

Dye Bleed

What are dyes?

Most textiles are coloured with dyes which fix chemically to the textile fabrics, colouring the garment without a noticeable change in the feel of the fabric itself. The chemistry of these dyes varies with the fabric type, different dyes required for different fabrics.

Dye bleed with plastisol printing is an effect seen principally with dyes used for polyester fabrics and poly-cotton blends.

Many people will have experienced cotton garments 'bleeding' in the wash, and have pink garments to show it. However, this is caused by action of water washing out unfixed dye, and is no indication of potential bleed on printing with plastisol inks.

So what is Bleed?

Dye bleed when plastisol printing can occur by one or both of the following mechanisms:

Dye Sublimation

Heating the garment to the temperatures required to cure a plastisol can cause the dyes in the garment to turn to gas and travel into the plastisol ink. This effect is known as dye sublimation. Sublimation becomes progressively worse as the temperature used increases, and is usually immediately evident as the garment exits the dryer.

Dye Migration

Some fabrics contain a proportion of dye which is not sufficiently fixed to the fibres.

This residual dye is usually removed during fabric manufacture, but if not, it can leach into the plastisol ink without the need of heat. This leaching is known as dye migration. The potential for dye migration is often not evident following printing and curing, and can occur subsequently in anything from a few hours to a number of weeks.

How do I recognise Bleed?

In its most active form dye bleed is quite easy to spot, turning your plastisol whites into versions of the underlying colour, but the effect is not always so dramatic.

A subtle discolouration caused by dye bleed on curing is often mistaken for lack of opacity on the part of the printing ink. It can however be easily distinguished by comparing the print immediately after printing, with the print as it leaves the dryer. If the cured print shows a change in colour, what you are seeing is likely to be dye bleed.

Discolouration caused by dye migration is more difficult to recognise, as it often occurs some time after the garments were printed, and thus no unaffected print is available for comparison.

What can I do about it?

Once printed garments have shown bleed there is nothing you can do to reverse the effect. The only way to combat bleed is to eliminate the cause prior to printing.

The first step towards this is to be aware of the possibility of bleed when printing fabrics containing polyester, and to thoroughly check garments prior to production. For sublimation bleed this simply entails comparing a wet print with a fully cured print for any change in shade.

As mentioned earlier, migratory bleed can sometimes take weeks to show itself, thus testing means monitoring the print over time for any effect. Though migratory bleed can take up to 6 months to occur, it is rare, and 6-8 weeks is usually long enough to be safe. Obviously this extended time period does not fit in with real-time production conditions, but is important to bear in mind that any reduction in testing time is a potential gamble.

So how do I reduce bleed?

Some garments are simply unprintable with plastisol inks due to their bleed characteristics. In these cases the only option is to accept a level of bleed, or to change the garment to a 100% cotton type.

When the option to change the garment is not available, in many cases the level of bleed can be satisfactorily reduced by one of the following:

Reduced-Temperature Curing

As mentioned earlier, dye sublimation is caused by heating. It can thus be minimised by keeping the dryer temperature set the minimum for full cure of the plastisol, which should be quoted in the relevant Product Information Sheet. Care should be taken not to undercure inks in an effort to achieve satisfactory reduction in bleed.

Ink Choice

The use of a lower temperature curing system will facilitate temperature reduction thus helping to reduce sublimation bleed. However in some cases this is still not enough and a dedicated 'low-bleed' plastisol may be required.

What is a Low-Bleed Plastisol?

Low-Bleed inks are special plastisol products, usually Whites, which look superficially like a standard plastisol, but contain agents which prevent the polyester dyes from penetrating into the plastisol ink. They can be used on their own, or as a basecoat to prevent dye bleed over the whole printed area, and are printed in the same manner as a standard opaque white plastisol.

Though this type of product is often very effective, they are not always 100% effective, and their use should not be considered a sure solution to a bleed problem.

So what is my best policy?

Above all be aware of the possibility of bleed when printing polyester-containing garments with plastisol inks. Simply being aware of the situation, and testing garments under the proposed conditions may prevent you from suffering the heavy cost of unforeseen dye bleed.

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