

Locking In Your Image

**THE CRITICAL ASPECTS
OF PRETREATMENT**

BY TAYLOR LANDESMAN



The color of your print can vary based on the amount of pretreat applied to different sections of your T-shirt. (Image courtesy i-Group Technologies)

Taylor Landesman is the vice president at Lawson Screen & Digital Products Inc. Previously, he worked as an attorney for the State of Illinois, Department of Insurance, handling regulatory and litigation matters. During law school, he was a Senior Editor on the Journal of Law & Policy at Washington University in the St. Louis School of Law.



The world of direct-to-garment (D2) printing focuses on improvements. Developments in technology like white ink and print heads often garner all the attention. This is to the detriment of critical, but “unsexy” topics like proper pretreating.

Dismissing proper pretreat techniques puts you at a disadvantage as this is a crucial stage of the D2 process that can make or break your final print. To use an analogy of building a house, pretreat is your foundation; everything else is built on it. Maximizing your color brilliance and achieving the best washfastness starts with proper pretreat application. Admit-

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tedly, it can be an unglamorous portion of D2, but nothing else will go right if this step is incorrectly done. To create shirts that mesmerize customers, start with a solid foundation of pretreat.

THE APPLICATION IS YOUR FOUNDATION

To properly apply pretreat, manual methods aren't always the best choice. Whether you use a spray bottle, roller, or spray gun, it is nearly impossible to apply a consistent deposit of pretreat. Such inconsistency affects your final D2 print in two main

ways. First, the color of your print can vary based on the amount of pretreat applied to different sections of your T-shirt. For example, a more saturated part of the print could have a rich, bright blue, while an area a few inches over might be duller. Second, inconsistent amounts of pretreat on a garment will ruin the uniformity of a print's washfastness. Both too much and too little pretreat will cause areas of the print to flake or fade prematurely. An automatic pretreat machine avoids these issues and creates a strong foundation.

CHOOSING A PRETREAT MACHINE

There are a variety of pretreatment options available in the market. Even within the same category of pretreatment machine type, not all are created equal, either. Different nozzles, speeds, settings, and overall design will affect your end results.

For instance, as of this writing, nozzles on the market are made from plastic, regular steel, or stainless steel. Plastic nozzles are the most affordable option while stainless steel is the costliest. Accordingly, you may experience different results with each type of nozzle.



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There are a variety of pretreatment options available in the market. Different nozzles, speeds, settings, and overall design will affect your end results. (Image courtesy Lawson Screen & Digital Products)



Clogging with any type of nozzle can be an issue, which stops production or creates an uneven spray pattern. If you do experience clogging in any print head, you must not try to clear the clog by sticking something in the nozzle. Doing so will affect the spray pattern for the life of the equipment. Plastic nozzles are more susceptible to damage from such an invasive action as the structure is not as rigid as steel.

You also want to look at the amount, in grams, of spray pressure and the speed a machine delivers, as well as how far the spray is from the substrate. The faster a nozzle moves the less pretreatment is laid down. The distance from the nozzle to the spray surface will also affect how much pretreatment is applied. The further away it is, the less concentrated the pretreatment. In short, if the valves or speed in the machine vary even slightly, this will alter the amount applied on the shirt.

Finally, you want to be able to control and fine-tune the amount of pretreat applied, as it will fluctuate from job to job. For example, you might determine 18 grams of pretreat is the right amount on a lightweight ring-spun T-shirt, while 30 grams is better

for color brilliance and washfastness on a heavier weight open-spun T-shirt.

PRETREAT MACHINE MAINTENANCE

When selecting your machine, determine how easy daily and weekly maintenance routines will be. In simple terms, pretreat is saltwater glue. It inherently gums up and clogs the components and the inside of any unit. Besides cleaning the lines with distilled water, you need to be able to easily access the spray chamber to clean the inside of the unit. This becomes especially important as you scale up your D2 production. The

long-term buildup of pretreat deposit is bad for your machine's operation. Further, excess pretreat that has been neglected on the bottom of a sprayer can stain your garment as shirt after shirt is dragged through the overspray. Therefore, it is essential to have easy interior access to clean out the inside of your machine.

Finally, assess the manufacturer's service commitment and parts availability. Issues always seem to arise at the most inconvenient time, typically late in the evening or on the weekend. Access to 24/7 service can make the difference between meeting a deadline or having to tell a customer you need an extra day because you could not get weekend service. Also, inquire about the warranty. What does it cover, what does it not cover?

WHAT AMOUNT OF PRETREAT IS CORRECT

The amount of pretreat solution to use in any run varies depending on many shop-specific factors and preferences. This creates a bit of a learning curve at the beginning and can lead to a few early days of frustration for those who like “black and white” answers. If you understand that pretreating is a mix of art and science and are willing to invest the time experimenting, you will succeed. Keeping track of what works is vital for consistency. Being able to reproduce what you did, whether it was yesterday or six months ago, allows for consistency. Consistency creates success.

While experimentation is needed, there

are some considerations and variables for determining how much pretreat solution to apply. A good starting point is 1.5–1.7 grams per inch (based on a width of 16”). For example, if you apply pretreat to a 16” X 20” area, the amount of applied pretreat will be 30–34 grams for an average weight garment.

The weight of the garment itself and its construction is, perhaps, the most important variable to consider. Heavier garments require more pretreat solution, while lighter garments require less. Likewise, darker colors require more pretreat than white and light colors. Ring-spun garments are best for D2 printing because they have a tightknit weave, which creates a smoother

and less porous printing surface. The ideal amount of pretreat also varies by manufacturer and type of garment, as well as the specific concentration of the pretreatment. For example, a thin ring-spun shirt will require less pretreat than a hoodie. This is due to variations in the absorption properties of the material. The thin garment has less material to soak pretreat, leaving more on the surface to interact with the D2 ink. As the hoodie absorbs pretreat, more needs to be applied to keep the surface properly saturated.

PROPER PRETREAT CURING

Proper pretreat curing depends on your production needs. For smaller runs, a heat

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Curing pretreat with a conveyor dryer is the best way to increase production rates and times. (Image courtesy Lawson Screen & Digital Products)

transfer press is a good option. The time and temperature can vary depending on your situation.

A good starting place is to set the heat transfer press at 330 degrees F. Using light pressure for 5–10 seconds, put a piece of untreated parchment paper, not a Silicone or Teflon sheet, between the garment and the heat press. Then, lift the transfer platen, quickly remove the parchment paper, and press again for an additional 15–20 seconds with heavy pressure. You want to use heavy pressure at the end to help matte down the shirt fibers and ensure a smooth printing surface.

SCALING UP PRETREAT CURING PRODUCTION

Curing pretreat with a conveyor dryer is the best way to increase production rates and times. There are two essential elements necessary for choosing a conveyor dryer. The first is choosing how you want to heat the garment. Conveyor dryers are either infrared electric panels or gas powered. Choosing one over another typically relates to utility cost and power requirements. For example, some people simply

do not have enough power in their building to run a large electric dryer. Bringing in enough power to your building could be prohibitively expensive. While a gas dryer requires a gas pipeline, much less power is required to run the auxiliary components. Another consideration is the utility costs of electric versus gas as they vary widely depending on your area of the country.

The other major consideration for a conveyor dryer is the airflow. For D2 use, you must have a significant amount of airflow. This is measured by CFM (cubic feet per minute) and relates to the volume of air pushed into the heat chamber. Proper pretreat and D2 use will require at least 1,500 CFM. You always want the air to have a forceful pressure when making contact

with your garment. Like when blowing out a candle, a gentle breeze just flickers the flame, while a stronger force extinguishes it. You want a powerful force to cure the pretreat quickly. Inquire about the impingement of the airflow. Impingement is described as how the air is circulated within the dryer. Does the conveyor dryer just rudimentarily use a blower to force air straight down? This method can cause “dead zones” where no air is directly hitting the garment. More sophisticated dryers use universal live-air or an air-knife system to distribute air in one continuous zone, evenly. This ensures the garment always receives a steady stream of air while curing in the heat chamber. Finally, moisture-laden air in the heat chamber must be


evacuated to maximize curing efficiency. A powered exhaust helps this process and speeds up the time required to cure pretreated shirts.

STORING PRETREATED SHIRTS

Whether you use a heat press or conveyor dryer, shirts can be pretreated and stored in advance of printing. Always re-press the garment for approximately 7–10 seconds before printing to remove any moisture in the shirt and to re-flatten the fibers. When storing pretreated garments, take care not to degrade the pretreated application on the shirt by avoiding excessive folding, bending, or scraping of the print area where the pretreat solution is applied. Damage can occur to the thin

film of pretreat solution, and you will be able to see variations where the pretreat application has been damaged. Remember, you want to print on a moisture-free, smooth image area.

CONCLUSION

Ensuring quality D2 prints is multifaceted but starts with a solid pretreat foundation. Invest the time up front to experiment with the garments you offer so the right amount of pretreat is applied. Automatic pretreat sprayers provide consistency and repetition to achieve the results you want. As your production requirements increase, a conveyor dryer speeds up production time and provides economies of scale that help lower costs. 



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