



» TECHNICAL BULLETIN

Screen Printing Dye Migration Guide Tips & Techniques

The Cause and Prevention of Dye Migration

What is Dye Migration?

Dye migration is the movement of dye from a dyed material (t-shirt) to another material (ink) in contact with the dyed material. It can occur on polyester and poly/cotton blend t-shirts and other garments when the garment is heated to temperatures in excess of 265°F (130°C), causing the dye in the garment to sublimate. In essence, the dye changes from a solid to a gas. Further, when plastisol inks printed onto the garment are heated to temperatures higher than 265°F (130°C), dye in the garment can move into the ink itself, causing discoloration of the plastisol ink. This heat related defect can be costly to printers, especially when working with expensive performance garments. Taking steps to prevent and pretest for dye migration can be crucial to achieve a good quality print.

How to Prevent Dye Migration

Research the garment prior to printing to understand its fiber composition, garment color, stretch, weave and texture. Printing onto 100% cotton, 100% nylon or nylon blends reduces the likelihood of dye migration, whereas using polyesters and polyester blends increases the chance for defect.

Select the appropriate ink for the substrate and avoid incorporating additives into low bleed inks. A defined edge on the shirt-side of the stencil can allow easier ink transfer, so align before printing. Once the garment has been printed, avoid excessive temperature spikes, and do not under or over cure in the oven. Once cured, stack garments after they are no longer hot. Though best practices to prevent dye migration are key, pretesting results on a garment can be the best indicator of potential bleed.



How to Test for Dye Migration (Bleed)

Bleed resistance, or the resistance of an ink to accept the dyes from the garment, is determined by the chemistry of the ink, completion of ink cure and by the ink deposit. Sometimes referred to as a white bleed test, the following procedure will test fabric for dye migration potential. Test new garments for bleed and select the appropriate low bleed ink that best suits the garment composition and use.

1. Use a screen mesh that duplicates the planned use of white ink, as well as two other possible mesh sizes
2. Print only the white ink on appropriate fabric swatches and hold for three weeks
3. Visually evaluate the prints for whiteness after the three week hold period
4. To accelerate evaluation, hold prints at 105°F (40°C) for 2–5 days

Choosing a Screen Printing Ink

Low or flexible curing, or “low bleed”, inks designed to cure between 260°F (127°C) and 280°F (138°C) protect garments from dye migration. To further protect sensitive garments, add a first layer barrier underbase.

**To learn more about dye migration
and low/flexible curing inks, contact
Avient at +1.844.4AVIENT.**

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