# Guidelines for UV Varnishes or Film Lamination

**Guidelines to consider which will help produce consistent results when print is to be UV varnished or Film laminated.**

As both processes depend for their success on the selection of suitable substrates and inks it is important to decide before the job is printed whether the job is going to be laminated or varnished.

Some important points to consider are:

## Choice of Substrate

It is fair to say that most substrates can be UV varnished or film laminated however as general rule of thumb these should be smooth coated substrates with a good degree of 'hold out'.

## Uncoated Substrates

These are normally unsuitable for UV varnishing or Film laminating as varnishing these substrates often produces poor or mottled gloss and darkening due to uncured varnish soaking into the substrate. (Uncured varnishes may also result in an unacceptable odour in the finished product and can be potential a health hazard)

Laminating uncoated substrates often results in a 'silvery' spotty result particularly over dark colours. (The bond strength of the laminate may also be reduced).

## Matt Coated Substrates

The slightly rough nature of these types of substrates may also produce a 'silvered' result when laminated and UV varnish may have a slightly lower gloss or pinholes, though screen UV varnish may give a better result, as a heavier coating weight of varnish is applied.

If in any doubt about the suitability of a substrate – supply samples to your nearest Celloglas factory who will be happy to produce proofs with your chosen finish.

## Suitable Inks

To produce good results for laminating and UV varnishing inks should be relatively wax free and fully dried.

The three main criteria that need to be considered when selecting suitable ink are:

- Pigment choice
- Drying rate
- Surface wettability (wax content)

If in any doubt about what inks to use - the simplest way is to specify to your Ink Supplier when ordering that the inks must be suitable for laminating and UV varnishing.

# Guidelines for UV Varnishes or Film Lamination

## Pigment Choice

Reflex Blue, Rhodamine Red and Pantone Purple should not be used in any inks to be film laminated or UV varnishes.

(It should be noted that these pigments are present in a large percentage of Pantone® mixes).

These pigments can chemically react with water based laminating adhesives and UV varnishes resulting in a colour change or 'bleaching' action on the pigment.

Other factors can also influence bleaching or colour change such as:

**Tint strength** – the colour change is more evident if there is a small percentage of sensitive pigment in the ink – as any colour shift will be much more noticeable.

**Print Drying** – the colour change is usually more severe if the inks are not hard dried at the time of processing as the resin system in the ink can offer a degree of protection to the sensitive pigment particles.

Ink manufactures can match colours to be laminated and UV varnished using non-sensitive pigments, though this will involve a special making as it is not possible to directly replace the base colours in the Pantone® blending system.

If it has not been possible to avoid the use of sensitive ink pigments then allow extra time for the print to fully dry before the finishing process, it may be necessary to air the sheets frequently to help accelerate drying.

## Metallic Inks

These inks can cause sometimes cause unpredictable problems when laminated and UV varnished.

Metallic inks often suffer from poor cohesion between the metal flakes. Laminates and varnishes applied to such surfaces are likely to exhibit poor adhesion (laminates will lift easily from trimmed edges and UV varnishes will have poor scratch resistance or 'shell off').

The print finisher has no influence on this type of problem as the failure is occurring within the ink.

Metallic inks often have a 'waxy' surface – this is due to the lubricants added when the metallic flakes are manufactured.

These lubricants can prevent good adhesion of a laminate or varnish and lead to poor flow out of the UV varnish.

If you have no choice but to use metallic inks it is recommended that they do not bleed out to the trimmed edges or areas to be creased and folded.

If you have time, proof the job – as proofs that give a defective UV varnish result can usually be laminated, provided the metallic ink is within the body of the sheet.

# Guidelines for UV Varnishes or Film Lamination

## Ink Drying Time

The majority of print being processed will be sheet fed litho, printed with oil-based oxidation drying inks. ('Conventional' or 'Press Stable' ink types).

There are various finishing problems associated with the state of ink dryness of the print at the time of finishing so it is important to allow sufficient time for any volatiles in the ink to evaporate before the finishing process.

Reasonable time intervals should be planned between printing and finishing. (No set time can be laid down, as many factors can affect drying time, as a guide a minimum of 24 hours should be allowed but this can vary due to many contributing factors).

## Common Problems Associated with slow ink drying include:

- Piping of laminated OPP film.
- Poor adhesion or 'Reticulation' of UV varnish.
- Ink colour change
- Set off and blocking in the stack.
- Varnish 'Shelling off'

## Surface Wettability (wax content)

Inks to be laminated or UV varnished should have a low wax content. Excess waxes can result in poor bond strength of a laminate or result in poor adhesion or pin holing of a UV varnish. Poor wettability can also result from silicone or other additives when remoistening the print surface on Heat Set Web Offset work. IR drying can also help to promote migration of waxes and other additives to the print surface and may increase the risk of problems particularly in heavily printed four-colour build areas.

## Summary

It is important to be aware that only a very small proportion of UV varnished and film laminated print results in a problem.

Unsuitable substrates and inks may sometimes be successfully processed, but this can only be viewed as a risky gamble.

## DO

- Consider both substrate and inks before varnishing or laminating.
- Allow sufficient time for the ink to fully dry between printing and the finishing process.
- If in any doubt, submit samples for proofing tests.
- Consult your Ink Supplier for advice on suitable inks.
- Think about spot register implications.

## DON'T

- Use inks, machine varnishes or sealers with a high wax content.
- Use rough or uncoated substrates without testing to see if the finished result is suitable.
- Use absorbent surfaces for UV varnishing
- Use excessive amounts of anti set off spray powder

# Guidelines for UV Varnishes or Film Lamination

## ‘Tight’ Register for Spot Varnished Work

This has always been and will continue to be a vague and difficult arena. When a sheet passes through a litho press (a complicated mangle) sheet distortion can often take place due to two main factors:

1
Pressure required from the blanket to the substrate - to transfer the printed image. This pressure can distort the sheet, often seen most at the corners of trailing edge. Ink ‘tack’ and ink coverage can also have a influence on this distortion.

2
Litho dampening - although printers go to great lengths to reduce as much as possible the amount of damp solution applied on press, any slight excess can be transferred to the blanket and in turn to the substrate. Thus slightly swelling the cellulose fibres in the substrate and results in further distorting. Grain direction has a influence here and as a result most sheets are long grain - as it is easier to adjust for print length variation than print width.

Printers are aware of these factors and will make very small adjustments in repro to overcome this distortion that appears on a printed sheet as it passes through a press - examples are ‘choke’ or ‘lock’ on inks that print adjacent to each other or overprint such as two hits when printing on dense solids.

When we screen varnish - often following lamination, the sheets can be further distorted and as a policy we only make stencils by registering varnished images to sheets that have been processed to the stage prior to varnishing.
By the very nature of distortion it is not constant and two consecutive sheets through a litho press, or indeed a laminating machine can have different degrees of distortion visually this will appear as a miss registration but is not in fact a register issue but a movement of the position of the printed image due to distortion.

## Optical Colour Change

It is important to note that laminating and UV varnishing will both optically enhance the final colour of a printed image.

Half tone prints will always show more apparent colour shift than solid printed images, as the film or coating has the effect of magnifying the half-tone dots.

There is no way to avoid this effect, if an exact colour match is required, then it is recommended that the job be proofed, prior to printing.

**As a quick’ indicating’ guide to the degree of colour shift to expect, place some ‘sellotape’ over the print surface.**