UV CURABLE LACQUERS - PROBLEMS AND PROBLEM SOLVING

CURE

UV lacquers require a suitable light source in order to initiate the curing process. Medium pressure mercury lamps placed strategically along the press provide this source. It is however important that the lamps are maintained and that the positioning is suitable.

Lamps can be positioned either at the end of the press after application of both ink and varnish or between units, known as interdeck. The exact positioning will generally depend on the type of work being produced, with relatively straight forward commercial work benefiting from lamps positioned solely at the end of the press, and more demanding work such as printing onto metallised papers and vinyl's, benefiting from interdeck lamps.

When the lamps are set correctly, problems with cure, will generally relate to the substrate, or ink film weight beneath the lacquer.

Impervious substrates such as foils and vinyl's will require a specialist lacquer, with conventional lacquers resulting in poor adhesion. In the case of such a substrate being involved, it is recommended that tests are performed in order to determine suitability.

Heavy ink film weights and dark colours (which will absorb UV light) may result in impaired curing, which if anticipated may be overcome with the use of specially formulated faster curing inks, under colour removal, slower press speeds or the use of interdeck lamps.

GLOSS

Problems relating to gloss are rare and are generally related to unrealistic requests. UV lacquers printed over conventional inks is not recommended as this will result in sub-standard finish, with the level of dry back being severe.

In order to overcome this problem, ECS have formulated a specialist varnish which provides very low levels of dry back and provides a commercially acceptable result.

ORANGE PEEL

Orange peel is the name given to the 'wavy' result achieved when the film weight of lacquer, which has been applied, is too high. This can be the result of incorrect viscosities, or exaggerated application.

Excessive film weight of lacquer can lead to insufficient flow out, and can therefore be remedied by a reduction in viscosity, film weight, or press speeds, therefore increasing flow out times.

Presses equipped with extended deliveries will be less prone to 'orange peel', as the lacquer is given more time in which to flow out prior to being cured.

FOAMING

The majority of UV varnishes supplied by ECS will have a defoamer built into the formulation, however with certain pumping systems and when large volumes of varnish are circulated for long periods of time, foaming can occur.

In order to overcome such a problem, it may be necessary to make an addition of de-foamer, although it may also be beneficial to turn off pumps during make ready and therefore reduce the initial generation of foam.

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SHRINKAGE

During the process of curing, UV lacquers will undergo a certain degree of shrinkage. In some cases this could be as great as 20%. Shrinkage as severe as this can result in substrate curl, which is more likely to occur on low grammage materials.

If shrinkage and curl on low grammage substrates are anticipated, a specialist formulation is available, based on higher stability products and therefore more suited to such an application.

CRACKING AND FLEXIBILITY

Certain UV lacquers will be more susceptible to cracking than others. This is generally based on the flexibility of the formulation which can be altered if problems are anticipated. Cracking can also occur when film weights are high.

COLOUR BLEED

Not all Pantone inks and matchings are suitable for use when work has to be UV varnished. The following colours may fade or alter dramatically when lacquered, especially when concentrations are low – i.e. Tints.
Rhodamine. Purple. Reflex Blue. 072 Blue. Violet. Warm Red.

If work requires these colours, it is possible to obtain an amine resistant ink, which will be suitable for UV application.

ODOUR

As UV lacquers cure, an odour is omitted which can be reasonably unpleasant. Functional extraction is a necessity for reducing such fumes, and although these odors are not harmful, if the problem is too severe a lower odour range of lacquers is available.

Problems Related To Off-line Varnishing.

Off-line varnishing is a commercially acceptable method of applying UV lacquers, without making the investment of UV curing units and UV compatible sundries. Problems are however common, and are generally related to the conditions in which the sheets are transported and the time involved between printing and subsequent varnishing. These problems are described below:

CANDLING

Candling will occur when inks have not been given sufficient times to dry or solvents have been retained either by unsuitable packaging or inks. ‘Candling’ is the term used to describe the easy scratching of the lacquer after application, and is so-called due to similarities between scratching the wax of a candle.

It is important when sending work out to trade houses to ensure the ink has had at least 24 hours to dry, and has not been shrink wrapped or tightly packed therefore restricting the release of solvent.

If a problem is observed, it will be necessary to air stacks and give the ink an increased period of time in which to dry.

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RETICULATION:

Prior to printing work which is to be subsequently UV varnished, it is important to check with the ink manufacturer that the ink is suitable for such an application.

Inks with very high levels of wax or solvent, can result in UV reticulation, which cannot be remedied and will require the job to be re-printed with suitable inks.

Reticulation is the word used to describe the unwillingness of varnish to sit over the ink, and is also known as rejection. Reticulation is related to surface tensions, which can be measured using special dyne pens.

OTHER FACTORS

Depending on the work type, some jobs will require such finishing operations as foil blocking, embossing, gluing, etc.. On such occasions, it is essential that the lacquers are known to be suitable for such finishing, as a special product may in fact be required.

When using foil blockable or glueable varnish, it is important that pumps, troughs and other piece of equipment used for application are thoroughly cleaned. This will prevent any contamination from other lacquers, as even a small amount of contaminate material can interfere with foil/glue adhesion.

If you have any questions regarding UV varnishes please contact the Technical department at ECS via sales@ecsnotts.co.uk

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