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TECH TIPS
A SPECIAL EDITION OF THE *IMPRESSIONS* NEWSLETTER
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# Printing on Finer Thread-Count Blends

## Best practices for screen printing on poly/rayon blends.

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Sponsored by ANVIL®

As the garment manufacturing industry continues to produce new and exciting apparel with a seemingly never-ending combination of fabric compositions, it is left to the apparel embellishment industry to develop the best practices to print these new fabric combinations.

In this installment of the *Impressions* Tech Tips Newsletter, we will be working with the ANVIL® 32PVL Women's Freedom Tank, made of 65% polyester/35% rayon. The challenge posed here to the textile screen printer is the polyester/rayon fabric and how to properly print, flash and cure this super lightweight blend.

ANVIL ® Freedom Tees offer the right mix for a super comfortable loose fit and an easy wear, wrinkle-free look. Made from 65% polyester and 35% rayon, these tees offer a high stitch density for a smooth printing surface. Available in three styles with sizes LXS - L3XL and seven fashion colors.

## FABRIC COMPOSITION

The 32PVL Women's Freedom Tank is a 4.0-ounce, 32/1 fabric, which gives it a particularly smooth finish to print on. With this particular knit construction, the printer can minimize the ink-film thickness, which brings additional benefits to the process. These include:

- A softer hand once printed
- Minimized ink consumption
- Faster flash times

In addition to the flat and smooth printing surface, the 32PVL offers a minimal amount of fabric surface fiber hair, which typically offers coverage issues depending on the inks being used. This helps minimize the potential for fibrillation, which is the term for the tiny fibers that stick up through the print.

The fabric's composition of 65/35 polyester/rayon offers a couple of different advantages. The

65% polyester component of the fabric gives a smooth, soft garment that holds and retains its shape. The 35% rayon component provides the fabric a good elongation and consistent fit. On this point, I will be addressing the challenges that rayon brings from the standpoint of heat sensitivity. It's important to engineer the process to minimize that aspect of it during printing and flashing.


## THE ART & SCREENS

In this printing scenario, I will be printing a four-color graphic with an underbase for a total of five screens. The graphic is a 50-line halftone and I will be printing the graphic in the following sequence:

1. White
2. Flash
3. PMS 102 Yellow
4. PMS 246 Purple
5. PMS 354 Green
6. Flash
7. Black

Since the garments I am printing are a medium shade, I can minimize the ink film as opacity will not be a major concern.

There are no limitations as to the graphic media that can be used on the Anvil 32PVL Women's Freedom Tank, save the fact that this is a lightweight fabric. So use graphics that will allow for reproduction of the graphic with minimal ink films and a soft-hand print.

As mentioned in the above, I will strive to reproduce this graphic with the thinnest ink films possible. Once again, I will print this graphic with a combination of thin thread (S) and standard thread (T) meshes.

The screens are shot on the following mesh counts:

- Underbase White is shot on a 225 / 40µ S mesh at 25N/cm²
- The PMS 102 Yellow is shot on a 305/40µ T Mesh at 25 N/cm ²
- The PMS 246 Purple is shot on a 330/30µ S Mesh at 25 N/cm ²
- The PMS 354 Green is shot on a 330/30µ Mesh at 25 N/cm ²
- The Black is shot on a 305/40µ T Mesh at 25 N/cm ²

The use of the thicker T-thread screens on the yellow and black was to print a slightly heavier ink film of yellow to act as a base for the overlay colors. Also, it will enhance the black, which simply is acting as an accent color.

The key screen here is the 225/40µ S mesh (thin thread) that is used on the white underbase screen. Using the thin thread mesh in conjunction with a sheer, sensitive, bleed-resistant ink allows for a thin, soft underbase print.

## THE INKS

The inks are the primary key in regard to printing on a 65/35 poly/rayon garment. The inks are from Synergy Inks, and are low-shear plastisols. They flash at a very low temperature and have no after-flash tack. Here are some characteristics of an appropriate ink to use:

- Fast-flashing characteristics (underbase): Keeping in mind that I am working with a 100% synthetic fabric, I will flash with as little heat as possible.
- Minimal (no) after-flash tack: Using white ink with a minimal amount of after-flash tack only will maximize your productivity and reduce your potential for post-flash printing errors.
- Excellent printability: Look for inks that have a high shear sensitivity that allows for maximum squeegee speeds and higher productivity.
- Excellent opacity: This allows for a thin ink film thickness and soft hand on lightweight fabrics such as these.
- Excellent bleed resistance.

- Low curing points: This allows us to minimize the heat exposure to the fabric.

Again, the key here lies in the underbase white, which meets the above criteria allowing me to print a soft, bleed-resistant ink film while maintaining opacity and the desired flashing characteristics.

## FLASHING CONSIDERATIONS

When working with any synthetic fabric, another primary key to success is the controlling the heat that the fabric is exposed to. Any printer that has worked with tri-blend fabrics understands the need to control heat exposure to a fabric's surface.

In this scenario, I am flashing with a fused quartz flash unit where I will be using a minimal amount of heat to achieve my goals. One of the primary control points is to preheat the pallets to 100˚ to 110˚F.

Preheating the pallets allows me to expose the ink film to the heat from the platens as well as the flash unit. This, in turn, allows me to decrease the output of the flash unit and minimize the heat exposure to the fabric. It also lessens the potential for any scorching to take place. Although the press used for this demonstration was equipped with a non-contact pyrometer designed to control platen temperature, you can achieve the same results with a hand-held unit that is sold through screen-print suppliers.

The flash time for this print is set at 1.5 seconds with a preheating of the platens to 100˚ to 110˚F prior to the shirt printing. The quartz elements are 2 inches away from the fabric/ink-film surface. These settings bring the substrate/ink-film surface up to 280˚F in 1.5 seconds. This allows for the maximizing the productivity while minimizing the heat exposure to the fabric. A water-based platen adhesive is applied to the platens prior to production.

## SQUEEGEE SELECTION

On this print, I will be running with 70/90/70 triple durometer squeegees on all screens. The 70-durometer edge of the squeegee conforms to the surface of the mesh allowing for a smooth and even ink film deposit. The 90-durometer center of the blade prevents the blade from rolling over and depositing an excessive ink film thickness. All squeegees are sharp since I am printing with fine screen mesh counts on all screens. The squeegee pressure is minimized at 45 P.S.I., allowing only for the transfer of ink onto the garment's surface while leaving no residual ink film on the ink side of the screen. The squeegee speeds are maximized based on the sheer rates of the respective ink colors.

## CURING

I used a gas-fired dryer with the temperature output set to 320˚F in a 12-foot gas heat chamber with a 15-feet-per-minute belt speed. The dryer's temperature control ensures the inks receive the temperature required to properly cure the ink film while not overheating the fabric surface.

Again, it is helpful to use a pyrometer to ensure that the ink film does reach the required fusion temperature for the ink you may be using.

The key to successfully printing on a fine blended fabric such as the ANVIL® 32PVL 65/35 poly/rayon Women's Freedom Tank is to ensure that you address the variables that require control to provide successful results. This includes all supplies used in the process and the proper controlling of the heat to which the fabric is exposed.

*The author would like to thank Evolutionary Screen Printing, (Lakeland, Florida), for the use of its facility and supplies in the production of this article.*

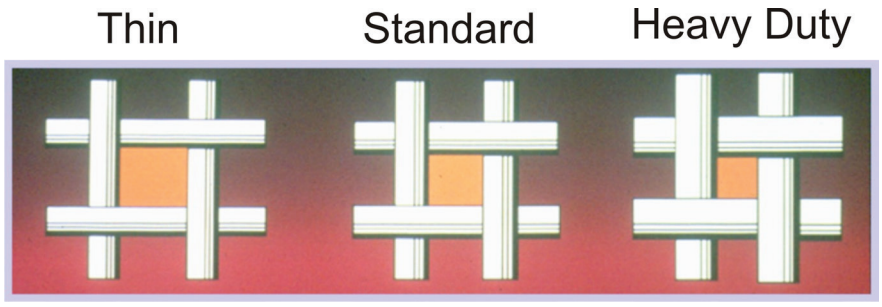
## STEP-BY-STEP

STEP 1 ANVIL's® 32PVL Women's Freedom Tank is excellent for screen printing on this fashion fabric basic.

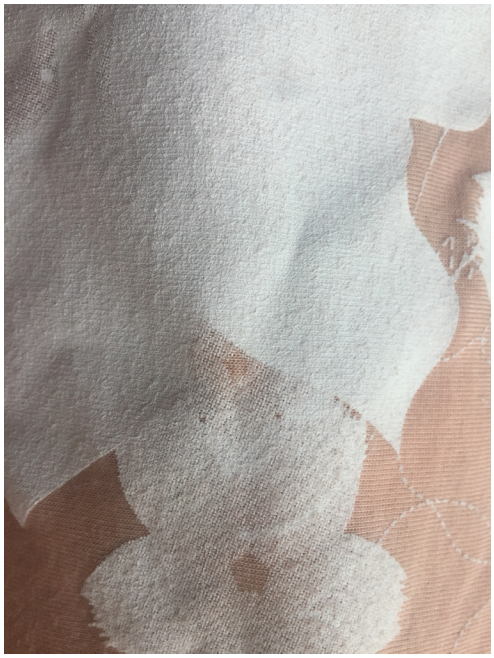
## STEP-BY-STEP:

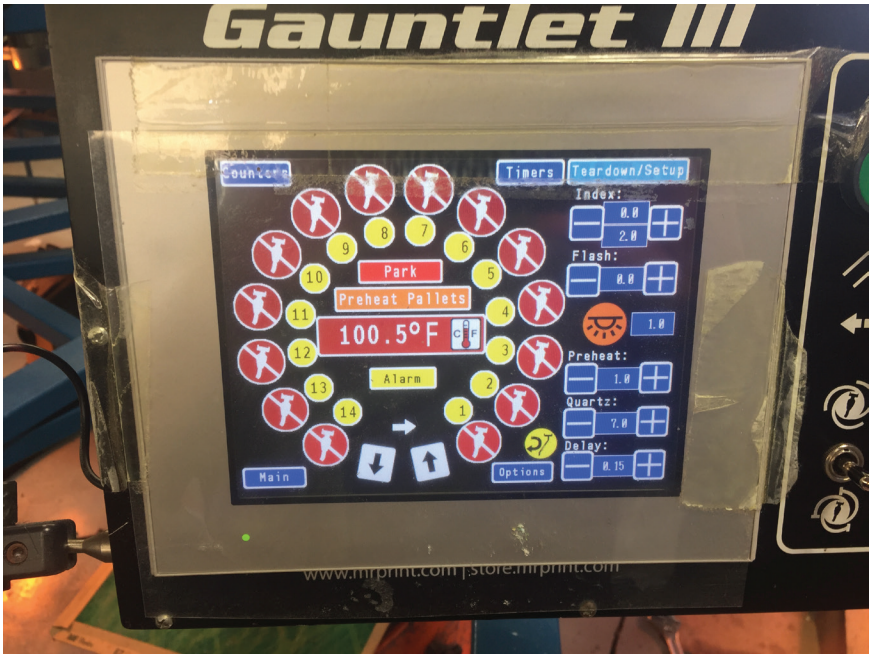
STEP 2 The exceptionally smooth surface of the fabric allows for thinner ink films and a softer print.

STEP 3 This shows the graphic laid out at 16.7% of the background shade of the garment.


STEP 4 Here, notice the difference in thread thickness and percentage in open areas between the three different thread variations.

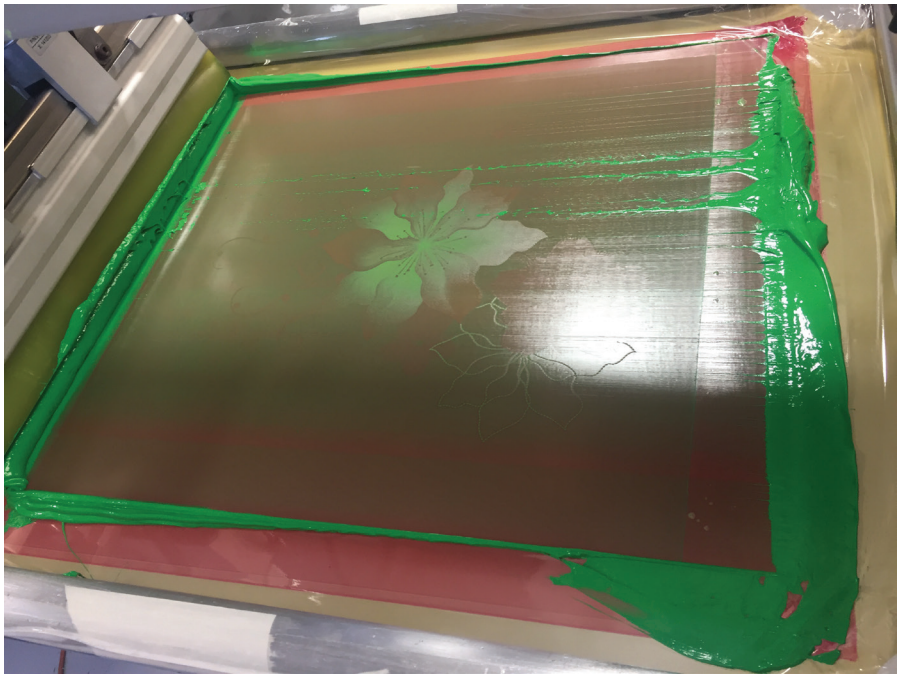





STEP 5 This image shows the opaque base print in conjunction with the accurate halftone reproduction.

STEP 6 Here is the preheat sequence on the press allowing me to preheat the pallets to 100˚ to 110˚F prior to printing.

## STEP-BY-STEP:



STEP 7

Here, you see optimized printing conditions with the squeegee designed to minimize the ink film deposit onto the fabric's surface.

STEP 8

The finished print, cured at 280˚F on an M&R Sprint 3000 dryer.

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