



Popular Garment Printing Techniques



Garment screen printers today must employ a wide variety of techniques to satisfy the broad range of market needs. If more than a few colors are required, traditional offset printers generally will employ four-color process, which reproduces all colors in the original illustration or design by using ink printed through color-separated halftones. Screen printed, four-color process can be unpredictable for inexperienced garment printers, but is a realistic goal to keep in mind as you become more experienced.

Other techniques involve more than four colors and usually yield better results. They also give the printer more control. This is why it is not unusual to find eight to 14 color presses in apparel decorator shops. What follows is a summary of the separation and printing techniques used to deal with the variety of production requirements.

Spot Color

Spot color images (see Figure 1, page 40) generally have specific solid colors. This technique is effective in printing cartoons, type, logos and line art. Spot color printing is relatively easy and is the most frequently used technique in our industry. Average spot color jobs usually contain two or

three colors.

A spot color image can be as simple as one color and as complex as 10 colors, and can include lots of shading, gradations and detail. They still generally have a flat, cartoon like look and are not photorealistic.

Four-Color Process

Four-color process images (see Figure 2, page 40) are composed of the colors cyan, magenta, yellow and black, referred to as CMYK. When printed correctly, CMYK inks absorb some wavelengths of light and reflect others. This is known as subtractive color theory. An apple appears red because green and blue light are absorbed (or subtracted) from the reflected light received by your eyes. If you use a magnifier to view a printed CMYK image, you will see small halftone dots that, when printed, make up the colors we see. Four-color process on garments is used to reproduce images that have a palette of colors well beyond the limits of the press. It is effective in reproducing paintings or photographs, and can be used for images that contain a broad range of colors. Process color prints on T-shirts work well on light colored shirts, but can be difficult when printing to dark shirts due to the transparency

To master four-color process printing, a good set of color separations is needed, as well as excellent screen-making and printing techniques.



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One of the hottest ink trends in T-shirt printing utilizes modified inks and printing techniques that produce a 3-D finish.



Figure 1

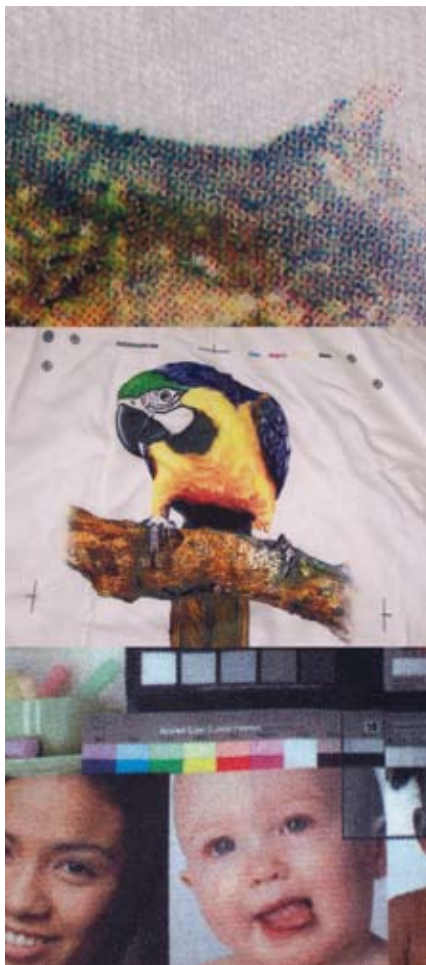


Figure 2



Figure 3



Figure 4

of the inks. To master four-color process printing, a good set of color separations is needed, as well as excellent screen-making and printing techniques. Process stability is paramount when printing four-color process. To broaden the finished effect, many four-color process prints have additional spot colors that expand the color gamut.

The advent of affordable computing has given the average screen printer a whole new set of tools. More printers are adding four-color process to their repertoire. The fundamental problem of any halftone reproduction on garments is the amount of pressure needed to saturate the weave of the fabric. This pressure can cause extreme amounts of dot gain, resulting in frustration, wasted time and money. Many printers are migrating from four-color process to simulated process due to their inability to print four-color process well and profitably.

Simulated Process Color

Simulated process color images (see Figure 3) have a photorealistic look, but are not printed with the process colors of CMYK, which makes this technique work well for dark shirts. The color separations for simulated process color are made up of halftone images of spot colors like red, yellow, blue, etc.

Because the inks for simulated process color are generally all-purpose, semi-transparent plastisol, they deliver a bright print even when printed on an underbase of white ink. When done correctly, simulated process prints can produce strongly-photorealistic images with smooth gradations and bright colors. It is one of the most popular methods used by today's award-winning printers.

Index Color

This technique (see Figure 4) is probably the most confusing of the separation methods. For the methods previously described, shading in the image is achieved by using different sized halftone dots that have a specific pattern and angle to them. This pattern and angle is known as amplitude modulation (AM) screening. Index color separations are created in Adobe Photoshop, and use random square dots that are all the same size (see Figure 5, page 41). These random dot patterns also are called diffusion dither, stochastic or Frequency Modulation (FM) screening and use uniform dot sizes with varied distance between them. This method is different from conventional AM halftone screening, which aligns dots of varying sizes on a

regular grid.

Index printing works on light and dark shirts and typically requires more colors than simulated or four-color process (especially if printing on black shirts). Images are very easy to print because all the dots are the same size and are printed side by side rather than on top of one another, as with other techniques. Separations are somewhat easy to do in Adobe Photoshop and screen making and printing can be more forgiving. The downside to index prints is that for the image to be photorealistic, you need at least six colors and in some cases, eight to 10 colors. Index prints can sometimes have a grainy, textured look to them, but when printed with several colors, they also can be very attractive.

Special Effects

There are numerous inks available to garment printers that are able to create a variety of special effects. These can be used alone or in conjunction with traditional artwork to enhance certain areas of the print. Here is a brief description of common special effect inks:

- Puff ink (see Figure 6) expands in all directions when heated.
- Glitter ink (see Figure 7) cures to a glittering, textured metallic finish when printed.
- Crystalline (see Figure 8) is a special effects ink designed to give prints a multi-color pearlescent appearance. Crystalline may be printed directly on light colored garments or over an underbase on dark garments, and may be overprinted on base colors to give a pearlescent appearance. For more dramatic special effects, Crystalline may be printed on top of a flashed puff or high density print.
- Shimmer ink (see Figure 9) cures to a glittering textured or “shimmer” finish. These inks have outstanding brightness relative to regular metallic, and unlike standard glitter inks, will not tarnish with age or washing.
- Suede ink (see Figure 10) combines an extremely matte finish with a fuzzy texture and a slight puff. The resulting print is almost indistinguishable from suede leather in texture and appearance.
- Thermochromic ink (see Figure 11) is designed to change color when exposed to sufficient body heat.

One of the hottest ink trends in T-shirt printing utilizes modified inks and printing techniques that produce a 3-D finish:

- Gel ink (see Figure 12) is a specially formulated clear ink for creating 3-D



Figure 5



Figure 6



Figure 7



Figure 8



Figure 9

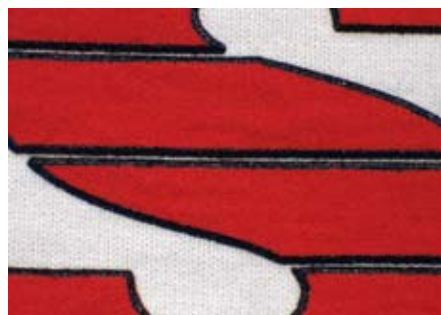


Figure 10



Figure 11

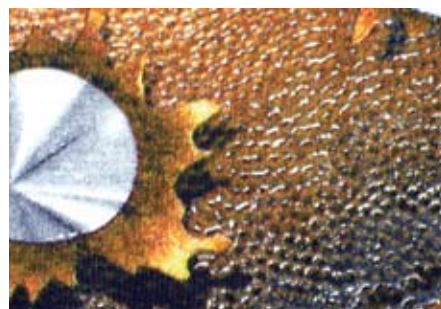


Figure 12

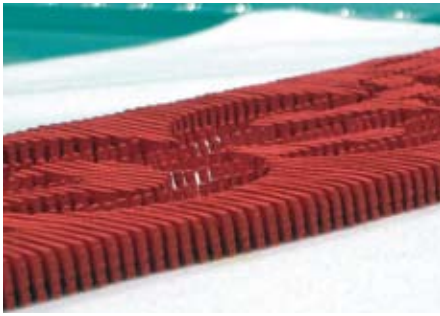


Figure 13

glossy wet looks when printed directly on garments or overprinted on colors. Colors may be printed on top of the gel to create various effects.

- High-density ink (see Figure 13) will produce a print with an extraordinarily thick ink layer that retains sharp edges and crisp, highly detailed definition even after curing (when printed correctly).
- Caviar beads/PVC flake are particles of PVC that adhere to the garment



Figure 14



Figure 15

using a screen printed adhesive. The beads or flakes are then applied to the wet adhesive and cured (see Figure 14).

- Foils are used to add a brilliant, high-gloss metallic finish and are applied using a heat transfer press (see Figure 15).

Any and all of the above can be used with special printing techniques to provide an endless combination of special effect prints. Designs that utilize special effects require additional time and labor, so charge accordingly.

There are some ink technologies that provide a special effect and are relatively simple to use. Among these choices are discharge and burnout. Discharge is a water-based ink that removes the dye in a shirt (see Figure 16). The dye used in the garment must be dischargeable, so the best results are achieved with garments that are 100 percent cotton and dyed with a reactive dye. The garment cannot have been over-dyed (when fabric is re-dyed to another color). The discharge ink might discharge the over-dye, only to reveal a phantom color underneath. Discharge ink also requires water resistant stencils to be used and has a limited pot life. Only mix what will be used in the next few hours. There's also a chance of it drying in the screen and clogging the mesh, so always leave the screen flooded after each print and keep a spray bottle of water handy to mist the ink every so often.

When printing on dark garments, using

a discharge underbase produces a softer-feeling print that doesn't have the bullet-proof feel of a regular plastisol. Some ink systems offer an additive that changes regular plastisol ink into discharge.

Another simple, yet effective, special effect ink is called burnout. It is a water based product that is printed on poly-cotton blends. It's called burnout because it literally burns out the natural, cotton fiber, leaving only the polyester. After it's cured, the shirt must be washed in order for the effect to reveal itself (see Figure 17). Burnout produces the worn, vintage look that is popular today.

Make It Happen

Decorated apparel designs are pushing the limits of available technologies and printing techniques. It's clear that creativity and consumers' desires for customized designs are driving garment decoration today. As margins become tighter, printers are constantly looking for new ways to capture additional revenue streams. Today's consumers strive to express their individuality no matter the cost. Using the right combination of technology and technique is one way to grab their attention.

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Figure 16



Figure 17