Impressions TECH TIPS
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Getting the Best Print on a 50/50 Blended Shirt

Screen printing on 50/50 garments is no hassle as long as you are using the right inks and watching your curing temperatures closely.

By Dan Corcoran, Contributing Writer

The JERZEES® Heavyweight Blend T-Shirt (style 29MR) is constructed of 5.6-ounce, 50/50 cotton/polyester pre-shrunk jersey. Construction details include a seamless body with set-in sleeves, 1x1 seamless ribbed crew neck collar, two-needle coverstitched front neck, taped shoulder-to-shoulder, and two-needle hemmed sleeves and bottom. The Heavyweight Blend Collection offers five styles in up to 27 colors in youth sizes 2/4 through adult 5XL.

The two most popular T-shirt fabrics in the decorated apparel industry are 100% cotton and 50% cotton/50% polyester. As a commercial screen printer, you should know how to print on both. Although our shop specializes in water-based printing on 100% cotton, we get plenty of clients who request 50/50 blends, which means printing with plastisol inks because water-based inks only work on cotton.

Blended fabrics offer some advantages over pure cotton. In general, they have a lighter feel, which appeals to customers in certain climates. The polyester content reduces fibrillation, which can cause a print to look faded because of the little cotton fibers that stick up through the ink. This means you also get better ink coverage with 50/50 shirts.

The global cotton shortage and corresponding rise in cotton prices also have given 50/50 T-shirts a greater price advantage than before. Although 100% cotton has been more popular, we need to be prepared for the possibility of blended garments surpassing 100% cotton as the most popular T-shirt fabric.

When printing on blended fabrics, the brand of garment you use definitely matters. All manufacturers do not adhere to the same quality-control standards, and not every polyester dye is created equally. Dye migration — where the fabric dye bleeds into white screen printed plastisol ink — is one issue than can occur.

The key to successfully printing on 50/50 shirts is constant testing and recording the differences in the variables that can work against you to muck up a beautiful print job.

For the sake of this article, we've chosen a popular design from a preprint line offered by David Murray, a self-taught illustrator who loves comic books. His website, seibei.com, offers a new design each week. Topics include eating,

is the newest employee at our shop.

SELLING 50/50

Many of our clients already know the garment type onto which they want their design printed. Regardless, I always like to educate them about the pros and cons of different shirts to make sure they've made the best decision.

For example, if the design involves a solid block of ink, a 50/50 fabric will have less tendency toward fibrillation, so the design will not look worn or faded immediately after printing.

The polyester fibers also can give the garment a softer, more sheer feel, in addition to offering increased wrinkle resistance. This may appeal to customers who consider cotton jersey too "rough." Lastly, polyester is known for its greater color durability, so clients interested in maintaining the color of their garments after repeated washings should consider blended garments.

PRODUCTION CONSIDERATIONS

When it comes to printing 50/50 garments, we focus on two areas to get the best possible print: dye migration and garment quality.

Dye migration occurs when polyester fibers are heated to the point that they start to release some of their dye in gaseous form. This colored gas migrates or bleeds into the ink deposit, thus leaving your beautiful, bright white print with the same tint as the garment color. A common example of this is to print white ink on a red shirt. If the dryer is too hot, you probably will end up with a pink print.

Dye migration is the No. 1 source of quality problems when printing on blends, so you need to get a handle on this before starting a production run. Also, beware that migration may not show up until a few days after printing, so do your testing ahead of time. Excess heat is your enemy, but we have a few suggestions to help combat this situation.

• **Use a low-bleed underbase ink.** We've seen experienced printers use a number of different setups to avoid dye migration, and it all starts with the underbase. We use a low-bleed white plastisol ink for the underbase on blended garments. Low-bleed inks have additives that help to resist the polyester dyes from sublimating into the ink. We've seen white, gray and clear versions of this "first-down" underlay ink.

Due to the additives, this ink is a bit tougher to print than a typical 100% cotton white ink. It is thick and should be vigorously mixed beforehand to loosen it up and make it easier to push through the screen.

Some manufacturers also offer a poly-blocking ink made for printing on 100% polyester garments. This ink is tougher to print than the low-bleed alternatives, but gives increased protection against dye migration. There also are additives (like the catalyst used for printing on nylon) that help to chemically bond the ink to the garment, thus allowing you to cure at lower temperatures while still achieving a wash-fast print.

• **Temperature control.** Finding the perfect temperature when curing blended fabric can be a balancing act. The ink must come up to the proper cure temperature so that it does not come off in the wash, but at the same time you need to ensure that the garment does not heat up so much that the polyester fibers release their dyes. This critical temperature generally happens around 300˚F, which also is close to the temperature that plastisol inks cure.

We use a low-bleed white ink that requires a cure temperature of 325˚F. It's best to cure the ink with the least possible time in the dryer and as close to 325˚F as possible since this is in the same range as the polyester dye sublimation temperature. In our shop, a 50/50 garment will spend about 1 minute in the dryer chamber. During this minute, the ink temperature is at full-cure temperature for less than 20 seconds. With careful management of dryer temperature, we avoid dye migration on quality garments.

STEP 4

Print the underbase, tinkering with squeegee speed, angle and pressure until you have a smooth, bright deposit of ink.

STEP 5

Flash the underbase to get a gel cure, being careful not to overcook the ink since you want to control the amount of heat the garment receives.

STEP 6

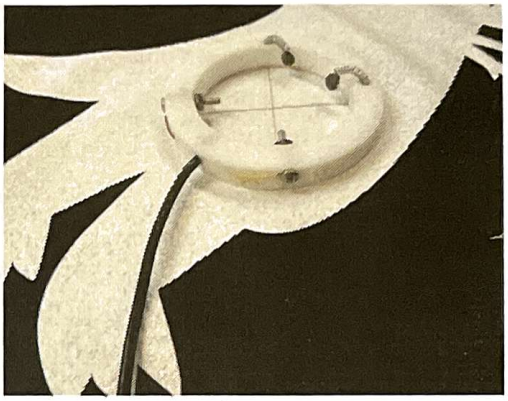
Check the flashed underbase. If ink comes off on your finger, you will need to increase the time and/or temperature of your flash unit.

STEP 7

Print the top colors as you would on any other plastisol print.

STEP 8

Make sure you have the right tools to determine your dryer temperature. An ideal tool for testing is a donut probe. (Thanks to Johnny Shell @ SGIA for letting us borrow his Atkins donut probe.)



STEP 9

Place the probe sensor directly into the ink film to be measured and send the print through the dryer, watching the temperature readings in real time.

STEP 10

Make sure that the person manning the end of the dryer periodically does spot checks on the ink temperatures.

STEP 11

Here's why testing is important: If you have applied too much heat in the dryer or on press, the dyes in the fabric will migrate into the ink, giving a pinkish tint on this red garment.

STEP 12

Once you have assessed accurate drying temperatures and have everything dialed in, get to printing and wow your client!

Dan Corcoran is the co-owner of Forward Printing, Oakland, Calif. The award-winning screen printing shop has seven

dryer temperatures. We've used heat-sensitive strips that you tape onto the garment, infrared heat guns and even a baking thermometer with an alarm to tell us when the temperature exceeds a given range. These options give you an idea of the cure temp, but are not exact and do not reveal what is happening deep in the middle of the dryer chamber.

For maximum accuracy, a screen printer doing jobs on a lot of blended fabric should consider purchasing a donut probe. This device is comprised of a ceramic ring with two sensor wires crossing the ring. You place the wires directly into the ink film to be measured and then send the print through the dryer.

There is a long cord running from the sensor back to a digital temperature readout. This probe will give you real-time readings of the temperature at the actual ink layer, allowing you to tinker with your dryer settings to get a good cure with no dye migration. And remember, test and retest until you get it right.

• **The garment.** Not all T-shirts are created equal, and it seems that some inferior polyester yarns release their dyes at lower temperatures than others. In selecting a preferred blended garment, test it by printing white ink on it and then overcuring it to gauge how much dye migration may occur. It's also a plus to choose a garment made with a fine gauge yarn and tight stitch density to

Now, on to the details of the featured project, which is being printed on JERZEES® Heavyweight Blend T-Shirts (style 29MR).

The films were output on an inkjet transparency printer. We used a 150 LX mesh screen for the underbase and 180 LX mesh screens for the two top coats. If we were printing darker top colors like blues or reds, we would have chosen 230 mesh screens for the top colors. All screens were coated with a SBQ photopolymer emulsion with a single coat on each side. All of our screens are tensioned to manufacturer recommendations, giving us a consistent, smooth coverage for the crucial underbase plate.

The press was set up with the underbase screen first in the print order. We flashed the low-bleed white underbase and then followed it with a few empty print stations to let it cool down. We preheat our pallets before the production run to speed up flash times; otherwise, the pallets will pull heat from the garment. The flash time was 3.5 seconds to start, although you can incrementally drop this down as the run proceeds and the heat on press stabilizes.

After the shirt came back around the press, we sent it through the dryer for about 60 seconds at 300˚F to 320˚F to reach a full cure. The person catching the garments at the end of the dryer will periodically spot check the temperatures of the prints with an infrared heat gun to catch any potential temperature variances.

STEP-BY-STEP TO VIEW A SHORT VIDEO ON THE PROCESS FOR PRINTING ON 50/50 BLENDED FABRICS DETAILED IN THIS NEWSLETTER, PLEASE CLICK HERE.

STEP 1 We need properly tensioned screens to get adequate coverage for our underbase. *All photos courtesy of Forward Printing, Oakland, Calif.*

STEP 2 Pallets are preheated to help stabilize heat on press and reduce flash times.

STEP 3 Be sure to use a high-quality, opaque low-bleed white ink for the underbase.