Screen Printing 101

Artwork

Though there are many ways to create art, the artist should know some basic information for creating art for screen printing. Some of the questions the artist should ask include:

- What is the substrate? (color? type of garment? material content?)
- What type of print? (process? spot?)
- What size does the art need to be? (child? adult? left-chest?)
- What are the ink opacity requirements? (bright? muted? glossy? matte?)
- Is an underlay needed? (bright ink on darks? specialty inks?)
- What are the registration requirements? (butt? trap? overprint?)
- What are your production capabilities? (auto? manual? number of colors?)

Though most information can be standardized for each shop, some will be influenced by the customer's vision of what he or she wants to achieve with the print.

Art Creation

The three most common forms of art created for screen printing are hand-drawn art, computer-generated art, or art replicated from fine paintings or photographs.

Hand-Drawn Art

Hand-drawn art comes in many forms. An artist can create a keyline (an outline of the design) by drawing it on paper with an opaquing pen, shooting it on a camera, or scanning it into a computer. Art can be created from a hand-drawn keyline provided the image is loaded into a scanning program, converted into paths, and then placed into an art program. With the image in a format that can be manipulated, the artist can clean it up, change its size and position, add text, and place color in selected areas. Another option is to draw directly onto vellum or onto a coated screen. This method is not recommended, but it is effective for simple one-color designs.

Computer-Generated Art

Computer-generated art is conceived and designed on a computer through a variety of design programs. The most common programs in the screen-printing industry are PhotoShop, Illustrator, Freehand, and Corel. Designs created on a computer are then separated with the computer's separation program.

Replications

Replications of fine art or photographs are most successful when they are shot with a digital camera or scanned into a computer. The artist can then utilize an advanced color separator program on the computer. The artist also can separate replications by hand through a series of hand-cut overlays.

Art Separations

After creation, art must be converted into final separations. The goal of art separation is to create individual films, either acetate or vellum, in which the print areas block UV light rays and the negative areas allow UV light to pass through. The most frequently used methods involve separating by hand, camera, and computer.

Hand Separations

An artist can achieve hand separations in several ways.

Hand-cut positives are created by cutting photomasking film, or rubylith, into the shapes or letters needed. Then the artist peels away the negative unwanted portion, leaving rubylith in the areas to be printed.

Overlays are color separations created by the use of acetate or rubylith overlaid on a keyline to create positives. By cutting, drawing, applying adhesive dot patterns, and using acetate or burnishing letters, the artist can build each color (as well as additional colors with dot pattern overlays).

Hand-drawn separations are created by tracing the design directly onto the acetate or vellum. Starting with a keyline of the design, the artist overlays each color one at a time and traces until all of the separations are completed.

Camera Separations

Camera separations are created by the use of a camera or other exposing equipment, such as a contact frame, to create acetate positives. An artist may use the camera to shoot separations from a laser jet printer or a hand-drawn keyline, as mentioned earlier. An acetate keyline from the camera then could be used as the basis for the hand-cut separation, utilizing rubylith (as mentioned earlier) to achieve the trap method of printing. The trap method is simply when colors slightly overlap where they meet on a design. Using basically the same method, instead of peeling off the negative areas after cutting the rubylith, the artist peels off the positive areas, leaving the print areas clear. The artist then takes this overlay (still attached to the keyline), and exposes it to reversal film on the contact frame. The end result is a perfect butt registration (or perfect dropout) of the separated color.

An artist also can utilize the camera to create "user-friendly" separations for the production department. Choking a color means that the artist produces a slightly smaller color separation, as if there is a hairline space between the separation and its adjacent color. Choking allows easier registration of overlay colors (if the choked color is a white underlay) and helps prevent colors from bleeding into each other by creating a slight barrier of fabric. To choke a color, simply place acetate sheets between the art and the film. The light will naturally expose inside the edges, creating a slightly smaller image on the film. To create a white underlay, an artist can register the film separations together on a contact frame and expose them onto duplicate film. This method automatically chokes the plate. This method is also useful in creating transfers because it is critical to butt-register all transfer colors.

Computer Separations

Computer separations usually are rendered from art created in a computer graphics program. Other art can be separated with the use of a computer, but first it must be scanned or converted digitally before it can be manipulated in a graphics program. Although there are many separation programs and drawing programs with separation options, they all must reach a common end.

A piece of art created in a vector program is separated easily because the color usage is controlled during the creation of the art. The program will render separations per color and will print out exactly what the artist needs.

Fine art or photographs can be separated by computer provided the artist has access to a large-format scanner, a drum scanner, or a digital camera. (If the art department doesn't own any equipment, a service bureau can be paid to scan these images.) For best results, the image should be scanned at about 300 dpi in an RGB mode and saved as a TIFF file. Once the piece of art is converted digitally, it can then be introduced into the design program (in this case, preferably a program that can manipulate full-color scanned images, like PhotoShop). When a design is in this type of program, it can render process separations, or areas of color can be selected to create individual channels for each color, producing spot plates. The use of PhotoShop plug-ins can decrease time spent creating spot-color channels. Many of these plug-ins use a predetermined ink color set, which enables the finished product to closely resemble the original design.

To calculate line counts for halftone screens, simply divide the mesh count by four. The result will equal the highest line count that should be used. The artist must have an understanding of mesh counts and their effect on the press. For instance, when a fade is needed in a design, the artist may be tempted to put it in a high mesh. However, if that same color also consists of large, open print areas, the printer will require a mesh in a lower count. In this instance, the artist should calculate the halftone line based on the lower mesh. To determine the best resolution for a design, multiply line count by 2.5. Example: 55 lines = 137.5 resolution. This should prevent the program from producing undersized dots in the lower-percentage halftone areas.

When the design is ready to be separated, it may be printed directly from the program, or you may split the channels to create individual files to be printed later. The program creates individual files for each color, giving the artist the option to go back and change a color individually if the print performance is not satisfactory. It is important to label each color and to make sure that each piece of film is complete with registration marks. Most programs offer these options on the separation screen, but some programs require the artist to incorporate the color names and registration marks with his or her designs. The artist must type each color name in its own color and color the registration marks with the "registration" color option.

Image output refers to the method in which a computer prints art or separations. One way of printing separations is on a laser jet printer. An artist may choose to print out directly on vellum, which exposes well, or on paper, which is then shot by a camera to render the films. In addition to laser jet printers, an image setter may be used to output separations. This equipment enables the artist to print out his or her art directly onto film (and can totally replace a darkroom).

It is a good idea to have a color "mock-up" of the design to accompany the separations to production. This ensures that everyone from the screen room through packing are on the same page.

Artists must understand the limits and advantages of screen printing. They must react to the needs of the customer as well as those of the production department. The bottom line is achieving communication between the departments to ensure a predictable, repeatable product.