

# MIRRINOR

## TECHNICAL GUIDE 1/13

### A BRIEF INTRODUCTION

MirriNor is made by laminating a moisture and temperature stable film to one side of a Norboard T flute microflute carton material. It is technically possible to have the film laminated to both sides (upon request and subject to quantity). The standard MirriNor reverse is a printable (uncoated) white Kraft; other papers are available, again upon request. The film is acetate based and is print receptive. Later in this guide some tips are provided to assist in getting the best results in printing and finishing. As the film is acetate, it is the sustainable and the environmental choice in adding value to your packaging and POS / POP.

### STORING & HANDLING

#### Storage

As a natural product, MirriNor is susceptible to environmental changes just like any other board. Our stringent curing protocol however ensures that the board is despatched in the most stable condition possible.

During the manufacturing process the base Norboard is continually checked for stability via an Absolute moisture tester.

Mirri have long understood the balance required for laminating film to cellulose based substrates and MirriNor is no different.

Therefore expect stable material. As long as the board is stored in constant conditions and not moved regularly between different environments, it should remain in a pristine condition. The same points apply to MirriNor grades as to all paper, card or board with regard to exposing the material to the elements - please don't!

When you are unloading MirriNor off a delivery, please place pallets directly into the warehouse as you don't want to compromise the pre-cured material by exposing it to the elements. This is normally much more critical for MirriNor as the expectations of the board are higher than the majority of standard materials.

Please note that sometimes storage areas are very dry environments, so dry in fact (especially in winter) that the R.H (relative humidity) of the surrounding air around the pallet can drop to below 40%.

This could lead to an excessive static build up in the board, which could result in productivity loss. For offset litho it can prevent the board feeding smoothly on press. \*As detailed in the feeding section in the offset litho printing section.

Where applicable - It is essential to keep the pallets wrapped until required, and to unwrap them as detailed in the next section, as the ambient R.H during manufacture ensures that the boards own R.H is fit for purpose.

# MIRRINOR

## TECHNICAL GUIDE 2/13

### STORING & HANDLING CONT...

#### Handling

For MirriNor as with other Mirri materials basic common sense applies to handling. Taking particular care to minimize handling as the film will highlight finger prints and can scratch. Ensure that the board has had some acclimatisation before subjecting a process to it. This will permit optimum production efficiencies.

As already outlined MirriNor is supplied in a stable, cured process ready condition and should not be unwrapped prior to use. This is especially pertinent for printing, particularly for offset, as potential further 'conditioning' could lead to board shape movement and feeding difficulties. The only time that we would condone unwrapping prior to use would be if the board store area were controlled for temperature and relative humidity. Otherwise, unwrap and go straight to press, or to the pile turner if you wish to use one. Please be aware that excessive jogging will create scuffing / scratching and potentially damage the film. Once printing is over, please ensure that the board is kept stable to ensure trouble-free finishing. A good tip is to re-use the original pallet top boards by replacing them back on the stacks, again taking care not to scuff the film surface.

### PRINTING/IMPRESSION PROCESSES ON MIRRINOR

All the main print and impression processes are possible on MirriNor, including:

Offset litho sheet-fed UV (& Conventional) / UV Screen / UV (sheet-fed) Flexo / Flat Bed Digital  
Embossing / De-bossing / Foil blocking / Engraving / Additional coatings / Gluing / Cutting and Creasing

To get the best results from printing MirriNor in each process, some of the key points to remember are listed below:

#### Offset Litho: UV and Conventional

When printing MirriNor may we suggest that you "make-ready" on standard plain Norboard in G or T flute to minimise waste and remember to follow the handling advice to avoid scuffing and scratching. Many printers who have not printed thicker calliper carton board may find the following commonly asked questions and answers useful:

# MIRRINOR

## TECHNICAL GUIDE 3/13

### PRINTING/IMPRESSION PROCESSES ON MIRRINOR CONT...

#### *Should we pile turn the board?*

It is not necessary to pile turn the board. As previously indicated, jogging the board could potentially damage the film. Please bear in mind that leaving MirriNor unwrapped for any length of time may lead to board shape changes due to the nature of corrugated sheet composition, therefore if you really feel the desire to pile turn the material, please only do so and go straight to press.

#### *Do we need to acclimatise the board before printing?*

As stated earlier we have already fully cured the material and as such there is no need to unwrap and acclimatise the board within the print room. Therefore we would advocate no longer than one hour between unwrapping the pallets and actually feeding the material. However if the print room is climatically controlled and you have a stable environment, then you could unwrap board for longer so long as it remained within said environment.

#### *I've been told we need a push side lay for all fluted materials - Is this correct?*

#### *Should we use a push?*

Actually, push or pull is fine. There is a strong argument that push lays are better in avoiding marking the board but, providing that the lay is strong enough to ensure register, it will be fine.

Modern vacuum transfer is perfectly suitable for running MirriNor. You may need to cover air holes as appropriate to re-direct the pressure. Central belt versions of transfer feed tables are more sensitive and can provide feeding issues. Please ensure that we are informed if you intend to print MirriNor on such a press, in order to enable us to provide the material shape to comply.

#### *Do we need to consider anything regarding the feeder?*

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

If you have an extended feed table then this should ease the transfer of any given substrate. However they are not necessary for success on MirriNor. Please ensure that any smoothers do not interfere with the board travel, especially where you are unable to adjust or remove the crash bar. A helpful aid to feeding is to use silicone suckers on the feeder, rather than Nylon ones. The static build up from nylon will inhibit sheet separation. Please ensure that all static bars are turned off for the same reasons.

# MIRRINOR

## TECHNICAL GUIDE 4/13

### *Should we have a gripper re-fit/service?*

If you have never or only rarely run thicker carton grades, then a gripper service may be required. Ordinarily modern presses are well made and should be able to operate over their full calliper range. A well-serviced press will always operate better than one, which is not! MirriNor is an excellent aid for highlighting any mechanical issues with your press that normal carton board will not show!

### *Do we need to use specialist blankets?*

Whilst specialist blankets produce superb results, most carton houses with compressible blankets will find their current blankets suitable for MirriNor. There may be times when specialist blankets would be appropriate, on a long run, for example, or for a particularly sensitive job. Otherwise, as some specialist blankets are not suitable for printing other carton grades, they may have limited use, and downtime to change blankets can be counter-productive. If you intend to use your existing blanket then ensure that they are compressible and that the Shore °A blanket values are between 60 - 80°A. This should allow you to print decent results onto MirriNor. Artwork complexity and the general type of work may dictate your usual values. Please refer to the flute shadow question regarding artwork modifications.

MirriNor recommends a multipurpose blanket that will cover all eventualities. Generally, if the blanket is compressible with good release properties, it will provide good results.

Current blanket recommendations that really do improve upon conventional carton blankets and can be used on your normal substrates are as follows:

[Duco Superflex](#)

[Printec Duel-core](#)

[Contitech Conti-Air Prestige\\*](#)

\*Please note that the Prestige is 2.3mm in thickness, whilst the others are the standard 1.95mm, therefore you would have to adjust the packing's if the Prestige was to replace your standard offering.

There are others, but the above three are easily obtainable for all current press formats.

A word of warning with specialist blankets, do not exceed the correct torque tension settings as the life expectancy of the blanket will reduce and you will not achieve optimum results. Please discuss with your blanket supplier or else our own technical department would be delighted to assist.

# MIRRINOR

## TECHNICAL GUIDE 5/13

As well as attention to the blanket type, don't overlook the packing. Ensure they are regularly checked and replaced if necessary.

Also don't overlook the necessity (if required) to adjust the plate packing. This will help with any compression creating colour misalignments which cannot be checked mechanically and where the artwork cannot be altered.

### *Must we increase the nip pressures to ensure that we bottom the print?*

One of the most common misconceptions in printing any microflute (and MirriNor is no different) is that you need to increase the printing pressure to enable the print to bottom out between the fluting. This is normally applied little by little, but this exacerbates the bottoming problem rather than curing it. The best method if extra pressure is needed is to over-compensate and gradually back the pressure off.

The ideal is for 'Kiss-printing' with all the pressure off. However, many printers will find that around 50 to 100microns on the nip should work well - generally a working standard with solid carton grades.

Pressure application or the lack of it has to be made in conjunction with the compressibility of the printing blankets, ensuring correct tensioning and of course don't overlook the packing's (blanket and plates).

### *Do we need specialist inks or varnishes?*

MirriNor is suitable for printing with both conventional inks and UV inks.

For conventional offset litho there is the absolute necessity for inks selected from formulations which will dry on non-absorbent surfaces. These ink formulations are commonly referred to as 'foil inks or fully oxidizing inks' and should dry solely by oxidization. Your ink supplier will be aware of these types of ink and should be able to recommend the correct range of inks to use.

Examples such as Oxy Dry plus from Stelin Hostag or Polybond from Sun Chemicals have achieved good results. MirriNor samples can be sent to your ink provider for them to conduct tests should there be any doubt. For conventional work keep stacks as low as possible to avoid set off. Please allow at least 48 hours for drying.

For UV litho we recommend plastic inks where possible to avoid scratching.

If 2-sided printing is required make sure all air settings are turned down to prevent scuffing and be aware of the heat as it needs to be reduced to prevent blocking as the film will retain heat.

# MIRRINOR

## TECHNICAL GUIDE 6/13

The colour sequence and repro have far more bearing in the quality of the printing than the actual ink set in many cases and if the artwork is client supplied then educating them to the nuances of MirriNor will assist greatly.

When printing 4 colour process it is possible to replicate standard white board by printing an opaque white under the image areas. This will create a 'punchier' look by adding areas of contrast in the image.

The same parameters apply for varnish as ink, although you should give consideration to die cutting and creasing when choosing the varnish. Usually aqueous varnishes do not give any issues whatsoever. However with acetate film liners, heavily siliconised UV varnishes may lead to very dry board, which may result in cracking on carton creases. These varnishes do die-cut better given additional time to settle down. If you have any queries concerning varnish composition then contact your supplier who will help.

### *Should we only use individual unit presses?*

The flatter the board transfer through the press the better. Therefore individual unit presses do offer an advantage over old stack unit configured presses, as do skeleton and/or oversized transfer cylinders on either press configuration. However, none of the above is compulsory and many jobs are run successfully without them. Virtually every suitable new press is supplied in a unit configuration, therefore the above question is becoming less of an issue.

### *Can we still print successfully using solid or standard sized transfer cylinders?*

Yes, of course, although it is preferable to have oversized or skeletal transfer cylinders. The important factor however is flute direction. The flute must follow the sheet travel direction to avoid the board flicking and marking.

### *Does direct print onto MirriNor significantly slow the press?*

The key to successful running of any material, especially MirriNor, is proper presentation and board shape. As MirriNor is presented press ready, there should be no restriction to significant running speed reduction other than what you might expect, given the increased calliper of the board and the subsequent number of sheets per pallet, all of which will potentially increase the number of pallet changes per run.

# MIRRINOR

## TECHNICAL GUIDE 7/13

### *Can we avoid flute shadow when printing MirriNor?*

Assuming that the information provided in this section is adhered to, then printing should result with little or no flute shadow. Please bear in mind that some flute shadow is actually an optical effect and as such, artwork depending, will never be fully eradicated. Again particular emphasis upon the original repro and the ink colour sequence in conjunction with pressure are the key ingredients for success.

MirriNor offer a full technical support service and we are only too happy to attend pre-press meetings and print runs or trials subject to diary availability.

You are also able to contact the technical department via the link in our website or else call the sales office for further assistance

## FLEXOGRAPHY HQPP (HIGH QUALITY POST PRINT)

For top end Flexographic work with the latest UV HD flexo inks MirriNor is suitable.

We are able to provide material matched to the requirements of the press and palletised to suit your feeder style.

The MirriNor technical development team are also following changes in flexo technology to ensure that our products can support new developments.

Some of the commonly asked questions from HQPP printers printing onto MirriNor are:

### *What flute profiles can be successfully fed down a HQPP press and how would you present the board?*

As MirriNor is only available in T or G flute profiles, there is no reason for any ambiguity. It is created for print and as such can and is fed successfully depending upon the press configuration. Please ensure that we are fully informed as to how you require the material presented on the pallet, as it is usual to ensure continuous feed. As such the board will all be stacked one way. Face up or down is the critical information for MirriNor, which is new to the flexographic sheet fed arena. Adjustments to the machine feeder maybe necessary to feed the microflute grades in G or T flute. This may include a facility to reduce the weight of the feed stack by 'blowing' air through the stack to assist feeding (although be extremely careful as the air could create scuffing on the film).

# MIRRINOR

## TECHNICAL GUIDE 8/13

### *How do we control and hopefully eliminate 'flute shadow'?*

Flute shadow is usually the result of excessive 'dot gain', that is created on top of the flute tips. It is more evident on lighter weight liners and the wider calliper flute profiles that predominate on normal corrugated substrates, as a result of the lighter liner 'dipping' between the flute tips. Traditionally the larger the flute profile the more the flute shadow.

Generally flute shadow is dramatically reduced when using a grade with a smaller flute profile which has a higher flute frequency. And which would thus be far less prone to liner dip. As MirriNor is based upon the smallest flute profiles, then physical flute shadow is minimised at the outset.

The liner weight or bulk is also a very important element in controlling flute shadow and as such it is traditionally advisable to run with at least a 130gsm or 170 micron liner to minimise the shadow. MirriNor guarantee a printable surface of 200 microns and thus provide an excellent print medium.

A further way to help eliminate flute shadow, predominantly on solid work, is by using a backer plate (which is a fine screen running behind your main block solid).

Another is to work with your reprographic people in establishing the utilisation of the right carrier (plate) and the caliper and shore hardness of the printing plate. Shore hardness of plates can now be as low as 17/18 shore, taking the compressibility element away from the board.

### *Should I feed the board across the flute or in the flute direction?*

Whenever possible the board should be fed in the flute direction to minimise flute shadow and also help retain the board's structural integrity. There will be lower stress on the compressibility by feeding the board this way.

### *Do I need special flexographic inks to print MirriNor?*

Yes, only use specially formulated UV inks aimed at printing fully coated or non-porous surfaces. These will include a faster drying resin for assisting the drying on coated liners. For presses without inter station dryers, MirriNor is not yet for you! Therefore it is important to establish a competent ink supplier who is familiar with the liner (film) characteristics and able to offer the latest generation of high strength flexo inks for best results.

Faster drying technology varnishes (mediums) do assist in the drying of inks onto coated papers and thus should be the starting point for MirriNor, again refer to your ink supplier.

# MIRRINOR

## TECHNICAL GUIDE 9/13

*Is it necessary to 'fingerprint' our press before we attempt to print MirriNor grades?*

The correct answer is a resounding yes! Any change of material\* should require a new press fingerprint to establish the specific press characteristics on each new material. The DGC (dot gain curve) information produced by fingerprinting is essential for the repro house to enable them to produce stereos capable of giving you the best quality results available. Each individual flute profile and liner type would be expected to produce a different DGC.

\*Not only a change of material, any change to a press characteristic, i.e. change of supplier, change of plate type (liquid, solid), change of anilox specification, change of inking system, should also warrant a fingerprint exercise.

*How do we know what we can achieve on our existing presses and how can we target the right markets to add value to our business?*

We can help you on both fronts, with technical advice on getting the most from your equipment in conjunction with our board offerings. We can support you with trial material and technical support on site upon request, subject to diary availability. Market advice where applicable in developing HQPP sales can also be arranged. Please discuss with our sales team.

## DIGITAL PRINTING

Developments in digital printing technology in recent times has been vast, with the range of digital print technologies that are now available getting larger all the time, from simple document print to large format UV flatbed technology and this is where MirriNor is appropriate. Note that if you do intend to trial MirriNor then discussing your plans with the technical team for the digital machine and the MirriNor technical team is a must.

### **Flat Bed Digital**

This is a rapidly developing area in which our traditional Mirri products are being used. MirriNor is eminently suitable for flat bed digital printing. With the flexibility on our laminator and the Norboard corrugator we are able to provide board sizes and stability to cope with the exacting demands of Flat bed digital printing.

Mirri has been tested on a number of digital machines and these tests are ongoing.

Following each test a report is written providing guidance for that particular press.

# MIRRINOR

## TECHNICAL GUIDE 10/13

### DIGITAL PRINTING CONT...

The following information answer the most commonly asked questions regarding flat bed digital printing on to MirriNor style corrugated substrates which have arisen:

*Is board warping an issue when digitally printing on to microflute board?*

All MirriNor is manufactured flat and will accept digital print without post machine warping. If the printer has a full vacuum facility, then it should hold the larger sizes without difficulty.

*Can the sheets be ordered in any size to take full advantage of the bed?*

Ideally, you should be looking to buy sheets to minimise sheet waste and optimise the bed size. MirriNor can be ordered in bespoke sizes, allowing you to take full advantage of your machine's capabilities.

Please refer to our ordering section when deciding upon optimising sheet sizes.

### UV SILK-SCREEN

All the pertinent points arising for other print processes apply to UV Screen, particularly regarding storage and handling to avoid scuffing and scratching. Make sure that you utilise plastic type inks to avoid scratching. Make ready on plain material to minimise waste.

The following questions and answers may be useful when UV screen printing onto MirriNor:

*Is the material affected by multiple passes through screen print presses and UV dryers and can the board be printed on both sides?*

Weaker materials may be inclined to shrink after initial pass, making register a difficult proposition on any subsequent passes. However given the integral strength of MirriNor corrugated board, this is not usually an issue. However if you are printing both sides of the material, ensure that the reverse is printed first and that the board is cured fully before passing a second time. This should enable any post machine warp to be avoided; please note that particular care must be taken to ensure that the board has cooled sufficiently to avoid heat block and as always watch for scratching.

Obviously make sure that the material is print room acclimatised before printing.

The logo for MirriNor features the word "mirri" in a lowercase, grey, sans-serif font, followed by "NOR" in a bold, uppercase, blue, sans-serif font. Above the "i" in "mirri" are five small red circles arranged horizontally.

# MIRRINOR

## TECHNICAL GUIDE 11/13

### UV SILK-SCREEN CONT...

Board stability is greatly enhanced by printing in line with the flute direction. Long fluted material is always more susceptible to post machine warp than conventional flute orientated board.

#### *Will there be flute shadow?*

Flute shadow is always a possibility, therefore be careful not to exacerbate or create any flute shadow through excessive squeegee pressure during printing. Please bear in mind that printing in line with the flute direction will also greatly aid the issue as the material is more stable this way.

#### *Does flute profile affect the quality of the print?*

Yes, although as MirriNor is a T flute based board, this is minimised from the outset. As such, the print quality issue will not arise unless excessive squeegee pressure is applied.

### SOFTWARE

#### **Color-Logic**

Color-Logic has certified MirriNor as with all other Mirri metallic substrates for use with the Color-Logic process metallic colour system. Color-Logic is an extremely effective and time-efficient tool for preparing artwork and placing whites. It can also be used to produce special effects such as watermarks within the artwork.

In order to print with Color-Logic a printing company must be a certified Color-Logic printer. With Mirri (including MirriNor) substrates, the Color-Logic process metallic colour system provides optimal results over a broad range of printing conditions and with a great many imaging services.

For more information request samples or visit [www.color-logic.com](http://www.color-logic.com)



# MIRRINOR

## TECHNICAL GUIDE 12/13

### FINISHING

#### Foil Blocking & Embossing / Debossing

MirriNor is eminently suitable for foil blocking or embossing / debossing and can add that extra contrast in both metallic and pigmented foils (which is available upon request subject to volume). For best results use foils that are suitable for plastics or PET. When foiling on flat beds try to avoid large solid areas as you can create 'gassing' or pin holing. Refer to your foil supplier for the best grade to use.

It is important to take care in setting up and make-ready. The main consideration must be the compressibility of the board; therefore allowances need to be made on the hit pressures and on the sizes of the male and female components. For certain designs of blind embossing, greater relief is preferable. The laminated film layer adds stability for particularly complex designs due to enhanced surface tension.

#### Cutting and Creasing

MirriNor is very easy to cut and crease. Make sure that blades are sharp and straight to avoid film pull off or flick back (which also applies to guillotining the material).

The creasing formula for MirriNor is based upon the crushed calliper of the board rather than the total calliper of the board before crushing. For example, for a Standard MirriNor grade with a thickness of 750 microns, the crushed calliper will be around 550 microns so you would be able to choose between two and three point rule.

Normally you can use a finer creasing rule when creasing with the flute direction than when creasing across the flutes.

The main reason for this is to ensure that the rule width does not exceed the flute tips and want to follow the flute rather than the creasing rule. Across the flutes you can afford to use wider creases, as they will not be affected by the flute tips.

MirriNor	Cutting rule	Creasing rule	Cito Rec.
750 MirriNor - crush calliper 0.550 1.9mm RY* + Profile	23.80	23.20 -2 point	06 x

\* Please bear in mind that RY can be substituted by IK.

# MIRRINOR TECHNICAL GUIDE 13/13

## FINISHING CONT...

It is critical that when die-cutting corrugated board, the Shore A hardness of the rubber does not exceed 30° Shore A. Most solid board rubber hardness will be at least double this figure and will damage the crease by collapsing the walls and creating cracking.

Creasing depths will vary due to the nature and width of the crease. Either 15mm or 18mm Ply baseboard should be used, dependent upon the thickness of the material being cut and creased. When forming for corrugated, it is always advisable to chamfer or taper flaps into straight creases or better still to use radii. This will elevate cracking and provide proper creasing. This will also assist in avoiding rebound and film stretch.

### Gluing

Use high tack adhesive to achieve better acetate to substrate bond.

It can be a distinct advantage to kiss cut or cut through the film to allow the adhesive to penetrate to the substrate when cut and creasing as this will permit a better bond.

### Additional coatings

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

### Guillotining

A common misconception about corrugated materials is that you cannot guillotine them. This is of course untrue!

With the T fluted MirriNor grade, you can use standard guillotine setups. The only stipulation is that the clamp plate pressure should not normally exceed 1000Kgs and the bundle heights should not exceed 50mm/2". This is because, despite having a small flute profile, it will still crush under pressure and the board will mark. To compensate for this, it is always beneficial to back trim MirriNor when guillotining. Making sure that the blades are sharp and straight to avoid film pull off.

For many forms of corrugated board or plastic or film laminated substrates a flexible clamp plate is a great help! This creates the effect of a shock absorber and alleviates crushing by the clamp plate. Please ask your guillotine manufacturer for the correct flexible clamp plate for your guillotine. Having the flexible clamp plate will allow larger bundles of board to be cut on the substrates than the 50mm/2" limit mentioned above. The bundle heights would depend upon the material specifications, however 100mm/4" should be possible. Some jobs, especially those printed with heavy UV solids (inks) or UV varnishes which are prone to cracking (this is due to the heat in the UV process drying the board out), will again benefit from back-trimming.