

# How to Achieve Quality Digital Prints on Dark Shirts

Controlling a variety of factors, including pretreatment, humidity and curing, can help you achieve top results when digitally printing on this troublesome medium.



**ONE OF BLUE** Heron's secrets for achieving such high quality on darks is using an external RIP. Each file is prepped according to the nature of the art. Files that contain fades and feathers will receive different attention than a file that is essentially a square block. *All images courtesy of Blue Heron Industries, Little Falls, N.J.*

As a screen printer first venturing into digital direct-to-garment printing a few years ago, my biggest niche was entertainment — a market that prefers black shirts. I purchased my first digital printer in 2007 as a way of capturing business that I previously had to reject because I consistently received poor-quality artwork. I once turned down 25 screen printing jobs in a week because the artwork was not ready to be separated.

With a digital printer, I could convert poor-quality art into a usable format. With an estimated 90% of my jobs produced on dark-colored shirts, I had to learn how to get the best digitally printed results on this

medium. Consequently, I have built a reputation as being the “King of Digital Darks.”

## **COLOR ACCURACY**

One of the biggest challenges I have dealt with during the past four years when digitally printing on darks is color accuracy.

The quality of the white underbase is a big part of achieving color accuracy on darks, but the most important factor is the translation between the art file and the digital printer. In our shop, all of our equipment has been linearized to maximize reproduction possibilities. The art computers running Adobe Photoshop files have been calibrated to our printing machines and

vice versa. When we print solid Pantone colors, we use a few of our own tricks for translating these colors to CMYK.

One of the fallacies of digital printing — when compared to screen printing — is that you can't match color. A lot of people don't understand that digital printing involves using a CMYK file that is being viewed through an RGB color spectrum.

Experience and detailed records are the key to accurate reproduction. All of our files are prepped using an external raster image processor (RIP). We prepare each file according to the nature of the art. Files that contain fades and feathers will receive different attention compared to a



ONE OF THE fallacies of digital printing vs. screen printing is that you can't match color, and this is untrue. At Blue Heron, we consistently come close to matching Pantone colors.

file that essentially is a square block.

If you use a Windows-based driver system, you don't have the same control as you do with external RIP. Our printing methods require that we have total control over the finished product.

You always will have color issues to solve when using direct-to-garment printing. No two monitors present exactly the same visual reference. So having good Photoshop files with layers and transparent backgrounds will enable you to capture the color profile that the artist placed in the file.

CMYK color adjustments as small as 1% to 2%, combined with our linearizations, can make a huge difference in the final print. Our Kornit machines and proprietary techniques enable us to control color quite accurately. Not all digital printing equipment gives you the ability to control the parameters that affect the color. Because of the way data is reduced and color is averaged during conversion, .jpg and .gif files don't have all the data of an original Photoshop file.

Environmental conditions also dramatically affect color and print quality. We constantly fight heat and humidity, and often see temperatures of 100°F in the production area during the summer months. In the winter, humidity can fall as low as 25%.

This requires constant monitoring. Ideally, the temperature should be 70°F to 85°F with humidity in the 50% range. We print with water-based inks, so we are particularly concerned about the atmospheric conditions in the shop. We have systems in place to help alleviate some of these challenges.

The consistency of the pretreatment application also can affect color. The direct-to-garment printers we use feature technology that allows on-board treatment, which enables 100% consistency when compared to independent pretreatment. Too much or too little pretreatment solution will kill your color accuracy, regardless of the machine brand. While no apparel decorator indicates in their terms and conditions that all Pantone colors will be exact in digital printing, the standard is to come as close as possible. That is how we operate, and we hit it pretty darn close.

Unless a garment will be printed on a white shirt, we rip all of our files to print for black. If we are in the darker shades of light, we can choose to sometimes put down a very low percentage of underbase to bump color up or take color down. Sometimes we alter a color by using the underbase to mute or highlight it. It is similar to any kind of process printing, so your color range is limited to the CMYK



TO MAXIMIZE PRODUCTIVITY, Blue Heron uses a return-feed dryer, which allows the same operator to load and unload from the same spot. The dryer has 10 feet of heat and 28 total feet of belt.



WITH THE USE of the return-feed dryer, the same operator who has loaded and unloaded shirts also can fold and pack them.

gamut. By adjusting underbase characteristics on the fly, we can affect the overall outcome on the machine

Creating the right underbase plays a big role in a digital print's quality. We actually separate our digital printing files like screen printing files. Although many digital printing programs are designed for plug and play, you must master Photoshop if you want to be proficient at digital printing on darks.

## CURING CHALLENGES

I see a lot of apparel decorators who print digitally struggle with proper curing. Some say they can't get an image to stay on the shirt, meaning that once a customer runs the shirt through a washing machine, the image disappears.

Over-curing also is a problem. Depending on your machine model, this can



**THE QUALITY OF** the white underbase is a big part of achieving color accuracy on darks. The secret is synchronizing the art computers to the printer.



**ONE OF BLUE** Heron's biggest niches is entertainment, which predominantly orders dark shirts. About 90% of all orders are on darks.

burn out the color. Over-curing in digital printing is similar to over-curing in screen printing. Once the ink hits a preset temperature and the molecular reactions that create a solid cure have occurred, additional heat can be detrimental. In screen printing, wash-fastness is compromised. In digital printing, water-based ink color will appear washed out and faded. Digital printers using heat presses can experience the same problems. We cure with gas-fired ovens using the same manner in which we cure screen printed shirts. The philosophy of time and temperature also applies to digital printing.

Because dark shirts require layers of pretreatment, white underbase and then the colors, they take longer to cure than white T-shirts that are digitally or screen printed. The ink amount used depends on how the design is set up and how the un-

derbase is created.

Another factor is if the artist has taken advantage of using the substrate color in the same way a shirt is designed for simulated process screen printing. If an order contains multiple shirt colors for the same design, there may be more than one production file that will be used to create a uniform look across the entire color palette. In many applications you are doing double whites depending on a dual underbase, and you can control that ink usage to a degree by manipulating the opacity of the underbase and highlight whites.

With our machine, we can print highlight whites so that we can sometimes reduce the opacity of our white underbase and ramp up the density of the highlight whites. However, in general, a dark design is going to use 40% to 50% more ink. Consequently, it costs about 65% more to

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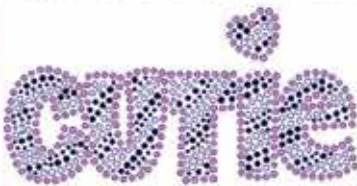


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**TO BE SUCCESSFUL**  
at digital direct-to-garment  
printing — particularly on  
dark T-shirts — invest a  
lot of time in research and  
development.



print dark vs. light colors. Dark shirts typically take between five and seven minutes to cure at 325°F. White T-shirts usually can be cured in half that time.

#### RETURN-FEED DRYER INCREASES OUTPUT

Using a return-feed dryer has allowed us to increase our curing productivity. It has a two-level belt. Operators place uncured shirts on the top belt and cured shirts return on the bottom belt. The dryer includes 10 feet of heat and 28 total feet of belt.

The purpose of the return-feed dryer is that your digital operator is unpacking, printing, retrieving and boxing his own goods. With digital printing, operators have time to do other things while they are waiting. It is not like a screen printing pallet is indexing every two seconds. So you shouldn't see shirts sitting on a table; they should be in a box.

With our equipment, I feel the hand of a digital print on darks is similar to a process screen print. One factor that contributes to that is using a gas dryer. We do not own heat presses because curing a digital print using that method gives it the glossy look of a transfer. Our digital prints have a matte finish and a soft, but perceptible, hand.

An advantage of specializing in digital printing on darks is we don't have to compete with screen printing. Because digital printing is still relatively new, there are competency and consistency issues. My shop's advantage is that we are printing on darks every day. We have learned how to manage the variables. Our repeat order rate is extremely high with retailers.

I have found that for small orders, digital printing is extremely profitable. On medium-sized orders, it still is a lot more profitable than screen printing. Bigger or-

ders require evaluating the production/time equation. At that point, profitability declines significantly and is more in line with standard screen printing when viewed from a percentage perspective. There is no magic formula to get rich doing digital printing.

If you want to be successful at digital printing, invest a lot of time in research and development. This was our biggest expense in setting up our digital operation, as we printed cases and cases of shirts to learn what worked. ▲

*Kevin Kelly has been involved in decorated apparel for more than 34 years. He opened his current business, Blue Heron Industries Inc., in Little Falls, N.J., in 2002. Blue Heron offers volume screen printing, embroidery and direct-to-garment services. Since 2007, he has established a reputation for quality direct-to-garment printing on dark T-shirts. For more information or to comment on this article, e-mail Kevin at [kkelly@goblueheron.com](mailto:kkelly@goblueheron.com) or visit [goblueheron.com](http://goblueheron.com).*