

Decorator Relations | White Paper Screen Printing & Ghosting on Cotton and Blends

Overview: In this white paper we will introduce solutions on how to identify and manage the frustrating phenomenon of Ghosting while screen printing on *cotton (both garment dyed, and reactive dyed)* and cotton / polyester blends. Ghosting is usually caused by the perfect storm of low bleed inks, humidity, heat exposure and certain dye stuffs used for cotton.

Problem: When printing low bleed white inks on cottons such as garment dyed cotton and cotton / polyester blends a faint almost invisible “ghost” image of the design will appear on the inside or backside of the printed garment and or on the front or back of stacked garments.

Background: Ghosting is primarily seen with low bleed inks and certain colors of cotton. The most prevalent colors affected are light blue, yellow, green and violet, but not limited to.

How to Test: Before printing, a garment can be tested using a heat press. This process requires printing a square of the desired ink on a garment, folding over the unprinted fabric and warming it in a heat press. When the garment is removed and unfolded a “ghost” image may appear.

- *Heat your press to 250 °F*
- *Print an image around 3” in size a piece of the same fabric you will use in production. Finish the print all the way through a dryer.*
- *Place the garment on the press and spray with a light mist of water to add humidity.*
- *Add a second piece of the same fabric to the top of the print (Sandwiching the Ink)*
- *Heat press for 30 minutes*
- *Remove the fabric and check the non-printed piece for the “ghost” image.*
- *Due to the variations in fabric and technology it is always best to test a new fabric in a real-world printing process.*

Note: Ghosting is primarily seen with cotton garments but is not limited to. A ghosting effect can occur on 100% polyester but is usually caused from low bleed inks that have peroxides or bleaching agents. The ghosting effect can also be caused by hot stacking garments directly off of the dryer especially if the ink has not completely cured. Many of the same controls below can help. Always consult with your supplier for best recommendations.

Potential Causes of Ghosting

Ink Selection: Using an ink that is not designed to be printed on cotton is one of the usual suspects. Many printers do not like to carry multiple ink and try to print low bleed inks on everything, this is not a practice recommended in today's printing environment.

Solution: Be sure to consult with your ink supplier and choose an ink designed to be used on the fabric being printed. Fabric that is garment dyed works best with 100% cotton inks. When working with a blend a low bleed ink may be required to control dye migration. In this case follow the other recommendations below. Avoid inks that use peroxide or other bleaching agents.

Excessive Heat: Heat can be accumulated in many parts of the printing process and kick start the ghosting.

Dryer: Be sure to profile your dryer regularly. Most printers use a laser heat gun to read the ink and garment temperatures. Laser heat guns will only get you close and cannot read deep into the chamber. Also remember hot and fast is not the best practice when working with a potential ghosting issue.

Solution: A "Donut Probe" is the best option for profiling your dryer and truly knowing your belt temp, ink temp and identifying hot spots in your dryer.

<https://www.cooper-atkins.com/products/aquatuff-35100-k-screen-print-kit/>

Dryer Chamber Length: Using a dryer with a short chamber may not evaporate the moisture out of the garment and or fully cure the ink. Low bleed inks that do not completely cure can react with certain dye stuffs and exasperate the problem.

Solution: Slow down your belt allowing the moisture to fully evaporate and the ink to cure. Again, I recommend a donut probe to be sure you are curing your ink deposits completely.

Dryer Exit Length: Using a dryer with a short exit belt will deliver shirts to the take off at their hottest point not allowing for any cooling time.

Solution: If a short belt is the only option stack the garments as in as many piles as you can, alternating stacks with each shirt allowing time for the fabric to cool.

Printing Hot & Fast: Running production at a fast pace usually means excessive heat and speeding up the dryer belt speed. This type of printing means its less likely the ink is fully cured; the shirts are then stacked at the peak of heat exposure and basically stay insulated maintaining the moisture and building temperature. This coupled with low bleed inks us a catalyst for a ghosting disaster.

Solution: Run production at normal even pace, give your dryer time to fully cure the ink and evaporate any remaining moisture at the recommended setting from your supplier.

Hot Stacking: After printing stacking one on top of the other right off the dryer will build up heat and could potentially cause “ghosting:” when everything else was done correct.

Solution 1: Create a cooling station or stacking area where you can lay out the garments in 3 – 4 stacks. By alternating between stacks 1,2,3,4 you are allowing the garments to cool before another is stacked on top. Many printers also add a fan pointing at the stacks to circulate air.

Solution 2: Cooling fans at the dryer exit are becoming more popular and start the cooling process while on the dryers unloading belt.

Humidity / Moisture: This can be caused by a unnaturally humid day or even garments stored in a humid environment or hot truck. These overly humid shirts will cause excessive moisture when the garment is curing not allowing the ink to fully cure.

Solution: Remove the garments from the boxes and bags staging on carts prior to production allowing the stored moisture to evaporate. In extreme cases where humidity is just excessive many printers will run the unprinted shirts down the dryer to remove moisture before printing.

Technique: As found with many problems in screen printing going back to the basics and ensuring your using the right mesh, a good level press, good squeegees, the proper off-contact and good screen tension for the best ink deposit should be in place. These will usually fix or mitigate problems all the way around.

Industry Links and References:

The Ink Kitchen – Mysteries and ghosts

<https://www.theinkkitchen.com/mysteries-and-ghosts/>

Impressions Magazine – How to prevent ghost images

<https://www.impressionsmagazine.com/screen-printing/process-techniques/prevent-ghost-images/>

Printwear Magazine – Ghost images in Screen Printing: Cause and Prevention

<https://printwearmag.com/features/ghost-images-screen-printing-cause-and-prevention>

Rutland Plastics – Technical Bulletin

https://www.rutlandinc.com/wp-content/uploads/2016/08/techbulletin_93_ghosting.pdf

International Coatings – How to test for Dye Migration and or ghosting

<https://iccink.com/?s=ghosting>

TexSource – Ghosting: How to handle and Prevent It

https://www.screenprintingsupply.com/Ghosting-How-To-Handle-and-Prevent-It_b_149.html

ScreenWeb – How to get ghosting under control

https://www.screenprintingsupply.com/Ghosting-How-To-Handle-and-Prevent-It_b_149.html

The information in this document was gathered from expert contacts throughout the industry and are a part of the Decorator Relations Affiliate Program at SanMar. We strive to bring the best printing fabrics and latest printing technology to the market and work with these companies to test fabrics and the latest in decoration techniques. If you have any questions or would like to learn more about our team, please see the links below.

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