

Commercial Solutions Division

3M™ Envision™ Print Wrap Film

LX480mC

3M™ Envision™ Print Wrap Film

SV480mC

3M™ Envision™ Print Wrap Film

LX480Cv3

3M™ Envision™ Print Wrap Film

SV480Cv3

Product Description

Use 3M™ Envision™ Print Wrap Film LX480mC or 3M™ Envision™ Print Wrap Film LX480Cv3 for Latex and UV inkjet printing.

Use 3M™ Envision™ Print Wrap Film SV480mC or 3M™ Envision™ Print Wrap Film SV480Cv3 for Solvent, eco-solvent and UV inkjet printing.

LX480mC, SV480mC, LX480Cv3 and SV480Cv3 are qualified for UV and Solvent screen printing.



This high performance non-PVC and phthalate-free film offers great conformability for a wide range of long term applications, such as indoor and outdoor signs, fleet, vehicle graphics, watercraft, textured walls and graphics exposed to occasional spills of petroleum products.

Due to its excellent conformability it allows even fleet and vehicle graphics installation on recesses and deep channels.

To protect graphics 3M recommends using the non-PVC and phthalate-free 3M™ Envision™ Gloss Wrap Overlamine 8548G or 3M™ Envision™ Luster Wrap Overlamine 8549L. LX480mC, LX480Cv3, SV480mC, SV480Cv3, 8548G and 8549L offer several environmental benefits. They contain no added chlorine or halogens and are manufactured using 58% less solvents than standard cast films. LX480mC, LX480Cv3, 8548G and 8549L are made in part of bio-based material.

This film uses 3M™ Controltac™ and 3M™ Comply™ technology.

3M™ Controltac™ minimizes the initial contact area of the adhesive and allows the applicator to reposition the film during application.

This allows easier installation of large format graphics in a wide temperature range.

Product variants with Comply™ adhesive also have air release channels for fast and easy, bubble-free graphic installations.

Product Line	Screen and inkjet printing	LX480mC	white, opaque, glossy, permanent adhesive (grey) with micro Comply™.
		SV480mC	white, opaque, glossy, permanent adhesive (grey) with micro Comply™.
		LX480Cv3	white, opaque, glossy, permanent adhesive (grey) with Comply™v3.
		SV480Cv3	white, opaque, glossy, permanent adhesive (grey) with Comply™v3.

Product Characteristics

These are indicative values for unprocessed products. Contact your 3M representative for a custom specification.

Physical & Application	Material	non-PVC polymer
------------------------	----------	-----------------

Surface finish	glossy	
Thickness (film)	50 µm (0.05 mm)	
Adhesive type	solvent acrylic, pressure-sensitive, repositionable	
Adhesive appearance	grey	
Liner	double-sided Polyethylene coated paper	
Adhesion	20 N/25 mm	FTM 1: 180° peel, substrate: glass; cond: 24 h 23°C/50%RH
Application method	dry only!	
Applied shrinkage	< 0.1 mm	FTM 14
Application temperature (minimum air and substrate)	+4°C to +38°C	for flat surfaces
	+10°C to +38°C	for curved to corrugated surfaces, with and without rivets
	+16°C to +32°C	for compound curves and surfaces with deep channels and recesses and/or watercraft
Notice!	+10°C to + 38°C	SV versions for flat surfaces
Service temperature (after application)	-60°C to +107°C	(not for extended periods of time at the extremes)
Surface type	flat to compound curved, rivets and corrugations, deep channels and recesses and/or watercraft	
	use for walls:	moderately-textured surfaces and simple curved architectural elements
Substrate type	aluminum, glass, PMMA, PC*, ABS, paint *Might require drying with heat before use	
Graphic removal	Fair to remove with heat and/or chemicals from supported substrates. No liability is given for ease or speed of removal of any graphic. Pay attention to adequate air and substrate temperature.	

The values above are the results of illustrative lab test measurements and shall not be considered as a commitment from 3M.

Storage	Shelf life	Use within two years from the date of manufacture on the sealed original box. Use within one year after opening the box.
	Storage conditions	+4°C to +40°C, out of sunlight, original container in clean and dry area.

The shelf life as defined above remains an indicative and maximum data, subject to many external and non-controllable factors. It may never be interpreted as warranty.

Flammability Flammability standards are different from country to country. Ask your local 3M contact for details, please.

Durability

The durabilities mentioned in the table below are the results of illustrative lab tests. The values show the best performance expected from these products, provided that the film will be processed and applied professionally according to 3M's recommendations.

The durability statements do not constitute warranties of quality, life and characteristics.

The durability of products is also influenced by:

- the type of substrate and thorough preparation of the surface (with 3M™ Surface Preparation System)
- application procedures
- environmental factors
- the method and the frequency of cleaning

Unprocessed film The following durability data are given for unprocessed film only!

Climatic zones Graphic durability is largely determined by the climate and the angle of exposure. Find below a table showing the durability of a product according to the angle of exposure and the geographical location of the application.

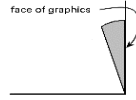
Zone 1 Northern Europe, Italy (north of Rome), Russia

Zone 2 Mediterranean area without North Africa, South Africa

Zone 3 Gulf area, Africa

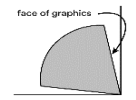
Exposure types

Vertical:



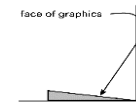
The face of the graphic is $\pm 10^\circ$ from vertical.

Non-vertical:



The face of the graphic is greater than 10° from vertical and greater than 5° from horizontal.

Horizontal:



The face of the graphic is $\pm 5^\circ$ from horizontal.

Interior: Interior means an application inside a building without direct exposure to sunlight.

	Zone 1	Zone 2	Zone 3
Vertical outdoor exposure white	12 years	10 years	8 years
Non-vertical outdoor exposure white	6 years	5 years	4 years
Horizontal outdoor exposure white	3 years	2.5 years	2 years
Interior application interior	12 years	12 years	12 years

3M™ Performance Guarantee and MCS™ Warranty

In addition, 3M provides a guarantee/warranty on a finished applied graphic within the framework of 3M™ Performance Guarantee and/or 3M™ MCS™ warranty programs.

For detailed graphic construction and application options along with specific Warranty periods, please see the Warranty matrices and Warranty information on [3M Graphic Solutions/Warranties](#).

Visit www.3mgraphics.com for getting more details about 3M's comprehensive graphic solutions.

Limitations of End Uses

3M specifically does not recommend or warrant the following uses, but please contact us to discuss your needs to recommend other products.

- | | |
|--|---|
| Graphics applied to | <ul style="list-style-type: none"> - flexible substrates incl. 3M™ Panagraphics™ III Wide Width Flexible Substrate. - low surface energy substrates or substrates with low surface energy coating. - mortar joints deeper or higher than 3.1 mm and square-cut or undercut mortar joints. - painted or unpainted rough wallboards, gypsum boards and wallpapers. - stainless steel. - surfaces with poor paint to substrate adhesion. - watercraft when the graphic is applied below the static water line. - watercraft graphics that are not edge sealed. - vehicles which will be subject to stone chip damage. - surfaces that are not clean. |
| Graphic removal from | <ul style="list-style-type: none"> - signs or existing graphics that must remain intact. - vehicles which do not have the original OEM paint applied. |
| Graphics subjected to Important Notice | <ul style="list-style-type: none"> - gasoline vapors or spills. - 3M Commercial Solutions products are not tested against automotive manufacturer specifications! |

- Graphics printed with UV inkjet inks and applied on recesses or deep channels might show ink cracking in the stretched areas. Some UV inks will show a change of gloss. Ask your local 3M representative for UV ink solutions from 3M which can be used for recessed or deep channel applications.

Tips for successful textured wall applications

This film is designed to be effective on many of the most common moderate textures found in public stadiums, arenas and similar environments.

- Notice
- Due to the wide variation in substrate texture, we encourage you to verify that the film and 3M techniques described in this Bulletin and Instruction Bulletin 5.37 are suitable for each of your applications.

[> Instruction Bulletin 5.37 'Application, Maintenance and Removal of Textured Wall™ Films' <](#)

- Use an installer trained in 3M's techniques and with access to the required 3M tools.
- Test each different textured surface you are considering at each location. See the instructions below.
- Film is more susceptible to lifting from deep or undercut mortar joints than shallow ones (about 3 cm deep). Instruction Bulletin 5.37 discusses the various types of mortar joints.
- In most cases, minor lifting does not detract from the impact of your customer's message, nor from the overall durability of the graphic.
Edge lifting, which is usually most noticeable at mortar joints, may be susceptible to picking and tearing if the graphic is at pedestrian level and within reach.
- Water may accumulate behind graphics applied to unsealed substrates, resulting in water bubbles that cause lifting.

Test Application Instructions

3M testing shows that the following test, which uses a small piece of film, is adequate for judging good adhesion to and appearance on textured surfaces. One of the following applicator tools will be needed for this test

Tools needed 3M™ Textured Surface Applicator TSA-1. Do not attempt this test using a standard squeegee. You will not be successful.
Industrial heat gun with an electronic readout, capable of achieving and sustaining > 500°C
Approximately 0.5 m² of film
Heat and burn-resistant gloves

Application Perform the test in an inconspicuous place on each type of substrate you plan to use for each of the larger graphics
Set the gun to > 500°C
Work at a speed that allows the film to be heated enough to make it conformable
Overheating damages the film; under-heating does not permit conformability
Hold the heat gun about 1 inch above and immediately in front of the roller
Start at an outside top corner and work straight across to the other side using this technique: Heat the film in front of the roller for about 1 second and then begin following closely with the roller, pushing firmly. Move at a slow, steady pace
Roll all the way to the edge
Move the roller down about 5 cm and repeat until the film is fully applied
If the film lifts immediately, the application technique may not have been satisfactory, or the texture is too severe for the film. Do not attempt to go over the sample again; try another one.

Test Time If possible, leave the film in place for one week, then check for good adhesion and acceptable removal.

Graphics Manufacturing

Graphic protection can improve the appearance, performance and durability of printed graphics. Any printed graphic exposed to abrasive conditions (including vehicles), harsh cleaners or chemicals must include graphic protection in order to be warranted.

When to use an overprint clear or overlaminate See instruction bulletin GPO 'graphic protection options' for further information about selection and use of protective overlaminates and printable clears.

[> Product Bulletin Graphic Protection Options <](#)

Shipping finished graphics Flat, or rolled film side out on 130 mm (5 inch) or larger core. These methods help to prevent the liner from wrinkling or application tape, if used, from popping off.

Converting Information

Inkjet Printing

A too high total physical ink amount on the film results in media characteristic changes, inadequate drying, overlamine lifting, and/or poor graphic performance. The maximum recommended total ink coverage for this film is 270%.

Adequately Dry Graphics

Inadequate drying can result in graphic failure including curling, increased shrinkage and adhesion failure, which are not covered under any 3M warranty.

Poorly dried film becomes soft and stretchy, and the adhesive becomes too aggressive.

Even if your printer has a dryer, it may not adequately dry latex and solvent inks in the short period of time it spends passing through the heater.

Recommendations to improve the drying of solvent inks

Dry the graphic unrolled or at least as a loose wound roll standing upright. To further increase air circulation place the spooled film roll on a grid, and place a fan beneath the grid.

If you only spool open the film, adequate drying could still take a week, depending on the environment.

Build enough time into your process to ensure adequate drying of the graphic. 3M recommends at least a minimum drying time of 24 hrs before further processing. Test: Fold a piece of film with maximum ink laydown of the graphic onto itself. Apply 140 g/cm² for 15 minutes, release and check for effects like sticking or dull spots. These are clear indications that further curing or drying is needed.

Notice: Latex inks are different

Unlike solvent inks, spooling and letting latex printed graphics sit does not help to cure the ink, but does allow the graphic manufacturer to see if any oily spots are generated which may interfere with proper adhesion of overlaminates.

To ensure proper latex ink drying, use the following recommendations:

Media Presets: HP media presets contain all the needed settings to print on a specific media.

Download and use media presets from the following page: www.hp.com/go/mediasolutionslocator.

Environmental Conditions: HP media presets have been specially designed and tested for each printer-media combination. Recommended environmental conditions: +20°C to +25°C, Humidity 40% - 60% RH.

Important notice for HP 831/871 and HP 881/891

The amount of ink printed is the main key for proper overlamine adhesion. Select a media preset using 100% or less ink density.

Post-processing of latex printed graphics immediately after printing

Latex inks should emerge from the printer fully dried. Post-air drying of a wet print will not enable drying, since latex ink drying requires that the dried ink is heated above the film formation temperature of the latex inside the printer.

For immediately post-processing of latex printed graphics follow strictly the recommendations given above (Section: Latex inks are different) and test the proper drying with the following performance tests:

Visual Test: Check the image immediately after printing. The sample should not be wet or sticky to the touch, or have an 'oily' feel when it emerges from the printer.

Rubbing Test: After the visual inspection, wipe the printed sample with a white wet paper towel. Fully-dried ink should resist wiping and should not show any stains on the white cloth. If the ink is easily removed by wet rubbing, then it is not dried.

Stacking Test: In some cases, the top surface will appear dry after printing but within a few minutes ink may migrate to the surface leaving an oily aspect. To ensure proper drying, stack at least 12 sheets liner to printed side and let sit for one hour.

After 1 hour, remove the stack and check for "oily" stains, wet surfaces or glossiness changes on high ink laydown areas on each sheet. If any of these occur, then the ink is not properly dried.

If a sample is not properly dried on the printer, reprint the image under a condition that allows complete drying. Common improvement steps are:

- Increasing the drying temperature in 5 degree steps.
- Increasing the number of passes to slow down printing.
- Reducing the amount of ink printed (media preset with lower ink densities).

Allow the converted graphic to build sufficient bond prior to application/installation

Give laminated samples time before applying them. The adhesion bond between the laminate and the printed base film will increase with time. 24 hours minimum for room temperature laminated graphics.

8 hours minimum for graphics laminated with heated rolls (one or two). Lamination temperature: +40°C to +60°C. Lamination speed: maximum 2 meter/minute.

Converting Information

Formulations and processing conditions can affect ink durability. Refer to the 3M Product and Instruction Bulletins for your ink for limitations and proper usage. Graphic protection can improve the appearance, performance and durability of your graphic.

Screen Printing

A clear coat also prevents chalking on unprinted films. Use equipment designed to handle high viscosity materials and make sure the coating is evenly applied to the specifications given in the clear's Instruction Bulletin.

Abrasion and Loss of Gloss

Abrasion damage and loss of gloss are not covered by any 3M warranty. This is considered normal wear and tear.

3M™ Knifeless™ Tape

3M™ Knifeless™ Tape is designed for clean and sharp trimming of adhesive films on high-quality painted surfaces. Knifeless Tape has a visible high-strength filament in the middle that is used to cut the graphic film without damaging the surface.

3M recommends Knifeless Tape DesignLine, TriLine (6 mm and 9 mm), PPF and PrecisionLine for 3M™ Envision™ Print Wrap Film SV480mC and SV480Cv3 and 3M™ Envision™ Print Wrap Film LX480mC and LX480Cv3. For additional information please refer to Knifeless Tape product bulletin.

[> Product Bulletin 'Knifeless Tape' <](#)

Application

See product bulletin ATR 'application tape recommendations' for information about selection and use of suitable application tapes for this product, please.

[> Product Bulletin Application Tape Recommendations <](#)

Refer to Instruction Bulletin 5.1 'select and prepare substrates for graphic application', for general application information.

[> Instruction Bulletin 5.1 'select and prepare substrates for graphic application' <](#)

Important Notice Controltac™ Films

Films require high squeegee pressure to avoid air entrapment between film and substrate. Therefore the use of 3M™ PA-1 Gold Squeegee with thin and soft sleeve is recommended. Wetting of sleeves helps to avoid scratches on film surface during application. Please refer to the product's instruction bulletin for detailed information.

Refer to Instruction Bulletin 5.46 'Application of 480Cv3 on substrates with recesses', for special application information.

[> Instruction Bulletin 5.46 'application of substrates with recesses and removal' <](#)

Maintenance and Cleaning

Use a cleaner designed for high-quality painted surfaces. The cleaner must be wet, non-abrasive, without strong solvents, and have a pH value between 3 and 11 (neither strongly acidic nor strongly alkaline).

Refer to Instruction Bulletin 6.5 'storage, handling, maintenance and removal of films and sheetings', for general maintenance and cleaning information.

[> Instruction Bulletin 6.5 'Storage, Handling, Maintenance and Removal of Films and Sheetings' <](#)

LEED®v4 Credits

The products can contribute to credits under LEED®v4. Please note that each application is different. It is the sole responsibility of the end user to evaluate and determine whether LEED®v4 credits are applicable. Refer to Customer Bulletin 'LEED®v4 credits'

[> Customer Bulletin 'LEED®v4 credits' <](#)

Important Safety Remark

Application to glass

The application of colored or printed film onto glass with sunlight exposure can lead to glass breakage through thermal expansion of the glass. The local conditions must be examined for the danger of glass break by uneven heat absorption through sun exposure. Type of glass (insulation glass, float glass, LSG, toughened safety glass, semi-tempered glass, etc.), glass dimension, joint condition, flexibility of the sealant, quality of the edge finishing, geographical orientation and partial shadow during sun exposure are the determining factors. Light color designs and application on the outside of the window are to be preferred. A free non-applied framework of 4 mm around the entire window front can help to dissipate the absorbed warmth. According to common knowledge a thermal crack can occur at temperature differences of approx. 130°C (toughened safety glass), approx. 40°C (float glass) or approx. 110°C (semi-tempered glass). Coldest place is usually under the framework in the embedded joined window part, the warmest place is typically on the darkest place in the format. Because of the many above mentioned factors, glass breakage cannot be fully predicted, therefore 3M does not accept liability for glass breakage when using this film for window graphics.

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

3M, Controltac, Envision, Scotchcal, Comply, MCS, and Panagraphics are trademarks of 3M Company. All other trademarks are the property of their respective owners.

The use of trademark signs and brand names in this bulletin is based upon US standards. These standards may vary from country to country outside the USA.