

## The 10 Most Common Plastisol Ink Application questions

In our technical service department, we receive hundreds of calls each week on a variety of subjects. When we tally the log sheet each month, it is interesting how the overwhelming majority of the problems can be placed under 10 basic questions.

*The most commonly ask question is;*

**1) A) What causes the ink to wash out when laundered? Or b) What causes the ink to crack when laundered?** The most common reason for wash out and cracking in the ink is undercure. Wash out will usually occur with thin deposits of ink, whereas cracking is common on thick, undercured ink deposits. In order to achieve a total cure, the ink film must reach the temperature recommended by the ink manufacturer. Most plastisol inks must reach a temperature of 320 degrees F (160 C). It is important that the ink film itself reaches that temperature. Dryer readouts and temperature strip readings from the garment do not ensure that the ink is reaching the required temperature. It is vital that you map your dryer readings, *which leads us to the next most common question;*

**2) How do I test my dryer?** The ultimate goal of your dryer is to bring the ink film to the cure temperature recommended by the ink manufacturer. With this in mind, the best way to test your dryer is to take a temperature reading of the ink itself, either by using a Thermo probe with the crosshairs placed in the ink or temperature strips placed under the wet ink before it passes through the dryer. By using a Thermo probe and recording temperature readings in a five second interval, you are able to create a map or cure curve of your dryer. You will find that your ambient (air) temperature may be steady throughout the dryer chamber, yet the ink film temperature is actually rising slowly and it usually doesn't hit the high temperature until it is close to the end of the chamber. Readings should be taken at different times of the day throughout the year, and notations of variables written on the chart. You need to keep in mind that a setting for one ink or situation may not be sufficient for another. Many variables can affect cure. Examples include humidity, belt speed, a fully loaded belt, type of substrate, ink deposit and ink type. Cure temperatures in ink can vary due to the following factors: Pigment color, product density and chemistry (as in an athletic vs. general purpose vs. fast fusion ink). Setting your dryer to ensure that the temperature window is above the ink cure recommendation is your best chance for success.

*One other problem associated with under-cure leads us to the next question;*

**3) Why doesn't the ink adhere to the garment?** Though under-cure can be the cause, the reason I didn't include this with question #1 is because usual suspect in this situation is incorrect ink selection. Different substrates require different ink or ink preparation in order to ensure good adhesion. This question is answered on a case-by-case situation, but the most common materials in which poor adhesion will occur are Nylon and Nylon Lycra. It is best to call your ink manufacturer directly for recommended inks for the substrate you will be printing. ( Also, see answers to questions 7 and 9).

*Another question that is usually attributed to poor cure is;*

**4) What causes the ink to fade when laundered?** Again, under-cure can cause ink to wash out, which will give the appearance of a fade, but if this is the case, the wash out is very uneven and splotchy. Actually, the most common cause of fading is fibrillation. This condition is caused by the shirt fibers pushing through a thin ink deposit during the laundering process, creating an illusion of a fade. In this case, the fade is very even and consistent throughout the design. It is most noticeable with dark color inks on white 100% cotton shirts. Thicker deposits of ink (using lower mesh counts) or a matte clear overprint will reduce the effects of fibrillation.

*A common question posed to all ink manufacturers is;*

**5) Why is the shirt color bleeding into my ink? Or... Why did my White ink turn PINK?!** Two common reasons for bleeding are poor ink selection and cure problems. Refer to the recommended substrates section of the product information bulletins to ensure correct ink selection. When a bleed resistant white ink is cured correctly and fully, the print should appear white when it comes out of the dryer, and it should change little during the following weeks. If the garment shows an immediate bleed, chances are that the dryer is too hot, or the garment is staying in the heat chamber for too long. If the garment bleeds days or weeks after it comes out of the dryer, chances are that the dryer was too cool or the conveyor belt was too fast. The best solution is to map your oven temperatures, then set your dryer belt to run as quickly as possible while still achieving the required temperature needed for a full cure.

*The 2 fabrics that printers are most often confused between are Nylon and Polyester, so the next 2 questions are often asked;*

**6) Do I need an adhesive additive for polyester garments?** The answer is NO. Plastisol ink will adhere to polyester substrates without the aid of catalysts or additives. Introduction of catalysts or additives will

reduce the bleed resistance of the ink. Polyester garments will bleed unless printed with pure bleed resistant inks. Be sure to check the label on the garment before you proceed with the print. Many substrates look similar, but they require different print parameters, so test the garment for dye sublimation.

**7) Do I need an adhesive additive for nylon substrates?** In most cases, the answer is YES. In order for ink to adhere to Nylon, the ink must form a mechanical bond with the fabric. A good “rule of thumb” is; “The less fabric texture, the more you need catalyst” (and visa-versa). Nylon Garments with little texture to the fabric, such as Satin jackets, require an addition of catalyst to create ink with greater tensile strength. In the case of woven nylon bags, most ink companies offer a single-part Nylon ink. This line of inks does not require a catalyst when printed on nylon substrates with a heavy texture. However, these materials may be treated for waterproofing, in which case the coating must be removed and a catalyst added to the ink. Be sure to check the label on the garment before you proceed with the print. Nylon micromesh athletic jerseys require an ink specifically designed to cure harder which will adhere to that type of fabric, it does not need catalyst. Many substrates look similar but require different print parameters. Nylon Dazzle cloth and Polyester Dazzle cloth look identical, so you must test the material for bleed propensity.

*Printers strive to achieve a good color, even on dark garments, so the next question is common;*

**8). What can I do to improve opacity?** Ink selection is very important. Be sure that the product you choose is listed as opaque ink. However, selecting an opaque ink will not ensure a totally opaque print. Factors such as print parameters and screen preparation contribute to achieving maximum opacity. When printed correctly, thicker stencils on screens will allow greater amounts of ink to be laid on the surface of the garment. The most effective way to print is with a hard flood that fills the stencil space completely, print with low-pressure and low angle with a hard, square squeegee. This print method allows the ink to stay on the surface of the substrate. Opacity is greatly diminished if the ink is driven into the substrate. You may also use additives in your ink that expand like High Density Additive or puff additive, this will however, diminish any smooth surface. Start with small amounts of additive until you are satisfied.

There are many fabrics available today, and many more release every year (ouch). *So a common question posed to us is;*

**9) Are there different types of inks for different types of substrates?** In a word, YES. Polyester fabrics need bleed resistance, usually a Low Bleed White under base. Nylon fabrics need better adhesion qualities, either with catalyst or specially made inks. Lycra needs an ink product with great elongation, which is usually a fast fusion product (270F-285F cure temperatures). Though it would be nice to create do-all ink, the properties of the different substrates make it impossible to create such a product. You must know your substrate, and then research the ink line you would like to use. The best source is from your supplier or ink manufacturer; keep product information bulletins on file for reference.

Sometimes, the selection or manipulation of the ink isn't the answer. *The top art question ask of us is;*

**10) Is there anything I can do to keep my 4 color Process prints from looking dark and muddy?** Most problems in Process printing are a result of incorrect separations. Computer Graphic programs will default to SWOP color; an ink set use in offset paper printing. So generally, separations are created with one set of inks and printed with a set of inks with different hues and strengths. Loading Process color values is a major step in creating accurate process separations. Adobe Photoshop allows an artist to load Process color values, which are the color positions of the ink that will be used in production. Most ink manufacturers offer color values for their Process inks, which can be downloaded from their web sites or sent from their Technical Services department. These values are free. The color values will differ with mesh counts, so you must know which process ink set and what mesh count your production department intend to use. There are two other tricks will help with a Process job on press. One is adjusting the black plate. Black was never meant to be an equal partner in CMYK. It is very important to allow CMY to take care of the subtle grays. Using Curves, adjust the black channel curve to start at the 25% mark; this knocks the black out of the lower 25 percent of the gray areas. Another trick is using a Wet White. This white is a first down white, followed by YMC then K. A wet white plate will include all white and pastel colors in the design. When the inks are printed, the wet white will mix with the process colors to create nice color tints and will keep the dot gain in those areas to a minimum.

The bottom line on most application questions is “Ask the source.” Nobody can help you quicker than the people who manufacture the product. Keeping product information on file for quick reference will spare many hardships also, so require your distributors to send you a Product Information Bulletin with any product you receive. Common sense must prevail, but never think that you are better off being safe rather than sorry by manipulating an ink. In some cases you can be introducing another group of potential problems.