

Commercial Solutions Division

Application on Substrates with Recesses and Removal of Graphics

3M™ Envision™ Print Wrap Film LX480mC

3M™ Envision™ Print Wrap Film SV480mC

3M™ Print Wrap Film IJ180mC-10

3M™ Print Wrap Film IJ180mC-114

3M™ Print Wrap Film IJ180mC-120

General Information

This Bulletin is specifically for the application and the removal of 3M™ Envision™ Print Wrap Film LX480mC, 3M™ Envision™ Print Wrap Film SV480mC, 3M™ Print Wrap Film IJ180mC-10, 3M™ Print Wrap Film IJ180mC-114 and 3M™ Print Wrap Film IJ180mC-120 used for substrates with recesses.

Relative Stretching Capabilities into Recesses of Wrap Film Graphic Constructions

Graphic constructions not mentioned here are not recommended or warranted for the ability to stretch for typical wrap installations. It is solely the responsibility of the user to test and approve other constructions.

Example of 150% stretch into recesses: A 10 cm (or 10 inch) piece of film can stretch to 15 cm (or 15 inches).

Example of 130% stretch into recesses: A 10 cm (or 10 inch) piece of film can stretch to 13 cm (or 13 inches).

Important Notice

Use the minimum stretch capability into recesses of the components you are using for your graphic construction, found in the 3 tables below.

Example: If your graphic construction used LX480mC with 8518 and UV ink, your stretching capability would be 130% into recesses if you were applying it to a surface that was recommended in the LX480mC product bulletin.

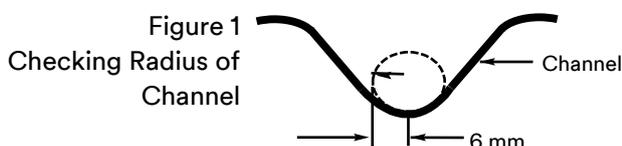
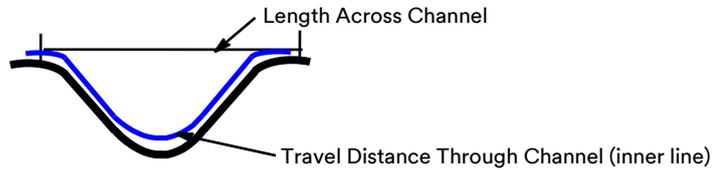


Figure 2
Determine Percent of
Stress



Film	Stretching Capabilities ¹
IJ180mC-10, IJ180mC-114, IJ180mC-120	Stretches up to 130% of the original dimension when the radius of the channel is 6 mm (1/4 inch) or more without using primer or making relief cuts.
LX480mC, SV480mC	Stretches up to 150% of the original dimension when the radius of the channel is 6 mm (1/4 inch) or more without using primer or making relief cuts.

- ¹ Example of 150% stretch into single or u-shape recesses: A 10 cm (or 10 inch) piece of film can stretch to 15 cm (or 15 inches).
 Example of 130% stretch into single recess: A 10 cm (or 10 inch) piece of film can stretch to 13 cm (or 13 inches).
 Stretching beyond these points requires the use of primer and relief cuts.

Graphic Protection	Stretching Capabilities ¹
Graphic Protection other than is listed below	Not intended for stretching; use only types of surfaces recommended in the film's 3M Product Bulletin. Will tent over rivets, may lift from corrugations. Using primer helps keep the film from lifting but not the overlaminates. Relief cuts also help prevent lifting or tenting.
1920DR, 8518, 8520	Stretches up to 130% of the original dimension when the radius of the channel is 6 mm (1/4 inch) or more without using primer or making relief cuts. Stretching more than 130% may cause the overlaminates to lift, even if primer was used with the base film.
9740i ²	Stretches up to 130% of the original dimension when the radius of the channel is 6 mm (1/4 inch) or more without using primer or making relief cuts. Stretching more than 130% may cause the UV clear coat to crack; the use of primer has no impact on this.
8548G, 8549L, 8550M	Stretches up to 150% of the original dimension when the radius of the channel is 6 mm (1/4 inch) or more without using primer or making relief cuts. Stretching more than 150% may cause the overlaminates to lift, even if primer was used with the base film.

- ¹ Example of 150% stretch into single or u-shape recesses: A 10 cm (or 10 inch) piece of film can stretch to 15 cm (or 15 inches).
 Example of 130% stretch into single recess: A 10 cm (or 10 inch) piece of film can stretch to 13 cm (or 13 inches).
 Stretching beyond these points requires the use of primer and relief cuts.

- ² To achieve stretching capability with 9740i, you have to follow optimal processing conditions.

Inks	Stretching Capabilities ¹
Most UV Inkjet Printed Inks	Stretches up to 130% of the original dimension when the radius of the channel is 6 mm (1/4 inch) or more without using primer or making relief cuts. Stretching more than 130% into recesses may cause the UV inks to crack; the use of primer has no impact on this. Stretching more than 130% into recesses may cause the overlamine to lift, even if primer was used with the base film.
Most Solvent Inkjet Printed Inks	Stretches up to 200% of the original dimension when the radius of the channel is 6 mm (1/4 inch) or more without using primer or making relief cuts. Stretching more than 200% may cause solvent ink to lighten; the use of primer has no impact on this.
GSLXr SuperFlex Ink	Stretches up to 200% of the original dimension when the radius of the channel is 6 mm (1/4 inch) or more without using primer or making relief cuts. Stretching more than 200% may cause the SuperFlex Ink to crack; the use of primer has no impact on this.

- ¹ Example of 150% stretch into single or u-shape recesses: A 10 cm (or 10 inch) piece of film can stretch to 15 cm (or 15 inches).
Example of 130% stretch into single recess: A 10 cm (or 10 inch) piece of film can stretch to 13 cm (or 13 inches).
Stretching beyond these points requires the use of primer and relief cuts.

Application Tape

The use of Application Tape is not required on laminated graphics. However, depending on environmental conditions (high temperature) it may be an advantage for a trouble free application. The use of Application Tape is recommended for clear coated samples.

For large format graphics 3M™ Scotchcal™ Premasking Tape SCPM-19 and 3M™ Scotchcal™ Premasking Tape SCPM-44X can be used. 3M™ Scotchcal™ Prespacing Tape SCPS-100 is suitable for pre-spaced graphics or logos.

Application

3M™ Envision™ Print Wrap Film LX480mC, SV480mC, 3M™ Print Wrap Film IJ180mC-10, IJ180mC-114 and IJ180mC-120 are not intended for wet applications. Residual water will cause lifting in the recesses after application.

There are basically two different types of recesses:



U-shape recess



Single recess

The following describes how to apply 3M™ Envision™ Print Wrap Film and 3M™ Print Wrap Film onto both u-shape and single recess.

Cleaning

Clean the substrate thoroughly with 3M™ Surface Preparation System as grease and oil prevent the film from adhering properly. Use lint-free paper towels. After cleaning make sure that the substrate is completely dry.



Note: Do not use isopropyl alcohol as this can affect the lifting resistance of the film in the recessed area. Other solvents than 3M™ Surface Preparation System may affect the expected lifting resistance performance of the film, too.

Alternatively, instead of manual application, specially developed hand-rollers can be used for the application of the film into recessed areas. The hand-rollers allow the film to be applied with uniform, continuous pressure and little friction.



Application to U-Shape Recesses

Before applying the graphic into the recess area, ensure that you are using a graphic film with the appropriate stretch capability.

For example: if the u-shape recess is 9 mm deep on one side and 8 mm deep on the other side. And the overall width of the recess is 40 mm the calculation is as follows:

$\text{stretch} = (\text{inner line} / \text{length across the channel}) \times 100$

$(40 + 9 + 8) / 40 = 1.425 = 142,5\%$ stretch into recess

This means you need to use a graphic construction that can be stretched at least by 143% to its original size without the need of using primer or making relief cuts.

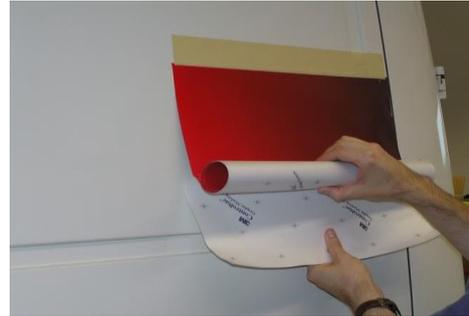
Position the panel onto the substrate and fix the panel with masking tape at the sides and then on the top.



Remove the masking tapes from the sides. Roll the panel up to the top.



Remove the liner carefully from the film.



Start the application on the flat part of the substrate and bridge the film over the recessed areas and deep corrugations. We recommend to use the PA-1 Gold Squeegee to apply the film to the substrate. Avoid air entrapment between the film and the substrate. Use a low friction, thin and soft sleeve if the graphic does not use application tape. Wetting of sleeves helps to avoid scratches on film surface during application.

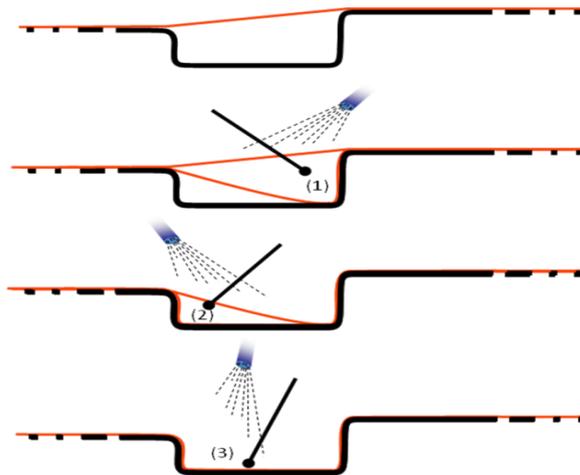


In case application tape is used, remove the application tape.

Apply the film manually or with appropriate tools on the recessed areas. When applying manually, wear cotton gloves to lower the friction between finger and film. Heat the film around the recess area with a professional heat-gun to a temperature of approximately +30°C to +50°C. Do not overheat the film. Only moderate heat is required to achieve conformability.



Start application in recess in the deepest point first (1). Then continue at the opposite point of the recess (2). Last close the middle part of the recess (3).



(1) Deepest point first:



(2) Opposite site:



(3) Center:



Applications to Single Recesses



Position the film and apply it from the top.



Apply inner area first

In case you need to apply the film in the inner area of the recess, calculate the space you need to leave unapplied at a minimum based on the stretch capabilities into recesses of your graphic.

Example: Your graphic can be stretched up to 130% (film stretch = 1.3) of the original dimension into the recess and the recess is 25 mm deep:

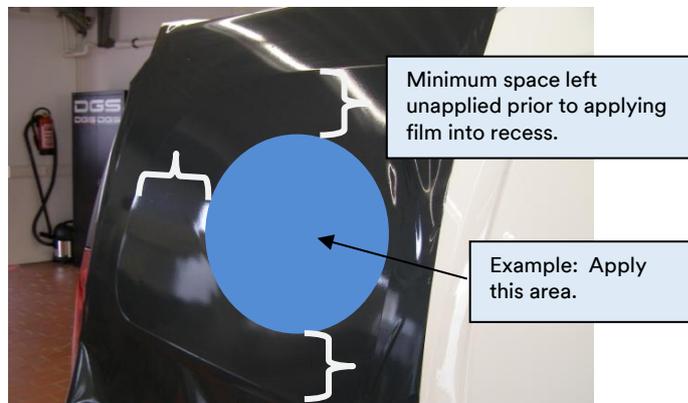
$$\text{film stretch} = \frac{\text{film length after stretch}}{\text{film length before stretch}}$$

$$\text{film stretch} = \frac{\text{film length before stretch} + \text{size of recess}}{\text{film length before stretch}}$$

$$\text{film length before stretch} = \frac{\text{size of recess}}{\text{stretch} - 1}$$

$$\text{film length before stretch} = \frac{25 \text{ mm}}{0.3} = 83 \text{ mm}$$

A minimum of 83 mm non-applied film to the recess is needed before working the film into the recess. If possible it is recommended to leave more space unapplied than the minimum.

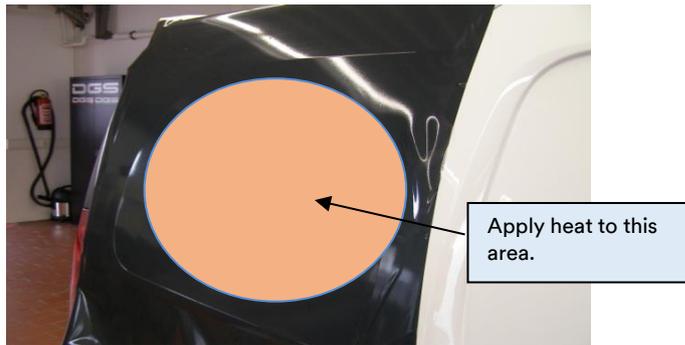


Heat the film around the recess area that is not applied yet with a professional heat-gun to a temperature of +50°C. Do not overheat the film. Only moderate heat is required to achieve conformability. Overheating can cause the film to wrinkle or discolour. Apply heat to areas of film 20 cm beyond the recess area will reduce the tension of the film being applied in the recess area.

It is important to heat up all the film that is not applied yet, not only the recess area.



Apply inner area last 3M recommends to leave the graphic not applied within the recess area.
Heat up the film as indicated in the picture below with a professional heat gun to a temperature of +50°C. Do not overheat the film. Only moderate heat is required to achieve conformability. It is important to heat up a large area of the film that is not applied.



Apply recess Apply the film into the recess either with your thumb or with the 3M™ VCAT-2 Application Roller.



After applying the recess area, apply the remaining non-applied area within the recess.
Due to the 3M™ Comply™ technology, trapped air can easily be removed without causing air bubbles.



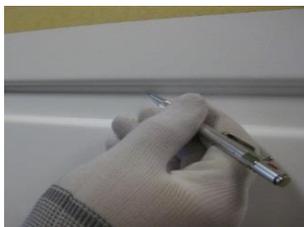
Finished application



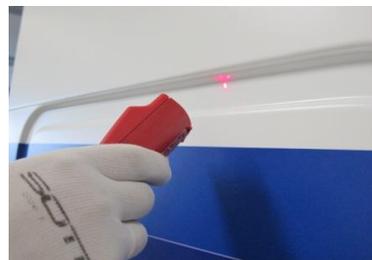
Multi Panel Multi panel graphics should be applied with an overlap from 3 mm to 10 mm.



Post-Heating Ensure that no air bubbles are left trapped between the substrate and the film by re-heating the film in the recessed areas and corrugations with a hot air gun. By doing this, overlooked air bubbles can be detected. Air bubbles between the film and the substrate must be removed with the air release tool.

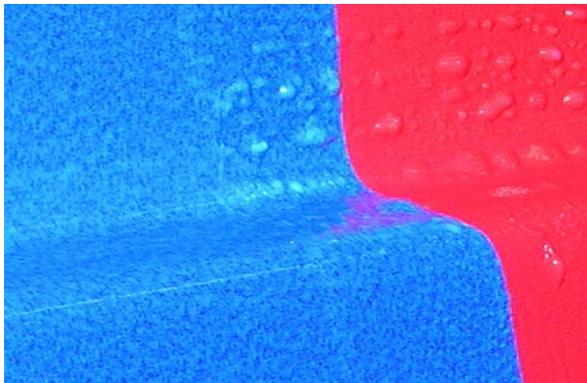
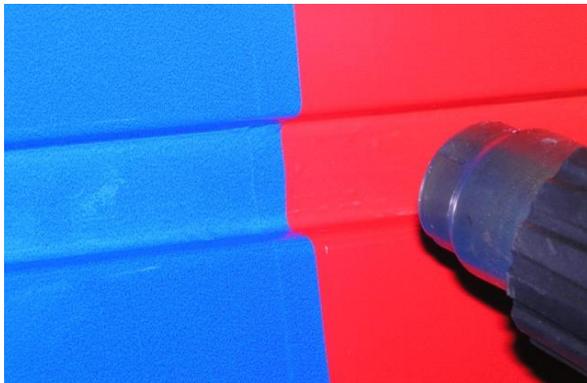


After checking air bubbles, the applied area should be heated to a temperature of at least +85°C to +100°C using IJ180mC and at least +95°C to +120°C using 480mC. Re-roll immediately the film with the small hand-roller in the recessed areas and corrugations. This softens the adhesive, closes remaining air channels and ensures good final adhesion.





Important: In order to avoid lifting at the overlaps of the panels, post-heating of the overlaps with the hot-air gun up to +120°C is necessary to avoid lifting failures.



CAUTION: Re-heating of the film and repressing the film into the corrugations is a quality control to assure a proper application without air bubbles.

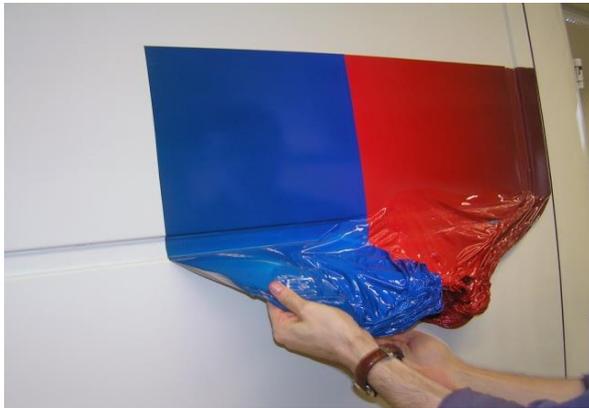
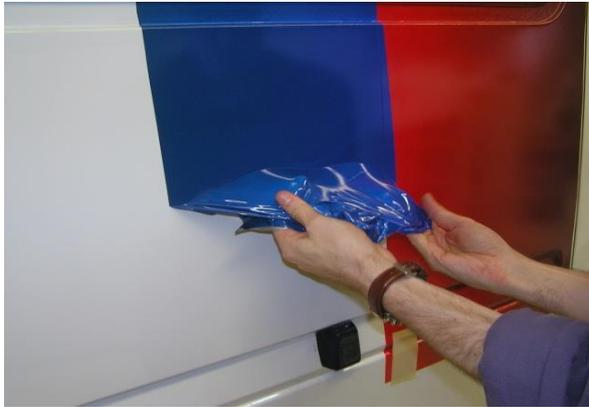
Omitting this can lead to lifting failures!

Removal

Applied graphics can be removed with heat or chemicals.

Heat the film up with a hot-air gun or IR-heater (2000W) at a temperature of approximately +60°C. Lift a corner from the film and pull the film from the substrate at a low pull-off angle. When scoring the film into 10 cm to 30 cm wide parts removal can be made easier. Be careful not to damage the substrate.





Remarks

This bulletin provides technical information only.

Important notice

All questions of warranty and liability relating to this product are governed by the terms and conditions of the sale, subject, where applicable, to the prevailing law.

Before using, the user must determine the suitability of the product for its required or intended use, and the user assumes all risk and liability whatsoever in connection therewith.

As outdoor graphics age, natural weathering occurs causing a gradual reduction in gloss, slight color changes, some lifting of the graphic at the edges or around rivets, and ultimately a minor amount of cracking.

These changes are not evidence of product failure and are not covered by a 3M warranty.

Additional information

Visit the web site of your local subsidiary at www.3Mgraphics.com for getting:

- more details about 3M™ MCS™ Warranty and 3M™ Performance Guarantee
- additional instruction bulletins
- a complete product overview about materials 3M is offering



Commercial Solutions Division
Hermeslaan 7
1831 Diegem, Belgium

Responsible for this technical bulletin

3M Deutschland GmbH
Carl-Schurz-Str. 1
41453 Neuss, Germany

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