribution and pushes the ink into the screen. If the proper amount of flood pressure is used, then the ink will be in the correct position for the squeegee to apply the ink. If this is not done correctly, the squeegee must do the job of the flood and squeegee, which slows the whole process and costs money, time and quality.

Cure at the recommended temperature settings. Plastisol ink requires heat in order for its components to bond and form a strong 'film'. When it does not get enough heat or time for those bonds to form, the film will tend to either crack when stretched, or wash off. In general, plastisol ink cures between 160–165°C, but low-cure inks can cure from 135–149°C. Be sure to test your dryer temperature using a donut probe and the surface of your garment using a temperature gun to ascertain that the temperatures are correct. Always test your cure before starting a production run.

If it sounds too good to be true, it probably is. Buying inks online may save money, but only if the ink works well after it has been tested for compatibility, printability, durability, etc. Research and testing will ensure that you're getting what you paid for. Factor in shipping costs and return shipping costs. Do [the manufacturers] offer printing help or advice? A customer recently brought us a bucket of plastisol ink from a competitor and told us that it was supposed to cure as low as 82°C, which would be a game changer for the industry. But despite what the advert said, he was having problems getting the ink to cure even at higher temperatures and wanted us to test it as well. As expected, the inks did not cure until we passed it through the dryer at 148°C for one minute.

UNTIL NEXT TIME...

The four basic tools covered form the building blocks of a cookie-cutter process. There are other 'tools of the trade' which are also relevant and I will cover those in Part II of this article. Printing for me is a way of creating art – a good printer knows how to use his tools to create the best possible print. A lot of experience is needed to master the finesse of screen printing, but knowing the basic facts about the inter-relationship of tools that might affect various aspects of the print outcome is half the battle. ■

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