Celloglas™

Make print memorable

Technical Guide

Reading Registered Office
Unit 12C, Exeter Way
Theale Commercial Estate
Reading, Berkshire, RG7 4AW

T 0118 930 3003
F 0118 932 3256
E thealefactory@celloglas.co.uk

Leicester
Unit 6, Meridian West
Meridian Business Park
Leicester, LE19 1WX

T 0116 263 1010
F 0116 263 1111
E leicesterfactory@celloglas.co.uk

Leeds
Units C7/C8, Cross Green Garth
Cross Green Industrial Estate
Leeds, LS9 0SF

T 0113 249 0056
F 0113 235 1530
E leedsfactory@celloglas.co.uk

www.celloglas.co.uk

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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.

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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.

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Guidelines for Foil Blocking

Guidelines to consider which will help produce consistent results when print is to be foil blocked.

Foil Blocking

These finishes can provide the ultimate in decorative appeal. They are not limited to gold and silver foils, but extend to an impressive range of pigmented, holographic and security foils.

All of these can be combined with embossed images to produce varying tactile effects – any one of which will enhance the printed message and provide shelf appeal for greetings cards, cartons, magazine covers, brochures etc.

Security Foils

These foils are primarily used to uniquely identify products and have the added benefits of deterring theft and counterfeiting. By including these foils on P.O.S materials they give the product a very distinctive high profile appearance. These foils are available “off the peg” in a number of designs or they can be made “bespoke” to your individual requirements.

Textured Foils

These foils are available in a myriad of designs or you can create your own unique image. They will give a design energy and provide an eye-catching alternative to traditional flat foil. These foils are also a cost effective alternative to security foils and they give companies the opportunity to use unique images which can be duplicated in there P.O.S material.

Embossing

Embossing gives you the opportunity to enhance your print with stunning 3-D effects. Embossing is particularly effective when used in conjunction with our other processes i.e matt lamination and spot U.V with the spot U.V image embossed out of the lamination or foilblocking and embossing.

Foil blocking and embossing - Advice for printers

Many problems can be eliminated at the design stage by forethought and correct specification of materials. Occasionally, however, some problems occur in production due to technical issues. Unfortunately these are not so easy to anticipate, control or eliminate.

If your not sure about something, do not hesitate to seek out advice.

Foil blocking onto laminate or varnish

It is generally recommended that foil blocking and embossing is carried out prior to laminating or varnishing. Foil blocking and embossing can be processed after laminating but there is a risk of the foil not adhering to the coated surface.

Matt laminating is the exception to this rule as it can be readily foilblocked after laminating.

It is not recommended that double sided laminates or varnishes are foil blocked as the image is transferred to the underside of the sheet.

Foil blocking large areas

It is possible to foil block large areas of foil onto print that has not been laminated or varnished. We would advise that areas above A5 are proofed prior to printing.

Anti- Set off Spray

This needs to be kept to a minimum and it is recommended that a soluble spray powder is used.

Spray powder can cause an uneven surface on which to foil and on some occasions will dull the foil.

Guidelines for Foil Blocking

Inks – some general advice

Adhesion of foil to an ink can be seriously affected by the presence on the ink surface of waxes or other slip additives. These materials may come from the inks themselves or be applied to the ink surface during re-moistening of heat set web offset printed work.

All inks contain waxes or slip additives, however some have more than others and these are generally referred to as high wax inks.

The slip additives migrate to the ink surface during the drying phase of the ink. The amount that actually reaches the ink surface is largely dictated by the type and quantity added to the ink, the length of the drying time and the amount of ink applied to the paper.

Because ink drying is likely to be slower and the quantity of ink greater in four colour build areas of the sheet, this will promote migration and it is very common to find problems caused by slip additives or waxes only in these areas of the sheet. Infra Red drying of print can also promote migration.

Some foils may be difficult to apply to an ink surface with a high wax content resulting in picking off of the foil. Both problems produce, at best, a poor finish in the affected area and, at worst, an extremely obvious defect.

Recommendations

All work to be foil blocked should be printed using low wax inks or sealed with coatings that also contain low levels of slip additives. The simplest way to ensure this is to specify to your ink supplier that inks coatings or sealers be suitable for foil blocking (and to take the recommendations for their use seriously).

Print Drying

Inks are formulated to set rapidly on the paper surface and to allow work to be backed up or processed in other ways, with minimum delay.

Setting time should not be confused with drying time, which can be significantly longer. Both setting and drying times are affected not only by ink formulation but also by substrate, how the print is made and the design and layout of images.

Problems associated with prints that are not sufficiently dry at the time of processing include:

- Print set off after transport to us but before we have processed the work
- Marking of the print during processing
- Reticulation and/or poor adhesion
- Print set off after processing by us - due to re wetting of partly dry inks

All these problems tend to affect heavily printed four colour builds particularly where they are backed up by similar images and are also likely to be variable in occurrence and severity throughout the job.

In each case allowing a little extra time for the print to dry can usually avert the problem. Even when the print appears to have dried sufficiently it is possible for an effect, termed “sweat back”, to soften an ink.

This occurs when ink solvents, which would normally dissipate into the paper and then into the atmosphere, are driven back into the dried ink film causing it to soften to a point where set off can occur.

Guidelines for Foil Blocking

Recommendations

It is impossible, in any practical sense, to predict many of the problems caused by fresh, semi-dried inks and therefore preventative action is difficult.

Advice for graphic designers

The choices you make at the design stage of a printed product are crucial, not only to its final success for your client but also to its successful production in terms of cost and deadline.

In this section you'll find advice that is intended to help you avoid some of the common problems, which we see regularly, and which frequently seem to have been designed into the product.

If you specify foil blocking or embossing on a job it is more likely that the printer will send the printed sheets to a trade finishing house such as Foil Works, or one of our associate companies for processing. We might also be contacted to provide additional services such as laminating, varnishing, embossing, cutting and creasing etc. before returning the processed sheets to the printer or transporting to a bindery.

Foil blocking and Embossing

When designing with foil full consultation is essential at first stage of planning.

Some things to avoid:

- Planning to have foil blocking after lamination or varnish
- Having the foil image to close to the grip
- Putting two coloured foils too close together
- Using a large foiled area
- Consider the planning and lay down of the printed sheet as waste foil is very expensive

Eco Films

Overview

CelloGreen® films have been developed to suit Environmental changes within the Print Industry, offering an alternative to OPP films. Giving Celloglas a range of film laminates to offer to Printers and Designers, which are biodegradable and recyclable. (Where facilities exist).

CelloGreen® films are accredited with DIN EN 13432 – the Internationally recognised standard for compostability and biodegradation)

CelloGreen® films are manufactured from cellulose diacetate with the main raw material (cellulose) being sourced from sustainable forestry in North America (SFI approved source – this is the North American equivalent of the FSC).

These films offer a range of different finishes, which can be used on the same diverse range of products as OPP to give superb results enhancing and protecting the print surface. - Films are available in GLOSS, MATT, SILK and SEMI MATT.

Being manufactured from Cellulose - CelloGreen® film laminates are suitable for gluing and Foil Blocking and can be screen UV varnished (except semi matt).

Gloss CelloGreen® film is not recommended for work laminated on both sides. The smooth Hi Gloss surface of Gloss Acetate makes this film more prone to clinging and sticking in the stack.

General Guidance

When laminating CelloGreen® film it is important to note that it is more brittle and less elastics than OPP. Therefore care needs to be taken if deeply embossed or subjected to tight or narrow creases.

Take care with machine sealers as the incorrect use can inhibit the bond of the laminate to the board surface.

Allow at least 24 hours post lamination to ensure that the maximum laminating bond is achieved.

Please also see ‘General Guidelines to consideration for UV varnishing and Lamination’

Rub & Reveal (Thermochromic) inks

Overview

Thermochromic inks are water based and are primarily used to hide printed messages, however they can also be used as an anti photocopying device to increase security of Documents.

When rubbed the Thermochromic ink changes to a semi- transparent grey/white state, allowing the message underneath to be read.

Black is the only colour that will mask other colours. (Different colours are available but they are extremely weak and will only mask very light tints of the same colour).

Thermochromic inks can be manufactured to react at different temperature ranges - though they are most commonly set to react at temperatures close to normal human body temperature. (This allows for the underlying message to be revealed through the warmth of a hand)

'Chill and Reveal' inks are also available – these inks appear slightly translucent at room temperature, with a hint of the chosen colour, but change colour when chilled in a refrigerator. (Colours available: Black, Blue, Orange, Pink, Red + Green).

These products are not approved for Direct food contact.

General Guidance

Ink has a short shelf life 1 MONTH in unopened containers – inks cannot be kept in stock and must be ordered for each job.

Do not use over areas that are to be folded, creased or trimmed.

Inks are best used to cover small image areas, there may be slight 'pinholing' evident in large image areas, which is not possible to completely eliminate.

Ensure the print surface to be covered has equal absorbency and hold-out – as uneven absorbency may cause the image beneath to 'show through' the Thermochromic ink.

For maximum protection of the Thermochromic print surface OPP lamination is recommended.

Please also see 'General Guidelines to consideration for UV varnishing and Lamination'

Soft Touch Laminate

Overview

Cellotouch is a matt BOPP laminating film that has a patented coating that produces a sensuous, high quality tactile surface.

Cellotouch can be used in all applications suitable for lamination.

General Guidance

This film has an extra matt surface, and when applied to dark printed images could show finger marking. We therefore recommend that when handling sheets with dark images cotton gloves should be worn.

Because of the high level of the wetting tension of the soft touch surface when board that is laminated both sides with soft touch is subsequently varnished, It's recommended to run small stacks to avoid the potential of any transmission of the varnish to the other side of the film'. Small stacks may require the provision of extra pallets.

The soft touch film can generate problems of scratches on the production of hard cover books, due to high coefficient of friction between the soft touch and any guides of the converting line.

We recommend to clean all the guides of the converting machine and to make test prior to produvtion In case of scratches, we recommend the use of teflon coated adhesive tape to reduce the friction.

Please also see 'General Guidelines to consideration for UV varnishing and Lamination'

Fragrance Burst Coatings

Overview

These are specially created coatings that give off the desired fragrance when lightly scratched or rubbed.

There are a wide range of fragrances available – please see separate updated list.

Bespoke fragrances can also be incorporated by the use of the fragrance essence – please discuss your requirement with Celloglas staff.

The surface of the printed Fragrance Burst ink will be slightly matt in appearance. Therefore allowance for this must be made at the design stage.

The coating is supplied as a two pack system and must be mixed prior to application. Once mixed the coating has a shelf life of 4 – 6 hours and any surplus coating must be discarded.

General Guidance

Do not use over areas that are to be folded, creased or trimmed.

Absorbent substrates are unsuitable, as the fragrance will be absorbed into the fibres preventing easy release of the fragrance.

The printed surface must be fully dried before application of the Fragrance Burst ink as any retained solvents from the ink may have a detrimental effect on the micro encapsulated fragrance.

Be aware of the limited shelf life of mixed coating.

For all fragrances it is important to supply samples to the customer of the intended fragrance for approval prior to production.

Glitter Varnish

Overview

Glitter varnish is a blend of small coloured particles of metallic polyester film and UV screen varnish.

The extremely high coating weight varnish is designed for decorative use only.

A range of colours and particle sizes are available.

General Guidance

Do not use over areas that are to be folded, creased or trimmed.

Because of the high coat weight glitter varnish may not be suitable for the reproduction of fine details.

Mesh selection will vary depending on the particle size of the glitter.

Please also see ‘General Guidelines to consider for UV varnishing and Lamination’. As the heavy application of Glitter varnish can further exacerbate these potential problems.

Hi Build UV screen Varnish

Overview

Hi Build varnish provides a high gloss finish with an ‘emboss like’ textured feel.

The effect is achieved by using a very course mesh and special ‘structured’ UV varnish.

The final texture achieved will vary depending on the image chosen – broken images give the best effect as a courser mesh can be used – solid areas have to be run on a finer mesh which results in a lower build of varnish however this will still be approximately three times higher build than standard screen UV.

The extremely high coating weight varnish is designed for decorative use only and is not suitable for large solid areas of print.

Due to the course mesh used – it is not possible to achieve very fine type.

General Guidance

Do not use over areas that are to be folded, creased or trimmed.

Large solid image areas will have a ‘pinholed’ appearance, which is not possible to completely eliminate.

Mesh selection will vary depending on the image selected.

Please also see ‘General Guidelines to consideration for UV varnishing and Lamination’

Phosphorescent – Glow in the Dark

Overview

Phosphorescent inks contain optically active pigments, which absorb light energy from any light source and then re-emits it as light – meaning the printed area will literally 'Glo in the Dark'. (The emission time is directly dependant on the previous exposure time.)

The standard colour is yellow/green – but Blue/green is also available on special order

Phosphorescent inks are solvent based and are applied by the screen process.

They are primarily used for functional safety signs but can be used for a number of novelty decorative items such as Greetings Cards, Posters, children's games etc.

Phosphorescent pigments have very poor covering power and will not print evenly over other inks, it is therefore recommended that they are applied directly onto the unprinted (but sealed if possible) plain white substrate and that the Phosphorescent image areas are always reversed out.

The high coating weight of ink laid down by the screen process is designed for decorative use only.

The surface of the printed Phosphorescent ink will be matt in appearance and will feel rough to the touch – to enhance and protect the surface and to give a glossy effect it is recommended that the sheets be overlaminated after the application of the Phosphorescent ink.

General Guidance

Do not use over areas that are to be folded, creased or trimmed.

Please also see 'General Guidelines to consideration for UV varnishing and Lamination'

UV Varnish on uncoated substrates – ‘Jamie’ spec

Overview

Jamie spec provides a UV gloss or matt finish on to uncoated substrates that previously could not be UV varnished.

This process is achieved by using a specially formulated aqueous sealer prior to applying the UV varnish.

Screen varnish, High Build and other screen applied coatings can be applied above sheets matt varnished in this manner.

General Guidance

Take care over areas that are to be folded, creased or trimmed and fully proof/trial prior to production.

Sheets printed with varying densities of ink or pattern applied machine seals or coatings may show variations in coating due to differential absorption.

Please also see ‘General Guidelines to consideration for UV varnishing and Lamination’

Printing onto Mirri substrates

Mirri is made by laminating a moisture and temperature stable film to one side of a paper, card or board. Most films are polyester based and some have a print receptive coating, however the following tips will apply irrespective of the Mirri substrate chosen.

For a more in depth printing guide please call: 0118 930 3656

UV Litho

Minimise waste - we suggest you 'make ready' on plain white material of a similar grammage.

Always handle the stocks with care to avoid scratching / scuffing.

To avoid damage to the surface of the film - turn off all joggers in the delivery unit.

Turn off all static bars to avoid gaining extra static in the sheets.

When printing use plastic inks where possible to avoid the inks scratching.

If printing on both sides of the sheet - print mirri side first. The reverse of most of our products are lick coated and will print as well as any similar material.

Always take care not to scratch the face side when printing on the reverse.

Turn all air settings down as low as possible when printing on the reverse side. If using double-sided Mirri stock keep settings low for both passes.

Also be aware when printing, heat must be reduced to prevent blocking as the film retains heat.

When printing 4 colour it is possible to replicate paper by printing a white opaque under the image areas, this will create a 'punchier' look by adding areas of contrast in the image.

UV Screen

Minimise waste - we suggest you 'make ready' on plain white material of a similar grammage.

Always handle the stocks with care to avoid scratching / scuffing.

When printing use plastic inks where possible to avoid the inks scratching.

If printing on both sides of the sheets - print the Mirri side first. The reverse of most of our products are lick coated and will print as well as any similar material.

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When printing 4 colour it is possible to replicate paper by printing a white opaque under the image areas, this will create a 'punchier' look by adding areas of contrast in the image.

MIRRI

REFLECT LUXURY

Printing onto Mirri substrates

Conventional Litho

It is important to note that when printing by conventional offset litho, inks must be selected from formulations which will dry on non-absorbent surfaces.

These ink formulations are commonly known as ‘foil inks’ or ‘Fully Oxidising Inks’ and will dry solely by oxidisation.

Your ink supplier will be aware of these types of ink and should be able to recommend the correct range of inks to use. (Good results have been obtained in the past using ‘Oxy Dry Plus’ from Stehlin Hostag or ‘Polybond’ from Sun Chemicals) - though we recommend that you conduct tests if in any doubt - we will be happy to supply samples to your ink supplier on request.

Minimise waste - we suggest you ‘make ready’ on plain white material of a similar grammage.

Always handle the stocks with care to avoid scratching / scuffing.

To avoid damage to the surface of the film - turn off all joggers in the delivery unit.

Turn off all static bars to avoid gaining extra static in the sheets.

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When printing 4 colour it is possible to replicate paper by printing a white opaque under the image areas, this will create a ’punchier’ look by adding areas of contrast in the image.

Keep stacks as low as possible to avoid set off. Allow at least 48 hours for drying.

Digital printing

Developments in digital printing technology in recent years have been vast, the range of digital print technologies now available is huge, from document printing through to large format such as the Inca Spyder 320, a UV flatbed printer.

We recommend if you are printing digitally on Mirri to run a test on the machine first, or consult your technical support for the digital machine. Also check with the Mirri support team for technical advice.

We have tested Mirri on a limited number of digital machines and these tests are ongoing, after each test a report is written giving guidance on how to print on that particular machine.

Printing onto Mirri substrates

Finishing - Foil Blocking

Foil blocking can add that extra contrast in both metallic and pigment foils. For best results use foils suitable for plastics or PET, when foiling on flat beds try to avoid large solid areas as you can get 'Gassing' or pin holing. Ask your foil supplier for the best grade to use.

All Mirri materials are fully foil blockable.

Finishing - Cutting and Creasing

Mirri is very easy to cut and crease, make sure blades are sharp and straight to avoid film pull off or flick back. Use a deeper wider crease to avoid rebound.

Finishing - Gluing

Use high tack adhesive to achieve a better plastic to substrate bond.

It is recommended to kiss cut or cut through the film to allow the adhesive to penetrate to the substrate when cut and creasing, this will allow a better bond.

Embossing / Debossing

Due to the laminated film layer, Mirri is ideal for embossing or debossing.

Additional coatings

Mirri is fully compatible with laminating, spot UV, overall UV and water based coatings.