

TECHNICAL BULLETIN #5

LIGHTFASTNESS OF FLUORESCENT INKS

The lack of lightfastness of fluorescent inks is a subject that many people have questions about. Fluorescent inks applied via the offset process (very thin films) have very limited applicability on printed materials which will be exposed in outdoor situations or where color fidelity must be maintained over long periods indoors due to the low level of lightfastness intrinsic to these "pigments".

Fluorescent colorants are not true pigments but are more accurately described as dyed resin. The various dyes used to produce the fluorescent colors are selected to conform to the properties which are necessary to produce the daylight fluorescent effect. These properties are a significant contributor to the lack of lightfastness in fluorescent colors.

The characteristic of the dye/resin combination that imparts the high color intensity is the ability for these dyed resin particles to convert UV radiation to wavelengths in the visible spectrum. For example, a conventional yellow pigment absorbs radiation (visible and non-visible) and reflects back only the visible radiation in the wavelength associated with yellow color. A fluorescent yellow color will reflect the same visible radiation **but** will also convert radiation in the ultra-violet wavelengths and reflect the UV back as yellow. It is this conversion of highly energetic UV radiation to visible light that creates the high intensity; the selection of dyes for these colors is based on their ability to make this conversion and their color purity (cleanliness).

Because of this sensitivity to UV radiation, the dyes are also more susceptible to degradation which results in color fade an order of magnitude more quickly than conventional colorants.

If fluorescent color is required in an outdoor situation, a process which utilizes a thicker film application, such as silk screen, will yield a higher degree of lightfastness, though not a complete solution. Some film laminates may also enhance lightfastness by providing a UV "screen", but these also result in a reduction of the fluorescent effect.

While the lightfastness properties of today's fluorescent colorants are greatly improved over the original products, they still are considered to be highly fugitive and "trade offs" must be made; either in producing printed material with low fade resistance or with less color intensity and cleanliness.