



# Special Effects On Automatic Presses

## TIPS FOR PRINTING CUTTING-EDGE GARMENT GRAPHICS IN HIGH VOLUME

*Designs that take advantage of special-effects inks require extra care in every stage of production.*

*Find out what to look for when orders for this type of work involve big numbers and tight deadlines.*

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**P**rinted samples give us a chance to present our best work to customers and potential buyers. We get to show off unique designs and fresh ideas that add value to the apparel. Many garment screen printers reach for special-effects inks to make their original concepts reality. But now even the smallest shops with limited resources have arsenals of tools that enable them to add an extra feel or look to a T-shirt. Simply adding blowing agent to an ink gives it height and texture. A kiss of foil transforms a flat, one-color graphic into a vintage design. But what happens when we hook the customers with our samples and end up with orders that we can only fill by bringing the job to automatic presses?

In the past, designs asking for special effects often translated into a machine in production running very slowly, beset with problems and with low volume. Hardly worth setting up. These days, however, long production runs that incorporate special-effects inks and require a degree of technical skill are not

only possible and cost effective, but also fairly common. This article presents some of the considerations to take into account when moving special-effects printing to high-volume production.

### Art

Good artwork is a key factor in successfully transferring special-effects garment printing to automatic presses. The designer must become familiar with the inks and printing process and develop a basic understanding of press configuration and the use of flashing units. The artist should also have a solid grasp of the variables where line weight and dot size are concerned, especially in instances that require the use of certain bases or inks that contain flakes or particles or need a heavy deposit.

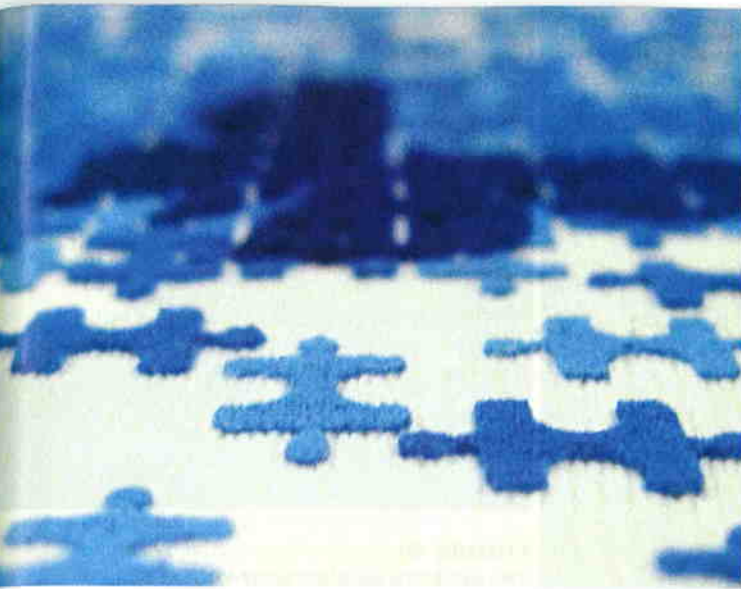
Garment screen printing is a relatively low-resolution process, especially when we move into special-effects printing. Inks that contain metallic flakes, for example, need a larger screen-mesh opening in order to pass through without

clogging. This, in turn, limits us to lower mesh counts and, as a result, limits the size of the dot or the line weight that we can use in our artwork. High-density ink is another example. The type of screen used to print high-density ink typically has a low mesh count and uses capillary film in thicknesses ranging from 200-400 microns. This again limits the dot size and line weight that we can use in the artwork.

Taking these variables into consideration at the art stage results in artwork that's more finely tuned to the inks' characteristics and capabilities, which not only makes the final print much easier to produce, but also makes it a more precise and appealing rendering of the original idea. Doing so also reduces overall cost by cutting back or eliminating reworks at the sample stage and ensuring a smoother production run with no stoppage.

### Sampling

Your ability to sample a special-effects-based garment design before production



**FIGURE 1 SCREEN PRINTING IN HD**  
Producing an effect such as this involves stacking high-density inks by using a print-flash-print sequence to build height.

**FIGURE 2 COMBINING SPECIAL-EFFECTS INKS**  
Shown here is an example of a special-effects design that involves the use of blowing agent and a metallic-silver overlay.

is a determining factor as to whether you'll achieve success with high-volume printing. Many special-effects inks require a flash after printing when they cannot be printed last. Inks that contain blowing agents are an example. In order to achieve maximum loft and definition using high-density ink, the best approach is to stack it: print, flash, and print again (*Figure 1*).

You lose a screen head—sometimes two when a cooldown space is added—for every flash unit you use on an automatic press. This means that one ink color less is available for use by the designer. Let's use as an example a 14-color automatic machine with a design that calls for high-density ink. Even if the high-density part of the design were only one color, you'd need two printheads—one flash (minimum) and a cooldown space—or possibly two. This equates to a minimum of four printheads to produce a one-color, high-density print and leaves the designer with 10 colors to work with instead of 13 for the rest of the graphic.

Adding another special-effects ink to the mix, like a second high-density color or a gel, once again dramatically drops the number of extra colors available to the designer. Such a situation becomes very problematic when printing designs that are character driven. The character-based designs for the youth market can be particularly challenging. These designs are often multicolored and call out one or more special effects. Such a situation calls for a skilled designer and color separator who can make room for special-effects inks by using fewer spot colors than would normally be available to achieve the same result.

Sampling plays a very important role here. You need to be able to print a strike-off and determine optimum placement for the special-effects screens in the print run. Determining placement is important, as it also dictates placement of the flash units and thus the position of the spot colors.

Sampling is also the best place to iron out kinks in a design and color separation. Is the line weight too thin or thick? Is the dot too small or large? Now is the best time to find out. Additionally, the sampling stage gives you a chance to figure out curing temperatures for heat-sensitive, special-effects inks like gel, HD, or puffs. Many of the newer special-effects inks on the market today offer a broader range of application. You can produce different effects using the same ink simply by adjusting dryer temperature. Again, your best bet is to identify those temperatures at the sampling stage.

Even a basic knowledge of the above-mentioned staging process is invaluable to a designer and color separator. The sample stage is a better place to discover whether a color separation requires revision for any reason. Keeping designers in the training loop can greatly simplify this step.

A production manager's worst nightmare is to see a machine stopped dead in mid-run with the shipping deadline looming. If a screen color is in the wrong place in the production line up, especially a special-effects screen, and needs to be moved in the middle of a production run, the entire job may need to be broken down and set up again. Mapping out an effective sampling process greatly minimizes such problems.

## Presses

Advances in automatic-press technology have taken huge steps in recent years. Walking up to any of the newer models feels more like stepping up to a launch pad. The digital control panel is a dominant feature and has grown in size, along with the ability to program many functions directly from the panel rather than having to visit individual printheads to make adjustments or corrections manually. While these developments help in many instances to speed up and streamline the production process, there is one important point to take into consideration: The fundamentals of printing on an automatic screen press haven't changed.

Automatic garment presses still have finite capabilities, and the average printhead size remains about 33 x 25 in., which gives us a maximum screen size of 31 x 23 in. and a maximum print size of 28 x 21 in. There are exceptions. Some automatic presses are designed to accommodate oversized printing, but the dimensions specified above refer to basic models that are used most commonly in garment printing.

You'll always have a clearly defined print area that you cannot alter, regardless of whether you use oversized, conventional, or smaller screens. This is but one of the defined parameters within which the designer must work. Another is the speed at which the machine can run in production, given the type of special-effects design.

The rules that apply to manual screen printing also apply to garment decoration on an automatic press. You still need to set, monitor, and—if neces-



**FIGURE 3 THE ROLE OF THE DRYER**

You can use your dryer to coax a variety of interesting effects from the special formulations you use. Be sure to consult with ink manufacturers to get an idea of how the inks will behave in the dryer you use.

sary—adjust off-contact, squeegee pressure, screen tension, and flood and stroke speed. The big issue is the need to adjust while the machine is in the middle of the production run. Try your best to avoid adjusting the press while a job is on it and keep in mind that adjustments are stoppages. The need to make a serious adjustment may require you to start the job from scratch. A thorough sampling process greatly reduces or eliminates on-press adjustments because the process gives you the chance to dial in press settings ahead of the game. Once again, sampling and investing time in R&D are important contributors to efficient production of special-effects-driven garment screen prints.

Maintenance is obviously an important issue with automatic screen-printing machines, just as it is with any equipment you own. Never underestimate the seriousness of keeping all of the press's channels lubricated and platens leveled. You should level a press's platens no less than once a month, if not weekly. The impossibility of trying to achieve a smooth and even gel print using a 300-micron screen on platens that are not level would quickly become apparent to anyone who tries. Gels don't contain the blowing agents or thickeners common to high-density inks. Like most inks, they lose viscosity during long printing runs due to the buildup of heat and friction. To apply a 300-micron-thick ink film evenly requires that both sides of the image area have the same off-contact setting. This is especially critical when the gel has lost some viscosity.

Uneven platens will make one side of a print look inferior to the other. The image may appear mottled, or it might simply collapse. This rule also applies to high-density inks and other formulations that require the use of thick stencils. Bottom line: Failure to keep your platens level negatively affects off-contact, so it follows that print quality also will suffer.

### Inks

Developments in ink technology are responsible for many of the new formulations introduced to the market in recent years. These inks allow for a much broader range of special effects than ever before. High-density ink is a familiar example, but there are others: gels, thermosetting plastisols, metallics, newer breeds of blowing agents (*Figure 2*), and more versatile water-based inks. These inks make some truly amazing and creative results possible, but they require some knowledge and skill in order to optimize their capabilities and attributes.

Anyone who is serious about becoming proficient in special-effects garment printing should research what's available and how to use the newest formulations. Ensure that the ink company or distributor supplies all of the necessary technical documentation regarding application settings. Ask for printed samples that showcase the inks' capabilities and demonstrate their visual appeal. Most ink companies conduct extensive R&D testing on the products they release, so be sure to take advantage of their knowledge and experience.



**FIGURE 4**

### THE BENEFITS OF ANCILLARY PROCESSES

You can pair up your specialty inks with other decoration processes to produce effects that are tough to imitate. Shown here is the application of a bronze foil on top of a special-effects design.

Paying attention to and documenting how the inks behave in real world situations is a vital part of your success in working with special-effects inks. While extremes of temperature or humidity can affect the performance of any ink, changes in environmental conditions may actually reveal new and fresh ideas for applications. Can you imagine taking printed T-shirts from your reject bin, showing them to the creative director of a chain of major retail fashion outlets, and having those same garments approved for production? It can happen. You just have to keep an eye on how the inks you use behave in different situations. Keeping detailed, accurate records can lead you to profit from what would otherwise be considered a loss.

### Mesh and screens

Choosing a screen mesh for a regular, flat print is usually a straightforward affair, whether you're printing a single-color or multicolor design. You might select a 110-thread/in. mesh for your underbase, 156- to 230-thread/in. mesh for your spot colors with no fine lines—or higher if a softer hand is required—and your halftones on 230- to 355-thread/in. mesh. But choosing screens for special effects requires that a lot of attention be paid to original intent, especially where thick stencils or capillary films are concerned.

How high will you stack your high-density ink? Should the gel print be highly domed and glossy or flatter, like a laminate? Do you require a thick deposit of suede ink, or should it be softer and smoother? These are the questions that

you should ask at the design stage and answer long before you allow the job to go into production on an automatic press. Ideally, you should answer these questions before the job order goes to the screenmaking department, because the parameters you specify determine the mesh and stencil you'll need to use.

Pose the same questions you ask of ink manufacturers to mesh and emulsion manufacturers. The variety of prepress products available, while not typically as extensive as ink, is still quite varied. Emulsions with long shelf and screen life are as common as capillary film and as easy to use. Developments in the manufacturing of emulsion and mesh systems mean that the low-resolution bar set for screen printing is raised, thereby making your ability to hold a smaller, sharper dot much more realistic.

### A word about curing

Proper ink curing is always an important matter, but the ways in which you use your dryer when you work with special-effects prints can dramatically influence the final appearance of your printed garments (*Figure 3*). Screen-printing inks are heat sensitive, but you can put this sensitivity as it applies to special-effects inks, to

good use. Adjustments to dryer temperature influence loft and texture produced by modern blowing agents, the glossy or matte finish of gel inks, and more.

Take note of the differences between electric and gas dryers and what is achievable with either. For example, curing water-based inks or gels in an electric dryer can sometimes be problematic. The main issue here is air flow in the heat chamber of the dryer. Some electric dryers don't have any, and the ones that do often pale in comparison to gas dryers. The point is that water-based inks and gels require longer cure times. The forced hot air in the gas dryer helps to speed this up, especially when water-based inks are concerned. The water must evaporate out of the ink before it can achieve cross-linking, just like plastisol. This process takes longer in electric ovens, which typically lack the forced hot air, thereby adding production time, consuming more energy issues, and introducing the possibility of scorching the printed garments. Again, be sure to quiz the ink manufacturer or distributor about these issues.

### Supplements to special-effects printing

The approach to special-effects printing

on automatic presses really is the same as that of conventional garment screen printing, except that there are more variables in special effects. Paying attention to these variables and then transferring knowledge gained to the designer is the key element.

The wide range of inks and possible applications can be dizzying, but you can learn a lot with some patience and forethought. Making use of the technical information you obtain from practice in production is as valuable as what the manufacturers are able to teach you—oftentimes more so.

Consider adding other types of decorating equipment to the production mix once you get the hang of working with some of these inks. Flocking machines and transfer presses are just a couple of examples of valuable tools that you can use to create amazing effects when paired with special effects-printing (*Figure 4*). Both are a staple in any modern printing facilities. Additions to automatic machines, such as inline foil or flock applicators, are also worth a serious look.

The ability to achieve impressive results in special-effects-based garment printing (*Figure 5*) was once limited to a small percentage of production facilities. That's no longer the case. Improvements in ink technology and press capabilities have opened the field to a much greater number of players. Nowadays, the question isn't whether you can get into special-effects printing—it's a question of when. ■

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**FIGURE 5 THE FINAL PRINT**

This design incorporated a thermosetting plastisol, texturing via crinkled paper on the press's platens, and foil application. This process required thorough sampling and a high curing temperature.



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