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PROBLEM SOLVERS

FACTORS AFFECTING THE DRYING OF UV INKS

INTRODUCTION

It is important that a UV cured ink is dried to an acceptable level of hardness as soon as it passes under the first UV drier. If this does not occur then the ink will pick off and build up on the divert rollers before it reaches the second print station and the second UV lamp. When the second ink is printed directly over the first then it is even more important that the first ink is thoroughly dry otherwise it will suffer adhesion failure from the substrate. The following report summarizes the factors affecting the curing of UV inks

PIGMENTATION

Darker and opaque colours (particularly blue, black and white) tend to absorb more UV light and therefore prevent deep penetration into a printed film. These inks are slower drying, particularly at high film weights. Higher pigment loading reduces penetration and drying even more. Substantial increases in cure speed with darker or more opaque inks is achieved by printing at lower film weights

FILM WEIGHT

The thinner the ink film printed, the faster the cure speed. In the case of solid colours it may be better to print two thinner films at high speed than one thick ink film at low speed. In process printing, darker colours such as cyan and black will benefit most from using the finest aniloxes possible.

SUBSTRATE

Non-porous papers and high surface tension plastic surfaces are the best substrates for rapid UV drying. Porous papers and boards allow diluents to absorb into the surface of the stock where it does not cure. The pigment may remain at the surface, underbound and undercured. This is evidenced by a “patchy” or low gloss ink surface which tends to remain greasy. Quite often, in this event, faster processing speeds reduce penetration and improve drying. A primer or keycoat will also improve drying.

Low-dyne plastics cause ink films to “bead-up” or reticulate, resulting in lower density and inhibited drying. Again, keycoats may improve the wetting, adhesion and cure response over such surfaces.

ACTIVATORS

Photoinitiators or activators may be added to the ink with care. Excessive levels may plasticise the film or may result in overcured and brittle films with poor adhesion

TESTING DEGREE OF CURE

Laboratory or production testing of cured ink films for UV drying may consist of one or more of the following:

- Ink Rub tests e.g. Sutherland rub
- Tape adhesion
- Solvent resistance (e.g. alcohol rubs)
- Talc gloss test where a greasy undercured surface picks up test talc dust and gloss is reduced.