Stopping Dye Sublimation and Migration

Or…how I learned to live with Polyester!

What is Sublimation?

- Sublimation is the transformation of the dye from a solid directly to a gas.
- Sublimation is not the actual process of bleeding, but the first step in the process.

When does Sublimation Occur?

- Sublimation occurs whenever the polyester dye is heated above its set temperature.
- The temperature varies by color of dye but begins at approximately 360 degrees F. (182 degrees C.)
- Once sublimated, the dye is free of the fabric and can go anywhere.

Why Is Red the Worst Color?

- The red dyes have the lowest set temperature.
- They are the first to sublimate when the temperature rises.
- Other colors sublimate at slightly higher temperatures, but all polyester dye colors can sublimate.

Why does the dye only bleed with plastisol ink?

- Plastisol, PVC, acts as a solvent for the dye molecules. They diffuse (migrate) through the ink film even after it is cured.
- The dye can even migrate to the surface of ink from the air. This effect is more common now with the popularity of clear gel prints.

What Can I do?

- Use low bleed underbases
  - Low bleeds contain ingredients to block dye migration
- Control Dryer and Flash temperatures

- Flashes are often as hot as 1000 degrees F. It doesn't take long to heat the fabric above 360 degrees F.
- Monitor dryer closely. Slower is better than hotter.

Why does it bleed even when I use low-bleed ink?

- Because it is exactly that, low-bleed, not *no-bleed*. There is only so much blocking capacity in the ink. If you exceed the capacity, the ink can still stain the ink.
- Low-bleed inks are insurance, but they are not the solution, proper technique and control is the solution.

Why are some fabrics worse?

- Some fabrics even have dye that is unbound and can migrate even if not overheated.
- These poorly prepared fabrics are more common today with the rapid increase in the popularity of polyester fabrics.
- Any suspicious fabric should be crock tested.

Do I have to buy expensive equipment to crock test?

- No, all you need is a simple piece of clean white cotton fabric and a finger.
  - Wrap the fabric around a finger and wipe firmly three times in one spot on the polyester
  - Repeat the test with a dampened piece of white cotton fabric.
  - If there is a slight coloration with either test, it is ok. If there is a heavy stain, DON'T PRINT.

What do I do with bad fabric?

- You can return it to the customer.
- You can inform the customer that you will do everything possible but there is no guarantee of success.
- You can recommend print colors that will not show a discoloration if bleeding occurs. (this one is a reach, I know!)

What about running the fabric through a dryer first?

- It doesn't work, and may make the problem worse.
- Dye can be released and sit on the fabric waiting for the ink to be applied.
- Proper controls are the only way.

How do I control things when I am Printing?

- When platens are cold, set flash for time and temp necessary to gel the ink.
- As the platens start to heat up, it is important to adjust time/temp to minimize heat buildup.
- Temperatures and times require constant attention. Flashes are not a set and forget system.

How do I control things, cont.

- Flashes should be adjusted to keep boards from getting much warmer than 120 degrees F. (42 degrees C.).
- Another key adjustment is to minimize the ink film thickness of the ink(s) that require flashing. Remember that thick ink film requires more flash energy.

Temperature Control

- The critical element in polyester printing is accurate temperature control
- Printers, QC personnel, and management must constantly monitor temperatures whenever polyester is being printed.
- Not just cure temp, but platens, flashes, and fabric temperatures

In Conclusion

- Polyester printing can be a valuable part of your operation
- But take care before, during, and after the print
- You cannot "set-and-forget" with polyester