



Discharge pigmentation on different colored substrates.

Water-Based Basics Are Only the Beginning

With a solid foundation, water-based inks can open new possibilities for profit.

While in no way a new technology, water-based inks have had a large resurgence in the past few years. New inks, better formulas, being even more user-friendly and intriguing special effects have led to more printers experimenting with them and achieving successful results. Most importantly, they're able to maintain consistent, quality prints.

Success depends on choosing the correct products and understanding the basics of printing as much it does the mindset of the shop and printers within it. It can be uncomfortable for printers who have mastered one type of ink to step into the unknown. Make the transition palatable for everyone by educating yourself and staff and maintaining good communication about change in procedure and technique.

When Sunday Cool, a shop in the Orlando, Fla., area decided to switch to water-based printing, it wasn't an easy transition. They're now successfully printing 90% water-based while

significantly increasing their business year after year. "As a company, a decision was made four years ago that this was the 'new' wave of printing, and we needed to figure out how to produce. There were mixed reviews across the board, but we realized that it was a premium product that our customer base had never seen nor felt. So we jumped in head first. It was no easy transition, a lot of trial and error on every basis from purchasing to prepress to quality control and everything in between. We were determined, though, to figure this out. We did, and have not looked back since," said Taylor Hooper, Operations Manager, Sunday Cool.

There has been even more demand to have the softer hand on ever-changing substrates, and water-based printing excels at helping to achieve this. Dependent on the garment type, discharge achieves fantastic results. Dye sublimation and special effects printing have been an ongoing hot trend and there is more

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By Tiffany Rader-Spitzer, Operations and Technical Product Manager, Roeder Industries



Scrutinizing simulated process prints at Impressionz Printing.

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to offer than ever before to print on or incorporate multi-media methods in one design. Some of the trends I have seen that have made successful water-based printers include topics outside of just ink. Understanding the basics and continuing research and development has been a great stepping stone to ensure great prints and less damages, therefore more profitability when printing in general, but especially with water-based.

Understanding the Basics Leads to Success

Whether you're printing with water-based (discharge or acrylics) for the first time, trying it again after many unsuccessful attempts, or have been printing successfully, building and expanding your foundational knowledge of what is required and recommended is the most important part. Water-based printing is not difficult, however, it is critical to understand how to treat certain aspects of prepress and production, so you don't end up with screen breakdown or clogged image areas, a couple of the risks when beginning with water-based.

A few other considerations to keep in mind before jumping in:

Emulsion: Using the right emulsion correctly improves image quality and ensures stencil readiness. Not all emulsions are made to print water-based. That's not to say they can't do it, but it might be necessary to add a hardener, post expose or both.

Mesh Count and Squeegee Durometer: Choose the right options

for better prints with crisp edges and appropriate laydown. If you're printing an ink that calls for a 160/60 mesh, and you're printing it through a 110/80, it's likely that you'll have problems further down the rotation.

Exposure: Get your times down so you are imaging correctly to reduce breakdown on press. Many screen printers underexpose their stencil, and this will cause issues when printing with water-based ink.

Garment Selection: The fabric content, and how it's dyed and manufactured, will determine what water-based products are applicable and how they will react with the fabric.

I've seen a recent increase in enthusiasm for education and wanting to understand more. Maintaining and expanding the knowledge base on the hows and whys and whens of printing is leading to a significantly better base of printers.

Research and Development

Research and development (R&D) is an important part of the process and shouldn't be overlooked. Keeping an eye on what's new and knowing how to successfully print it will get you the best jobs and allow you to charge the most and have the most success on press.

"R&D is fundamental to stay above the curve and staying in demand. Being driven to stay on top supersedes those around you. Pushing yourself by trying new, better and/or more difficult techniques makes you better than the rest and increases your print ability,"



Top: Image without (left) and with underbase.
Bottom: Dye sub blocker test print.



Matsui Special Effects (clockwise from top left): Pearl Binder, Gold Shimmer, HO Crack Base, Simulated Silicone, Phantom Clear (appears when wet).

said Andy Torres, Operations Manager, Impressionz Printing, Orlando, Fla. Andy regularly conducts R&D, always pushing the envelope and perfecting technique to ensure that the best prints come out of Impressionz.

Spending more time with R&D will save headaches during production. Figuring out how an ink behaves and what the shortcomings and strengths are before production starts keeps the press running. When the rubber meets the road in production, you'll already have the expertise to overcome any obstacles with plenty of solutions lined up.

Soft Hand and Discharge

Discharge is the easiest way to get prints with soft hand, which is probably the most requested characteristic in apparel screen printing. Because discharge alters the pigmentation of the garment, the hand/feel is virtually nonexistent after washing and is used as a major customer selling point.

Discharge underbases are gaining in popularity as a stepping stone to printing water-based. They allow plastisol printers to discharge just the underbase and still print plastisol for the remainder of the colors. With the discharge, you're effectively printing directly onto the garment while still maintaining color values, allowing a softer, cleaner print. Discharge underbasing can be a great learning tool and process for anyone trying to get into water-based printing. You are printing the remainder of the screens as you normally would, so the only

new technique will be on one screen, the underbase.

Discharge is type of water-based ink. By adding an oxidizing and reducing agent, typically zinc formaldehyde-sulfoxylate (ZFS)-based, the ink will remove the dye from the garment, revealing the grieger goods or raw, original color of the garment. If your discharge is pigmented, it will essentially dye the grieger goods with the color of the pigment within the ink. Discharge works best with natural fibers such as 100% cotton garments, however, depending on the look you are trying to achieve, brand/color of garment and the type of discharge you are using, you may be able to use it on blends as well. The way the fabric is manufactured and dyed will also affect how the discharge interacts. Some colors, such as purples, royal blue, deep red and Kelly green, don't discharge well. Garment manufacturers offer dischargeable charts, rating each color based on how well it discharges to help guide printers and their customers through the choosing process.

Printing on Polyester

The fear of dye migration is real for printers who don't have a handle on it. Soft hand printing on polyester with no migration is a screen printer's dream. Available white, gray and black underbase water-based dye migration blockers eliminate dye migration problems when used correctly and the hand feel is first-rate. Knowing how to navigate the temperature element that can cause dye migration and finding the appropriate ink to cure at the

best temperature is another important aspect. Certain inks, some with additives, can cure at lower and lower temperatures, reducing the stress and anxiety of printing on polyester.

With the expansion and growth within dye sublimation and other digital printing, you might find yourself looking for options to be able to print additional designs on a fully sublimated or digitally printed garment. There are solutions for that, too. Dye sublimation and some digital inks will also migrate, so remedy the situation with a blocking base and you'll be able to add your name drop or additional design with no problems. Recognizing the benefits of other decoration options will open up the possibilities for creating amazing multimedia designs and prints that would never be possible with just one type of decoration method.

Special Effects

The higher perceived value of special effects can significantly increase the end product's potential profit. As special effects have become more user-friendly and less expensive, more and more printers are experimenting. Being able to get a crisp, bright, beautiful, soft hand, gold metallic (or the like) has never been easier, and there are products where, with a double stroke, a base is unnecessary, even on black or dark garments.

Bright metallic gold with no base and soft hand? Mind blown! There are so many options now, and the majority of them are genuinely easy to use and produce amazing results. More special effects are



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being incorporated into general design work to show a pop of glitter or gold or crack. Reflective ink is being used to hide messages that only show when the wearers' picture is taken at an event. Thermochromatic (disappears or appears based on temperature), photochromatic (disappears and reappears based on UV light) and aquachromatic (disappears or appears based on wetness) inks are becoming more prevalent. Being able to have no visible design, and then have a tonal one appear once the shirt gets wet, or to have additional design elements show up when the wearer steps into the sun, has really allowed printers to up their game and show some skill, both print- and design-wise.

Where Can You Learn More?

After the basics, get familiar with ink options. Do some research. Read some tech sheets, along with PolyOne Corporation's James Ortolani's Journal article on different water-based printing variables (Fall 2019 Apparel edition). Your ink distributors or manufacturers should be able to teach you how to use the inks. There are also workshops, seminars, articles and classes available through a variety of publications and expos, and of course, through SGIA.

In September 2019, SGIA hosted a summit on water-based inks, WB/Camp. Major ink manufacturers demonstrated

and explained the latest technology in water-based ink at a state-of-the-art production shop, Motion Textile, in Sacramento, Calif. Attendees got to listen to educational sessions led by these ink manufacturers as well as industry leaders in print, and everything from traditional to special effects to HSA was discussed. Events like these are changing and evolving the print industry for the better by exposing printers to new and better skills and techniques to allow them to reach their potential.

Tiffany Rader-Spitzer loves all aspects of print, especially garment screen printing. She is currently the Operations and Technical Product Manager at Roeder Industries (garment screen print supply house) as well as Owner/Operator of RedHeaded Step Shirt (consultant company). Previously a co-owner of Allusive Butterfly, an award-winning contract screen print company that focused on special effects and simulated process prints for major brands and theme parks throughout the world, Tiffany has an extensive history of teaching and writing articles. She utilizes her almost 20-year industry experience to spread awareness and enthusiasm about screen printing. From startups to large multi-automatic shops, Tiffany trains and teaches for both the individual and in large group settings. In her free time, she volunteers within the industry and sits on advisory councils for SGIA.