

Technical Information



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Technical Information

Technical data

Introduction

The following sections describe the storage, cutting, weeding and application methods for applying Metamark sign vinyl, identifying the special requirements for different film and adhesive types. Extensive hints and tips are included and precautions to be taken when applying to different substrates.

Vinyl Types



Sign vinyls can be one of a number of constructions, each one being suitable for suitable applications. Calendered vinyls are recommended for interior and most exterior applications onto vehicles, buildings and for commercial graphics. Monomeric Calendered or Intermediate Performance vinyls, like Metamark 4 Series, have the simplest construction, and are suitable for short term (up to 5 years exterior) application to flat surfaces or those with a simple curve, although they may show some shrinkage over time. Polymeric Calendered or High Performance vinyl such as Metamark 7 Series is recommended for medium term (up to 8 years exterior) graphics as they are more dimensionally stable and can be applied to flat or curved surfaces. Shrinkage will be minimal.



For the most demanding applications a cast vinyl, such as the Metamark 2100 Series, is recommended, being softer and thinner than calendered films. Unlike calendered vinyl, cast vinyl does not have memory and is therefore dimensionally stable and will show virtually no shrinkage if properly applied. As well as permitting the cutting of finer text than calendered films, cast vinyl is highly conformable and can be laid over rivets or curved surfaces. For compound curves such as door handle indentations it is still recommended to cut and lay the decal to avoid excess stretching. Cast films can be heated to soften though care should be taken not to burn the film.

Polyester is used as the face film for polish effect materials as it achieves a high gloss finish. Polyesters are non-conformable, do not stretch and should not be applied to compound curves. They are only able to achieve a low adhesion on textured surfaces. The face film of reflective vinyl is manufactured using a compound containing glass beads and resin, and is therefore more difficult to cut.

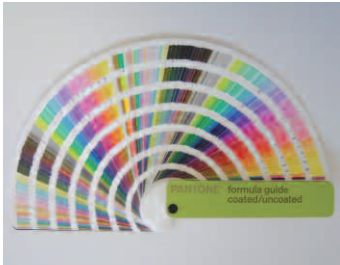
Adhesive Types

All the vinyls Metamark manufactures and supplies use a pressure sensitive adhesive. Each vinyl has a slightly different level of initial tack, which serves to hold the decal in place whilst being applied. Once pressure is applied with a squeegee or roller, a chemical process begins in the adhesive, which will increase the bond with the substrate. The final strength bond will be formed after 3 to 5 days, depending upon the particular adhesive used and the ambient temperature, so care should be taken with any graphics during the first few days following installation.

Many vinyls, including the Metamark 7 Series, 4 Series and T Series, are supplied with solvent-based acrylic adhesives, however water-based (solvent free or emulsion) acrylic adhesives are also common. Care should be taken when wet applying films with water-based adhesives. Use no more than a fine mist

of application fluid and expel any fluid immediately to avoid the adhesive turning milky, although this condition should clear over a number of days. When a water-based adhesive is combined with non-porous polyester films application can prove difficult for large areas. Refer to the technical data sheets for film and adhesive specifications.

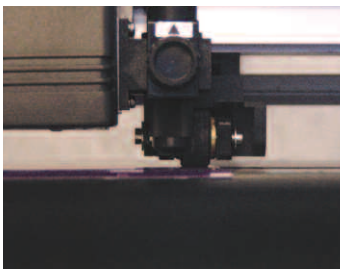
Colour Matching



Graphics are often specified by the end user to be produced to one of several colour matching reference systems that are used across industries, including Pantone®, RAL and British Standards. Most vinyl ranges are not cross referenced to these systems, and in addition a typical vinyl range with around 50 colours will never be able to match the variations of thousands of shades in each colour matching system. Metamark supplies colour reference guides, or the Sales Office will be pleased to advise you on the closest match available from within our ranges. Custom colours can be produced in the Metamark 2100 series cast range, and a detailed quotation is available from the sales office.

Plotters and Blades

Plotter blades are generally available in cutting angles of 30, 45 and 60 degrees. Use a 30 degree blade for routine cutting of calendered and cast vinyls, but use a 45 or a 60 degree blade when cutting thicker materials such as fluorescent, reflective and sandblast material.



Take particular care when handling plotter blades; do not apply excessive pressure, and when handling never touch the tungsten carbide point with your finger, as the oils from the skin will blunt the cutting edge. If you experience cutting problems, inspect the blade under a magnifying glass to ensure the tip is in good condition, and also check the condition of the Teflon cutting strip which on most plotters runs laterally across the throat; this can become grooved from continued use and will adversely affect cutting performance.

Metamark supply a comprehensive range of compatible plotter blades. We do not recommend the use of resharpened blades, as resharpening changes the length of the blade, and blades wear at the socket end as well as at the cutting tip.

Tools and Equipment

The recommended tools for application include a sharp scalpel, squeegee, scissors, tape measure, metal straight edge, masking tape, application tape, lint free cleaning cloths, isopropyl alcohol and application fluid. Metamark offers a wide selection of plastic and felt squeegees.



Cutting

Computer aided cutters offer cutting weight adjustment and in most cases cutting depth adjustment. Initially perform a test cut on the material. Peel back the cut vinyl and check the cut to ensure that the blade has just marked the silicone layer of the release liner. Then look at the reverse (printed) side of the release liner and check that an impression of the cut is not visible on the reverse of the liner. If such a mark can be seen, the cut is too deep and can will cause paper de-lamination when weeding as well as



premature blade wear and damage. It is important to remember that the choice of cutting weight and depth is dependent on the film type, with cast materials requiring the least pressure and speciality materials such as polyester and reflective vinyls the most. For general guidelines refer to the plotter's manual.

Certain speciality materials such as fluorescent and reflective vinyls and sandblast vinyl will require a greater blade angle and a slower cutting speed, as will materials with a polyester face film. Before processing any vinyl it is recommended that the roll be allowed to reach room temperature, ideally for 24 hours.

Weeding



Once the vinyl graphic has been cut the process of removing the surplus is known as weeding. Using a knife or precision tweezers remove the surplus vinyl, starting at one corner and pulling upwards at an angle of 45° to the text or graphic. Short sharp snatches can often prove the cleanest method, particularly where text has sharp serifs. Correct cutting will save weeding time.

Cutting and weeding can prove difficult in cold or hot conditions and it is important to weed the graphic shortly after cutting to avoid adhesive bleed that will make weeding difficult, particularly in hot conditions. Refer to the technical data sheets for more information.

Application Tapes



The easiest way to apply vinyl is with application tape (also called tack or application paper) to lift and relay the graphic, though panels can be applied without tape. Choose a roll of application tape wider than the graphic and apply across the full width of the graphic, squeegee gently down. Standard tack paper application tape is generally recommended though transparent tapes can be used to ease detailed alignment, and extra high tack tapes may be required for small decals on some etch effect materials. Low tack tape can be used to lift printed graphics without risk of damaging the printed image. Metamark also supplies silicone release paper, which allows multi colour graphics to be built up before applying application tape to the finished design.

Surface Preparation

All the surfaces must always be clean and dust free. We suggest the following cleaning methods:

Painted metals & wood	Isopropyl Alcohol (IPA)
Glass	IPA or vinegar and water mixture
Acrylic & polycarbonate	Acrylic cleaner followed by antistatic rag
Banners or awnings	IPA, vinegar & water mixture or liquid detergent & water
Expanded PVC	Vinegar followed by a quick wipe with toluene
Large panels on vehicles	Degreaser, then wash with a 1:1 mixture of IPA & water

Do not allow thinners or alcohol to come in contact with the vinyl. Use the mildest solvents possible and only clean until the surface dirt has been removed to avoid damage to the surface.

Application Surfaces (Substrates)

Most flat surfaces such as stainless steel, painted steel, and aluminium, glass and most plastics do not generally present a problem for the application of vinyl.

Certain types of plastic substrate may present a problem for the application of vinyl graphics. Polycarbonates are prone to out-gassing (they continue to emit gas for a period after manufacture, and this gas can become trapped underneath the vinyl, forming unsightly bubbles). The adhesion of vinyl to low energy plastics such as polypropylene and polyethylene may be limited. If you are unsure about a particular substrate, it is best to test a new material by applying a vinyl panel and waiting for 48 hours to test for adhesion and to see if outgassing has occurred. When applying vinyl to coated fibreglass, ensure that the wax film used as a mould release agent is fully cleaned off, and also check as above to ensure that the material is completely cured and has ceased to outgas.

All PVCs gain their flexibility from the use of plasticizers in their manufacture, and this plasticizer will migrate out of the PVC surface during the material's lifetime. PVC's such as banner fabric and vehicle curtains may have very high plasticizer content and the migration of the plasticizer will cause distortion of applied vinyl graphics after a period of time. We recommend the use of a specialised material for vehicle curtains, whilst for banners which are to be kept for more than a few weeks MetaFlex banner vinyl should be used. Metamark 4 Series is suitable for short term usage banners.

Application to Glass

There are a number of precautions to be taken when applying vinyl to glass. Adhesion can be a problem in cold conditions, areas of high moisture, and where the glass has been cleaned with silicon based window cleaners. Use isopropyl alcohol to clean the window, and ensure the surface is warm before attempting application. With a wet application leave the graphics overnight before removing the application tape.

Avoid covering the windows with large areas of dark coloured vinyl. The vinyl can cause prolonged heat absorption and retention and can cause the glass to crack or explode. This is particularly of a concern with laminated glass, double glazing, and large areas of vinyl. The stress levels created in the glass are determined by its dimensions, the type of glass, orientation, colour of vinyl and a number of other factors so it is important that the installer determines whether applying the vinyl to glass is appropriate.

Application to Painted Surfaces

Sound painted surfaces are generally suitable for the application of vinyl although the paint must be fully cured before application. For vehicles a general guideline is to allow at least 5 days after painting before the application of vinyl, although this may be longer if the initial coats of paint have not been allowed to cure before the next coat applied. Two pack paints on vehicles provide a more stable surface than cellulose paints, as the latter will continue to give off solvent whilst hardening, and this solvent can become trapped under the vinyl causing bubbling. A test application in a small area is recommended if you have any doubts about the quality of the paint finish.

Application and Service Temperature

In cold conditions vinyl can become brittle and harder to cut, thus requiring unnecessary adjustment of the cutting depth. It can also make application difficult, as the initial adhesion of the vinyl will be reduced and the time taken for the adhesive to cure completely will be longer. The recommended application temperature for applying vinyls using a 'dry application method' is at least 10°C and for a 'wet application method' is at least 17°C. Application in temperatures below 5°C is not recommended.



When applying vinyl graphics to a vehicle in cold weather always try to work indoors and raise the temperature of the vehicle by using a fan heater inside with the vehicle doors open. When this is not possible, for example an exterior application in winter conditions, it is very important to make absolutely sure that the adhesive has established a good bond to the substrate.

The service temperature range stated in the technical data sheets for each type of vinyl is the recommended temperature when in use.

Application Methods



Once the decal has been cut and weeded, and application tape applied, it can be offered up to the substrate and carefully aligned in its final position. Apply a 50mm tab of masking tape to fix each end in place horizontally. Apply a third strip of masking tape vertically across the centre from top to bottom; the tape should extend above and below the decal and fix it to the substrate.



Start with the right hand side of the decal and cut or tear the 50mm strip of masking tape, leaving half on the substrate. Turn the right hand side of the graphic back on itself. Peel away the silicone release liner, cutting it at the centre point where the vertical masking tape fixes the decal to the substrate, and discard. When peeling decals away from the silicone release liner always try to keep them as flat as possible and peel back the release liner towards you. This will reduce the chance of damage to fine details or serifs.

The first half of the decal can now be lightly applied by holding it taught and using the two parts of the 50mm masking tape tab to align it perfectly. Squeegee down firmly. Remove the vertical strip of masking tape and repeat for the left hand side of the decal. Finally remove the application tape by peeling away at 45° to the direction of the text and 180° to the surface. Air bubbles can be removed by puncturing with the tip of a scalpel.



This method of application can be modified for large graphics (in excess of 2m). Apply vertical strips of masking tape at two, three or more intervals. Cut the graphic half way between these points to form smaller panels and proceed as described above.

Calendered vinyls or polyesters should be laid onto the surface without distorting, stressing or stretching and without the use of heat, or the vinyl may pull back from the position in which it has been applied. When applying over corrugations, lay the vinyl into the surfaces without stretching it. Cast vinyl is recommended where surfaces have compound curves.



If it is necessary to apply a decal in sections (panelling) the vinyl should overlap by approximately 3mm. The lower panels should be applied first to avoid water ingress, and on vehicles apply the rear panels first to protect from damage from the airflow.

Wet and Dry Application

Smaller graphics can be applied direct to the substrate as described above, and this is called the dry method. For larger graphics or graphics on glass it is preferable to apply them wet, by using a liquid to slow down the formation of the initial bond of the decal to the substrate, making it easier to locate and reposition the decal, but without affecting its final bond to the surface. Application liquids are commercially available, but an effective mixture is a solution of half a litre of water, a few drops of baby

shampoo and 5ml of methylated spirits. Spray the surface where the graphic is to be applied as well as the adhesive side of the decal using a household spray dispenser.

The amount of spray to be used will depend on the surface type, the film type, and the application temperature and decal size. For laminating large etch glass effect panels onto glass the best results can be achieved by saturating both surfaces, while to apply text onto cold glass keep the liquid to a minimum to avoid excess time before the release paper can be removed. For applying vinyls with water-based adhesives onto glass keep the liquid to a fine mist as the liquid may in some cases turn the adhesive milky in colour. Whilst this effect will gradually clear over a period of days, it can mean unsightly patches visible through the glass. All Metamark's Etch Glass effect vinyls are manufactured using solvent based adhesives to eliminate this problem.

The wet application method is not recommended for application onto riveted or corrugated areas as it can prove difficult to expel the water sufficiently.



When applying materials manufactured with polyester films, it is very important to use the minimum amount of liquid, as the drying process is much slower than for standard vinyls. When using a wet application method it can be necessary to allow several hours for the adhesive bond to build before the application tape can be removed without also removing the decal. Spraying the application tape once the graphic is in place can help to break down its adhesion to the vinyl and ease its removal.

Printing Technologies and Media

The product guide includes a specific product range that has been approved for thermal transfer printing using the Gerber Edge®, Summa Durachrome, and Roland PC60/600. None of the Metamark material is suitable for waterbased inkjet or oil based (Eco Solvent) inkjet printing but most Metamark materials are suitable for screen-printing; full details can be found on the Metamark web site.



The Metamark **DigitalVinyl** range has been specifically developed for solvent inkjet printing. To achieve the best results Metamark offers a profile and settings specification, which is specific to each printer and RIP. The Profiles are available on the website. This range is also suitable for u.v. curable printing.

Applying Digitally Printed Vinyl and Vehicle Wrapping

It is best to wait 24 hours after printing before applying any material printed with solvent based inks to allow for solvent levels to reduce, the print to dry completely and any transient effects of the solvent on the adhesive to pass and the adhesive to regain full strength. Application onto flat or slightly curved surfaces can be achieved by following normal vinyl application procedures. For application into complex curves and vehicle wrapping full application instructions can be found on the web site.



Overlaminating

While solvent inkjet printing offers exterior durable print quality the images can be overlaminated to improve resistance to chemicals such as petrol and cleaners, u.v. and abrasion, which is a particular concern on vehicles. For application of graphics to vehicles it is preferable to apply the laminate once the image has been applied, while for flat images it can be applied before installation.

Cleaning

Once applied, vinyls should be allowed to cure to the substrate fully for at least 72 hours before any cleaning is carried out. Vinyls should not be cleaned with abrasive cleaners, thinners or petrochemicals. Vehicles with vinyls applied must not be steam cleaned.

Vinyl Removal

Vinyls can most readily be removed by the application of heat. Heat the vinyl so as to soften the adhesive but not so much as to melt the film. Lift the corner of the decal and gently peel it back. The adhesive will sometimes remain on the surface, particularly if the vinyl has been in place for a number of years. It can be removed with an acetone based adhesive remover. After removing any residue, clean and prepare the surface with Isopropyl alcohol, which can also be used to remove adhesive where the adhesion is less aggressive. Citric acid based cleaners may also prove suitable and are more pleasant to work with, but do leave a residue which must also be removed with alcohol before any new application.

Durability

The stated durability of a vinyl refers to its tolerance for shrinkage and discolouration. As such, colours tend to have a lesser durability than black and white. Due to their construction cast vinyls will have a greater durability than calendared vinyls. Within the specified durability all vinyls will experience a limited amount of shrinkage and discolouration.

Fire Resistance

The vinyl used in the manufacture of Metamark's products is self extinguishing. The flame resistant characteristics of any panel or artefact made using vinyl is therefore determined by the characteristics of the substrate used

Storage



Vinyls should ideally be stored at 23°C and 50% R.H. Storage in very high or very low humidity can result in the release paper absorbing moisture so that the vinyl will no longer lay properly flat, although most of Metamark's own brand material has the advantage of a polyethylene coated release paper which avoids such moisture.

Rolls of vinyl should be stored on end or suspended on poles in dust free conditions. Unapplied graphics should be stored in a cool dry room away from direct sunlight. Application tape is also very sensitive to humidity levels.

If vinyl is wound too tightly, mottling may occur. Mottling consists of areas of lower gloss. If the patches occur across the width of the vinyl at regular intervals it is probable that the cause is that the roll has been laid on its side; if the mottling is general, then the most likely cause is excessive tightening of the roll on the core. Mottling can be cured by loosening the vinyl on the roll so that air can circulate, and leaving in a warm temperature for a few days. No damage is caused to the vinyl.

Restrictions and Limitations on the Use of Vinyl

There are restrictions on where certain films can be used, including legislation regarding the use of conspicuity reflective markings and window tinting films on vehicles. Certain surfaces are unsuitable for vinyl application. See the 'Application Surfaces' section above.

Additional Information Resources

Further information on the Metamark products as well of details of our latest offers and promotions can be found on our website www.metamark.co.uk. In addition, technical reference and FAQ sheets also available on request from the sales office.

METAMARK warranty

METAMARK signvinyl

Metamark (UK) Limited warrants to its customers that completed decorative markings which utilise Metamark 4 Series, Metamark 7 Series or Metamark T Series **signvinyl**, will remain in good condition without excessive fading or colour degradation for the specified life time of each material when correctly stored and applied in accordance with procedures outlined in the technical literature.

If within the specified years of normal use Metamark **signvinyl** becomes ineffective for its intended use, then Metamark will provide sufficient material to produce a new replacement marking, and will also, at its own discretion, contribute an allowance in additional material towards the costs involved in replacing the graphics.

METAMARK digitalvinyl

Metamark (UK) Limited warrants to its customers that completed decorative markings which utilise Metamark **digitalvinyl** will remain in good condition without excessive fading or colour degradation for the specified life time of the ink used, when correctly stored, printed and applied in accordance with procedures outlined in the technical literature.

If within the specified years of normal use the Metamark **digitalvinyl** becomes ineffective for its intended use, then Metamark will provide sufficient material to produce a new replacement marking, and will also, at its own discretion, contribute an allowance in additional material towards the costs involved in replacing the graphics.

In all cases the converter is held fully responsible for storing, processing and applying the unconverted materials in accordance with Metamark's technical specifications.

Metamark (UK) Limited will not be liable for any indirect or consequential loss or damage, and will not provide any allowance against improper usage, application accident, negligence, chemical damage or improper repair.