



Controltac™ Graphic Film

- IJ180-10, RG180-10*
- With Comply™ Adhesive IJ180C-10, FN180C-10, RG180C-10*
- With Comply™ v3 Adhesive IJ180Cv3-10, FN180Cv3-10

For Solvent, UV and Latex Inkjet Printing Only

1. Product Description

These 2-mil films offer versatility along with slideable, repositionable, pressure-activated adhesive. These long-term durable and removable films have excellent hiding power and stability, making them perfect for signs and fleet graphics and watercraft, including surfaces with compound curves, corrugations and rivets.

Films with Comply adhesive IJ180C and IJ180Cv3 (all versions) have air release channels for fast and easy, bubble-free graphic installations. In addition, the air release channels for films with Comply v3 adhesive are non-visible and have improved air release.

When printed with solvent-based inks and using selected overlaminates, this film can be stretched up to 130% without using primer or making relief cuts while maintaining excellent lift resistance. When stretching at higher levels, primer and/or relief cuts are required.

* Films RG180-10 and RG180C-10 are available for purchase and use with only a 3M Basic Product Warranty on a customer test and approve basis.

2. Recommended Types of Graphics and End Uses

When constructed and used as described in this Bulletin, these types of graphics and end uses may be warranted by the 3M™ MCS™ Warranty or the 3M Performance Guarantee. Please read the entire Bulletin for additional details.

- Indoor and outdoor graphics and signs, including point-of-purchase and displays
- Commercial vehicles and fleet trucks and trailers, emblems or striping
- Bus graphics
- Personal vehicle graphics and wraps
- Non-vertical and horizontal vehicle wraps when protected with 3M overlaminate 8528
- Watercraft graphics (above the static water line only)
- Small format original equipment manufacturer's (OEM) decorative and identification graphics, cautionary and safety labeling

A. Limitations of End Uses

This 3M product is not designed or recommended for the following uses. Please contact us to discuss other options.

(1) Unsuitable End Uses for This Film

- Graphics applied to:
 - stainless steel (we recommend using [3M™ Controltac™ Graphic Film IJ181](#) instead)
 - non-3M films (see Removal Warranty)
 - watercraft when the graphic is below the static water line
 - watercraft graphics that are not edge sealed
 - painted substrates with poor paint to substrate, or paint-to-paint bond
 - substrate surfaces that are not clean and smooth (little or no variation in texture)
- **For film with Comply v3 adhesive only:** Do not use prespacing tape in cut and weeded applications where the tape must adhere to the exposed liner.

- Film without graphic protection under these conditions:
 - printed vehicle graphics
 - watercraft graphics
 - exposure to abrasive conditions, harsh cleaners or chemicals
 - outdoor, horizontal applications
- Graphic removal from:
 - applications with poor paint-to-substrate adhesion
 - existing graphics that must remain intact; damage may occur during removal of film
 - watercraft
 - outdoor, horizontal applications
- Graphics subjected to gasoline vapors or spills, including those at or on gas pumps, automobile fuel-tank ports, watercraft or top-feeding, petroleum tankers

B. Wall Graphics

Two-mil cast films are typically the best choice for indoor smooth surface wall graphics. However, the user is responsible for determining the product's suitability, including adhesion and, if required, removal characteristics. Due to the wide variability of smooth indoor walls, neither finished graphics nor removal is warranted, even for removable or changeable films. [Instruction Bulletin 5.37](#) provides comprehensive information for the most successful wall graphics film selection and application.

C. Important Information About Bus Applications

Film used on buses must not be applied so as to restrict the safe use of emergency window exits. See the most current version of [Instruction Bulletin 5.4](#) for details.

3. Compatible Products

This Bulletin provides details about the base film, **recommended construction options, warranted durability and warranty limitations for the constructions shown in the Warranted Durability Tables**. Additional specific information about compatible products can be found in the Product and Instruction Bulletins listed in **3M Related Literature** at the end of this bulletin.

A. Solvent Inkjet Inks and Printers

Ink Series	Printer
• 3M™ Piezo Inkjet Ink Series 1500v2	EFI™ VUTEk® 150, 2360/3360, 3300/5300 and 3000/5000 Printers
• 3M™ Piezo Inkjet Ink Series 4400	HP XLJet 1200 and 1500 Printers
• 3M™ Piezo Inkjet Ink Series 4800	HP Scitex TJ8300, TJ8350 Series Digital Press
• 3M™ Piezo Inkjet Ink Series 5500	Océ Arizona 600 Printer
• 3M™ Piezo Inkjet Ink Series 6200	Agfa :Jeti 3312, 3318, 3324, 5024 [Gandinnovations] Printers

B. Latex Inkjet Inks and Printers

• HP 3M LX600 Specialty Latex Ink	HP Designjet L65500, Scitex LX600 & LX800
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C. UV Inkjet Inks and Printers

• 3M™ Piezo Inkjet Ink Series 2200UV	EFI™ VUTEk® PV200 Printer
• 3M™ Piezo Inkjet Ink Series 2600UVv2	3M™ Printer 2500UV
• 3M™ Piezo Inkjet Ink Series 2700UV	Durst Rho 160R and 351R Printers
• 3M™ Piezo Inkjet Ink Series 2800UV	EFI™ VUTEk® QS2000, QS3200, QS3220 and QS220 Printers
• 3M™ Piezo Inkjet Ink Series 5400UV	HP Designjet H35000/45000 Printers
• GSr 3M™ Premium UV Inks	EFI™ VUTEk® GS5000r Printer
• Mimaki LF-200 Ink Series*	Mimaki UJV-160, JFX-1631 & 1615R Printer
• Mimaki F-200 Ink Series*	Mimaki JF-1610, 1631 Printers

**Manufactured by 3M.*

D. Graphic Protection

- 3M™ Scotchcal™ Gloss Overlamine 8518
- 3M™ Scotchcal™ Luster Overlamine 8519
- 3M™ Scotchcal™ Matte Overlamine 8520
- 3M™ Scotchcal™ Luster Overlamine 8908
- 3M™ Scotchcal™ Matte Overlamine 8909
- 3M™ Scotchcal™ Gloss Overlamine 8528 *with horizontal vehicle warranty! See page 8.*
- 3M™ Scotchcal™ Ultra Matte Overlamine 8915
- 3M™ Piezo Inkjet Protective Clear 8530
- 3M™ Screen Print UV Gloss Clear 9720i
- 3M™ Screen Print Gloss Clear 9720UV

E. Other Products

- 3M™ Premasking Tape SCPM-3
- 3M™ Premasking Tape SCPM-44X
- 3M™ Prespacing Tape SCPS-2
- 3M™ Prespacing Tape SCPS-55
- 3M™ Prespacing Tape SCPS-53X
- 3M™ Edge Sealer 3950
- 3M™ Edge Sealer Tape 8914

4. Characteristics

These are typical values for unprocessed product. Processing may change the values. Contact your 3M representative for a custom specification.

A. Physical Characteristics

Characteristic	Value	
Film	Vinyl, cast	
Film color	White, opaque	
Thickness	Without adhesive: 2 mil (0.05 mm) With adhesive: 3-4 mil (0.08-0.10 mm)	
Adhesive	Films IJ180: Pressure-activated, slideable, repositionable Films IJ180C, IJ180Cv3 (all versions): Pressure-activated, slideable, repositionable, air release channels	
Adhesive color	Gray	
Liner	Polyethylene-coated paper	
Characteristic	Value	
Adhesion, Typical 24 hours after application	Substrate	Adhesion
	ABS	4.2 pounds/inch (0.75 kg/cm)
	Acrylic enamel	3.5 pounds/inch (0.63 kg/cm)
	Aluminum, anodized	7.9 pounds/inch (1.42 kg/cm)
	Aluminum, etched	5.2 pounds/inch (0.93 kg/cm)
	Chrome	4.8 pounds/inch (0.87 kg/cm)
	Fruehauf pre-painted panels	4.0 pounds/inch (0.7 kg/cm)
Tensile strength	5 pounds/inch at 73°F (0.9 kg/cm at 23°C)	
Chemical resistance	<ul style="list-style-type: none"> • Resists mild alkalis, mild acids, and salt • Excellent resistance to water (<i>does not include immersion</i>) • Resists occasional fuel spills 	
Flammability	Call 1-800-328-3908 for information	

Physical Characteristics, continued

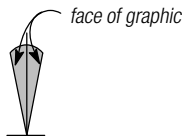
B. Application Characteristics

Characteristic	Value
Finished graphic application recommendation	<p>Surface type: Flat, with and without rivets, simple curves, compound curves, and corrugations</p> <p>Substrate type: ABS resins, aluminum, chrome, glass, fiberglass reinforced plastics, paint (check adhesion to powder-coated or water-based paints), fiberglass with gel coat</p> <p>Application temperature:</p> <ul style="list-style-type: none"> Flat without rivets: 40°-100°F (4°-38°C) Curves or corrugations with rivets: 50°-100°F (10°-38°C) Compound Curves and/or watercraft: 60°-90°F (16°-32°C) <p>Application method: Dry</p>
Applied shrinkage	0.015 inches (0.4 mm)
Temperature range after application	-65° to +225°F (-60° to +107°C)
Graphic removal	Removable with heat and/or chemicals from most substrates within the warranty period at 50°F (10°C) minimum (air and substrate)

5. Definitions

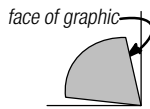
A. Exposure Types

U.S. Vertical Exposure



The face of the graphic is +/- 10° from vertical.

U.S. Non-vertical Exposure



The face of the graphic is greater than 10° from vertical and greater than 5° from horizontal. This includes non-vertical surfaces of vehicle wraps or fleet truck and trailer graphics.

U.S. Horizontal Exposure



The face of the graphic is +/- 5° from horizontal.

U.S. Desert Southwest Exposure

Any outdoor graphic exposed to solar energy more than half of the daylight hours in Arizona, New Mexico and the desert areas of California, Nevada, Utah and Texas is subject to reduced warranties. A detailed map is available at 3Mgraphics.com under Warranties.

B. Graphic Types

Indoor Signs

Stationary graphics applied indoors and *not* exposed to the elements.

Outdoor Signs

Stationary graphics applied outdoors and exposed to the elements.

OEM

Labels and decorative graphics produced for and used by original equipment manufacturers.

Decals

A small graphic used for decoration, information or identity.

C. Graphic Construction

The products used to make a graphic, which may include film and/or flexible substrate, graphic protection, ink, printer and application tape.

D. Graphic Protection

Overlamine films or clear coats used to protect the graphic and/or change gloss.

E. Vehicle Types

Commercial Vehicle

Buses, vans, automobiles, trucks and trailers (except those defined as Fleet Trucks and Trailers) that are used for commercial business purposes

Fleet Trucks and Trailers

Straight trucks, semi-tractors and trailers used in commercial fleets. Excludes air shields.

Personal Vehicle

Vans, automobiles, pickup trucks and trailers primarily for personal use.

Railcars

Railcars and lead cars of trains, but not locomotives or engines.

Locomotives, Engines	Please contact us to discuss your needs.
OEM	Original Equipment Manufacturers (OEM) small format decorative and identification graphics, cautionary and safety labels
Recreational Vehicle (RV)	Vehicles used for personal pleasure, such as campers, motor homes and trailers, that are not used in connection with any commercial or business enterprise. 3M specifically excludes watercraft from this definition.
Watercraft	Boats intended for personal pleasure such as runabouts and speedboats having aluminum and/or smooth fiberglass/gel coat bodies, including boats used in fishing tournaments and off-shore racing boats, but not 1 to 3 person personal watercraft or other boats used in connection with commercial or business enterprise. 3M specifically excludes all other recreational vehicles from this definition.

6. Warranty Information

A. Limitations and Disclaimers Applicable to All Warranties & Warranty Coverage Overview

Both the warranty coverage and the durability for each graphic is based on the user(s) reading and following all applicable and current [3M Product and Instruction Bulletins](#). 3M will honor the Warranted Durability stated in the base film or substrate Product Bulletin that is current when the film was purchased. Warranted durabilities may be reduced and stipulations may apply for certain constructions and applications, as covered in this Bulletin.

The following is made in lieu of all other express or implied warranties, including any implied warranty of **merchantability** or fitness for a particular purpose or implied warranty arising out of a course of dealing, custom or usage of trade. 3M will replace or refund the price of any 3M materials that do not meet this warranty within the specified time periods. These remedies are exclusive. **In no case shall 3M be liable for any direct, indirect, or consequential damages, including any labor or non-3M materials charges.**

See the [3M Warranty Brochure](#) at 3Mgraphics.com, which gives the terms, additional limitations of the warranty, if any, and limitations of liability.

B. 3M Basic Product Warranty

All 3M products are warranted to be free of defects in materials and manufacture at the time of shipment and to meet the specifications stated in this Product Bulletin and as further set forth in the 3M Warranty Brochure.

C. 3M™ MCS™ Warranty

Subject to Stipulations set forth in Section E., below

Finished graphics constructed with the materials specified and the exposure specified in the Warranted Durability Tables, Section C.(1), are eligible for the 3M™ MCS™ Warranty. For warranties for other exposures, see Section E.(1).

(1) Warranted Durability Table for Finished Graphics in a Standard U.S. Vertical Exposure

VEH = Commercial Vehicle, Fleet Truck and Trailer, Bus, Personal Vehicles
 OUT = Outdoor Signs, OEM
 WATER = Watercraft Graphics
 IN = Indoor Signs

Graphic Protection	Warranted Durability, in Years											
	EFI™ VUTEk® 150, 2360/3360, 3300/5300, 3000/5000 Printers				HP XLJet Series 1200, 1500 Printers				HP Scitex TJ8300 and TJ8350 Digital Presses			
	SOLVENT Ink Series 1500v2				SOLVENT Ink Series 4400				SOLVENT Ink Series 4800			
	VEH	OUT	WATER	IN	VEH	OUT	WATER	IN	VEH	OUT	WATER	IN
8518, 8519, 8520, 8528*, 8915	7	4	2	8	7	4	2	8	7	4	2	8
8908, 8909	—	1	—	3	—	1	—	3	—	1	—	3
1920DR	3	3	2	5	—	—	—	—	3	3	2	5
9720UV	—	—	—	—	—	—	—	—	3	3	2	5
9720i	5	4	2	8	5	4	2	8	5	4	2	5
8530	2	2	—	3	2	2	—	3	2	2	—	3
none	—	2	—	2	—	2	—	3	—	2	—	3

Warranted Durability, in Years												
Graphic Protection	Agfa :Jeti 3312, 3318, 3324, 5024 [Gandinnovations] Printers				Océ Arizona 600 Printer				Designjet L65500; Scitex LX600 & LX800 Printers			
	SOLVENT Ink Series 6200				SOLVENT Ink Series 5500				HP 3M LX600 Specialty Latex Ink			
	VEH	OUT	WATER	IN	VEH	OUT	WATER	OUT	VEH	OUT	WATER	IN
8518, 8519, 8520, 8528*, 8915	7	4	2	8	7	4	2	8	4	3	2	5
8908, 8909	—	1	—	3	—	1	—	3	—	—	—	—
1920DR	5	4	2	8	5	4	2	8	2	2	—	3
9720UV	—	—	—	—	5	4	2	8	—	—	—	—
9720i	5	4	2	8	5	4	2	8	—	—	—	—
8530	2	2	—	3	2	2	—	3	—	—	—	—
none	—	3	—	3	—	3	—	3	—	—	—	—

Graphic Protection	EFI™ VUTEk® PV200 Printer				3M™ Printer 2500UV				Durst Rho 160R & 351R Printers			
	Ink Series 2200UV				Ink Series 2600UVv2				Ink Series 2700UV			
	VEH	OUT	WATER	IN	VEH	OUT	WATER	IN	VEH	OUT	WATER	IN
8518, 8519, 8520, 8528*, 8915	7	4	2	8	7	4	2	8	7	4	2	8
1920DR	—	—	—	—	5	4	2	8	—	—	—	—
9720i, 9720UV	5	4	2	8	5	4	2	8	5	4	2	8
none	—	3	—	3	—	3	—	3	—	3	—	3

Graphic Protection	EFI™ VUTEk® QS2000, QS3200, QS3220, QS220 Printers				HP Designjet H35000/45000 Printers				EFI™ VUTEk® GS5000r Printer			
	Ink Series 2800UV				Ink Series 5400UV				GSr 3M™ Premium UV Inks			
	VEH	OUT	WATER	IN	VEH	OUT	WATER	IN	VEH	OUT	WATER	IN
8518, 8519, 8520, 8528, 8915	7	4	2	8	7	4	2	8	5	4	2	8
1920DR	—	—	—	—	—	—	—	—	3	2	—	5
9720i, 9720UV	5	4	2	8	5	4	2	8	4	3	2	8
none	—	3	—	3	—	3	—	3	—	3	—	3

Graphic Protection	Mimaki UJV-160, JFX-1631 & 1615R Printers				Mimaki JF-1610 & 1631 Printers			
	Ink Series LF-200				Ink Series F-200			
	VEH	OUT	WATER	IN	VEH	OUT	WATER	IN
8518, 8519, 8520, 8528*, 8915	7	4	2	8	7	4	—	8
1920DR	—	—	—	—	—	—	—	—
9720i, 9720UV	—	—	—	—	—	—	—	—
none	—	—	—	—	—	2	—	3

*For overlamine 8528 horizontal warranty, please see Section E. (2).

(2) **Unprinted Film with No Graphic Protection, and a U.S. Vertical Exposure**

For unprinted film, 3M offers:

- Warranted Durability for finished graphics covered by the 3M™ MCS™ Warranty.
- Expected Performance Life as a good faith estimate of how long unprinted product may perform satisfactorily based on 3M testing. However, there is no warranty for performance or durability.

	Ink and Graphic Protection	Years	
		VEH	OUT
3M™ MCS™ Warranty Durability	None	0	2/3*
Expected Performance Life, Unwarranted	None	10	10

*Ink series 1500V2, 4400, 4800 and F-200 have 2 years; the others are 3 years.

(3) **Paint Refurbishing Reimbursement Policy**

a. **For Automobiles, Vans, Buses, Recreational Vehicles**

This Policy applies to automobiles, vans, buses, and recreational vehicles only, and specifically does not include Watercraft. Refer to [Instruction Bulletin 5.36](#) for complete details.

- A *Pre-Installation and Inspection Report* (in Bulletin 5.36) must be completed prior to graphic installation and submitted with any claim for paint damage sustained during the removal of 3M removable or changeable graphic film from vehicles.
- A separate report for each vehicle involved in a claim is required.

b. **For Watercraft**

This applies to Watercraft only and specifically does not include any other type of vehicle. Refer to [Instruction Bulletin 5.42](#) for complete details.

- A *Pre-Installation and Inspection Report* (in Instruction Bulletin 5.42) must be completed prior to graphic installation and submitted with any claim.
- A separate report for each watercraft involved in a claim is required.
- Graphics must be applied above the static water line.
- Graphics must be cut at seams and all edges and seams and edges must be sealed.

D. **3M Performance Guarantee**

Subject to Stipulations set forth in Section E., below

Graphics constructed with the 3M materials specified and in the exposure specified in the Warranted Durability Table, Section D.(1), are eligible for the 3M Performance Guarantee. This warranty only covers the performance of the recommended 3M products used in the graphic construction when imaged with the printers and OEM inks listed in the most current version of the [Performance Guarantee Matrix](#) at 3Mgraphics.com. The Matrix may also list certain restrictions for using the film covered in this Bulletin. For warranties for other exposures, see Section E.(1).

Warranted Durability for 3M Product Performance, in Years

(1) **Warranted Durability Table for**

- 3M Product Performance
- Standard U.S. Vertical Exposure

Film	Graphic Protection	Vehicles, Outdoor and Indoor Signs	Watercraft	Inks and Printers
IJ180-10 IJ180C-10 IJ180Cv3-10	1920DR 8518 8519 8520 8528* 8915 9720UV 9720i	3	2	See the Performance Guarantee Matrix

*For overlamine 8528 horizontal warranty, please see Section E. (2).

**E. General Warranty
Stipulations for 3M™
MCS™ Warranty and
3M Performance Guarantee**

These stipulations apply to both the 3M™ MCS™ Warranty and 3M Performance Guarantee. General provisions for these stipulations are covered in the [3M Warranty Brochure](#) at 3Mgraphics.com.

**(1) Reduced Warranted Durability
for Non-vertical Graphics**

For graphics oriented in a non-vertical, outdoor exposure, multiply the warranted durability years for your graphic construction as shown in the applicable Warranted Durability Tables, Section C.(1) or Section D.(1), by the percentage shown for the intended graphic exposure.

If the Graphic Exposure is:	Use this Percentage of U.S. Vertical Exposure, Warranted Durability	Calculation Examples
U.S. Non-vertical	50% (0.5)	0.5 x 7 years = 3.5 years 0.5 x 4 years = 2.0 years
Desert Southwest Vertical	70% (0.7)	0.7 x 7 years = 4.9 years 0.7 x 4 years = 2.8 years
Desert Southwest Non-vertical	35% (0.35)	0.35 x 7 years = 2.45 years 0.35 x 4 years = 1.4 years
Horizontal (Also see Legibility provision Section 6.C.(4).c.	0%	0

**(2) Overlamine 8528 ONLY
Horizontal Warranty**

Printed film as specified in this bulletin with overlamine 8528:
U.S. - 2 years; Desert S.W. = 1.4 years

**(3) Removal Warranty with Heat
or Chemicals**

**a. For the 3M™ MCS™
Warranty Only**

Within the stated warranted durability period, if this film cannot be removed with heat and/or chemicals, or if more than 30% of the adhesive residue remains on the substrate, 3M will reimburse a reasonable portion of extra removal costs.

**b. For the 3M Performance
Guarantee**

Within the stated warranted durability period, if this film cannot be removed with heat and/or chemicals, or if more than 30% of the adhesive residue remains on the substrate, 3M will reimburse a reasonable portion of 3M material cost.

**c. Removal Warranty
Exceptions**

The following exceptions are not covered by the Removal Warranty.

- Substrate damage due to:
 - removing film from a pre-existing graphic
 - removing film that was applied to painted wallboard or any unapproved substrate
 - removing film from paint that is not firmly bonded to the substrate
- No guarantee is made for:
 - ease or speed of removal of any graphic
 - removal from paint that is improperly cured
 - removal from aged paint or metals, surface oxidation or chalking; user must test, approve and accept liability for such applications
 - removal from horizontally-exposed outdoor applications

(4) 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.

(5) Application Outside the U.S.

Contact the 3M organization for that country.

(6) Application to Glass

3M accepts no liability for glass breakage when using this film for window graphics. See [Instruction Bulletin 5.1](#) for details.

(7) Graphics Made with Components Not Sold or Recommended by 3M

The 3M™ MCST™ Warranty does not, under any circumstances, cover graphics made with inks, film, graphic protection and/or application tapes that are not sold or recommended by 3M.

The 3M Performance Guarantee does not, under any circumstances, cover OEM inks, even those approved by 3M for this program, or any type of 3M product failure that results from their use.

The user is solely responsible for the graphic appearance, performance and durability of graphic constructions that include any non recommended or qualified products.

(8) Printed Vehicle or Watercraft Graphics

Any printed graphic applied to vehicles or watercraft that are exposed to abrasive conditions, harsh cleaners or chemicals must include graphic protection in order to be covered by any 3M warranty.

7. Factors that Affect Graphic Performance Life

The actual performance life of a graphic is affected by all of the following.

- The combination of graphics materials used
- Complete ink drying or curing
- Selection, condition and preparation of the substrate
- Surface texture
- Application methods
- Angle and direction of sun exposure
- Environmental conditions
- Cleaning or maintenance methods

8. Graphics Manufacturing



CAUTION

Before using any equipment, always follow the manufacturers' instructions for safe operation.

A. Inkjet Printing

Always read and follow the ink manufacturer's written instructions on usage.

(1) Total Ink Coverage

The maximum recommended total ink coverage for this film is:

270% when printed with all approved 3M solvent inkjet inks.

280% when printed with all approved 3M UV inkjet inks and latex ink.

250% when printed on the Mimaki JV5 Series printer with HS ink series (3M Performance Guarantee).

Do not exceed the recommended total ink coverage for the ink series used on this film. Too high a total physical ink amount on the film results in media characteristic changes, incomplete drying, overlamine lifting, and/or poor graphic performance. Refer to the Product & Instruction Bulletin for the ink system being used for additional details about total ink coverage.

(2) Completely Dry Graphics

Important Note!

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

Always build enough time into your process to ensure complete drying of the graphic. Poorly dried film may become soft and stretchy, and the adhesive may become too aggressive. This can cause difficulty when applying an overlaminate, rolling or applying the graphic. See the ink's Instruction Bulletin for more details.

B. Cutting

The following are common cutting methods for this film. See [Instruction Bulletin 4.1](#) for details.

(1) Methods

- Bandsawing
- Hot kiss cutting
- Hot and cold steel rule
- Drum-type electronic cutting
- Flat-bed electronic cutting
- Guillotine
- Hand cut
- Cold and hot steel-rule die cutting

(2) Size of Cut Text

These values are based on upper case Helvetica medium type. Weeding can be more difficult with smaller text.

Minimum stroke width:	0.25 inch (6.35 mm)
Minimum height:	3.0 inch (76.2 mm)
Minimum radius for end of stripe:	0.125 inch (3.18 mm)

C. Graphic Protection

Graphic protection may improve the appearance, performance and durability of the graphic.

- Clear 8530 must be applied with a liquid laminator.
- Overlaminates must be cold roll applied.

D. Application Tapes

(1) When to Use Premasking Tape

- As an application aid to increase stiffness, and prevent stretching and damage during application.
- When little or no liner is exposed.

(2) When to Use Prespacing Tape

- Hold cut and weeded letters or graphics in registration after removing the film liner.
- Protect cut graphic parts from scratching or damage during application.
- Use when large amounts of liner are exposed.

Note: Prespacing tape does not adhere to the exposed liner of film IJ180Cv3, but it does adhere to the top of the film. Therefore, prespacing tape may still be useful when applying large graphics—even large cut graphics—with some smaller cut and weeded graphics to hold the elements in alignment. Use film IJ180 or IJ180C for more intricately cut and weeded graphics.

(3) How to Select a Tape

Determine whether you want to premask the graphic or prespace cut pieces of film such as letters. Then locate the graphic protection used on your graphic in the table below, and use the corresponding tape. See [Instruction Bulletin 4.3](#) for complete details.

EXAMPLE: To premask a film includes overlaminate 8519, use premasking tape SCPM-3.

EXAMPLE: To premask a film that includes clear 1920DR, use premasking tape SCPM-3.

Graphic Protection		Refer to the Warranty table to determine what graphic protection is approved for your graphic construction.					
Tape	None	8519 8520 8915	8908 8909	8530	1920DR	9720i 9720UV	8518 8528
Premasking SCPM-3	■	■	■	■	■	—	—
Prespacing SCPS-2 IJ180	■	■	■	—	■	—	—
Premasking SCPM-44X	—	—	—	—	—	■	—
Prespacing SCPS-55 films with any Comply Adhesive only	■	■	—	—	■	■	—
Prespacing SCPS-53X	—	—	—	—	—	■	—

— = The use of an application tape is not recommended in this construction.

9. Application and Installation

Install the film using the dry application method.

Refer to the **3M Related Literature** section, located at the end of this bulletin, for a list of the Instruction Bulletins that may be needed to apply or install this film.

When these films are printed with solvent-based inks and use overlaminates 8518, 8519, 8520, 8528 or 8915, the graphics can be stretched up to 130% without using primer or making relief cuts. When stretching at higher levels, primer and/or relief cuts are required. See [Instruction Bulletin 5.36](#) for complete details.

A. Adhesive

(1) All Films in this Bulletin

This film has a pressure-activated adhesive that allows the film to slide easily on the substrate, be positioned with light finger pressure, and repositioned if it is not in the right place. However, by design so that a good adhesive bond is established, the positionability feature is lost:

- When firm pressure is applied with a squeegee or other application tool
- At application temperatures above 100°F (38°C) even if only light finger pressure was used for tacking
- If any part of the film is removed from the original liner and reapplied to the same or another liner

Solvent from inkjet ink that has not completely dried and is retained by the film also affects slideability and positionability.

Always work from the center out to the edges of the graphic to allow trapped air to exit through the air release channels. If the channels are closed off by firm pressure and air is trapped, use an air release tool to aid in removing air bubbles. See [Instruction Bulletin 5.4](#) for details.

(2) Films with Comply™ Adhesive

Air release channels are a characteristic of films with Comply adhesive. Removing and attempting to change liners or reapply the same liner damages air release channels.

Films designated as Cv3 offer the ultimate in invisible air release channels.

B. Graphics Printed with UV Inkjet Inks are Heat Sensitive!

UV inkjet inks may crack if too much heat is used during graphic application to complex curves and deep contours as well as around rivets. When using a heat gun or other heat source during application, make sure the film surface temperature does not exceed 212°F (100°C).

Using additional heat in the post-application process may also cause UV inkjet ink to crack.

For the best results, ***always do a test application*** of a UV printed graphic to determine how much heat can be used without damaging the image.

C. Application to Vehicles

Read and follow all instructions, and complete the *3M Automobiles, Vans and Buses Pre-installation Inspection Record* in [Instruction Bulletin 5.36](#) prior to manufacturing or applying any graphic to a standard vehicle, van or bus.

D. Application to Other Substrates

3M offers several detailed Instruction Bulletins to help you achieve a successful graphic installation. Please see Section 14., 3M Related Literature.

10. 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.)

11. Removal

Removal requires heat and/or chemicals. The ease and rate of removal depends on a number of factors. See [Instruction Bulletin 6.5](#) for details. A chemical remover system is available for graphics printed with solvent-based ink. Follow the procedures for using film remover R-221 and adhesive remover R-231 and for additional removal details.

12. Shelf Life, Storage and Shipping

A. Shelf Life

Total shelf life: 3 years from the date of manufacture on the original box. Up to 3 years unprocessed, **OR** process within 2 years **and** then apply within 1 year of processing.

B. Storage Conditions

- 40° to 100°F (4° to 38°C)
- Out of sunlight
- Clean dry area
- Original container
- Bring the film to print room temperature before using

C. Shipping Finished Graphics

Flat, or rolled printed side out on 6 inch (15 cm) or larger core. This helps prevent the application tape, if used, from popping off.

13. Health and Safety



CAUTION

When handling any chemical products, read the manufacturers' container labels and the Material Safety Data Sheets (MSDS) for important health, safety and environmental information. To obtain MSDS sheets for 3M products go to 3M.com/MSDS, or by mail or in case of an emergency, call 1-800-364-3577 or 1-651-737-6501.

When using any equipment, always follow the manufacturers' instructions for safe operation.

14. 3M Related Literature

Before starting any job, be sure you have the most current Product and Instruction Bulletins.

The information in 3M Product and Instruction Bulletins is subject to change. [Current Bulletins](#) are available at 3Mgraphics.com. The following applicable Bulletins provide information and processes you need to properly make the graphics described in this Bulletin. Additional Bulletins may be needed as indicated in the 3M Related Literature section of other 3M components you use.

Bulletin types: PB = Product Bulletin; PB-IB = Product & Instruction Bulletin; IB = Instruction Bulletin

Subject	Type	Bulletin No.
3M™ Piezo Inkjet Ink Series 2200UV	PB-IB	2200UV
3M™ Piezo Inkjet Ink Series 2600UVv2	PB-IB	2600UVv2
3M™ Piezo Inkjet Ink Series 2700UV	PB-IB	2700UV
3M™ Piezo Inkjet Ink Series 5400UV	PB-IB	5400UV
3M™ Piezo Inkjet Ink Series 2800UV	PB-IB	2800UV
GSr 3M™ Premium UV Inks	PB-IB	GSr
Mimaki Ink Series LF-200	PB-IB	LF-200
Mimaki Ink Series F-200	PB-IB	F-200
3M™ Piezo Inkjet Ink Series 1500v2	PB-IB	1500
3M™ Piezo Inkjet Ink Series 4400	PB-IB	4400
3M™ Piezo Inkjet Ink Series 4800	PB-IB	4800
3M™ Piezo Inkjet Ink Series 6200	PB-IB	6200
3M™ Piezo Inkjet Ink Series 5500	PB-IB	5500
3M Graphic Protection Products	PB	GP-1
3M™ Piezo Inkjet Protective Clear 8530	PB	8530
3M™ Screen Print Gloss Clear 1920DR	PB	1900
- Applying screen printing clear 1920DR	IB	3.12
3M™ Screen Print UV Gloss Clear 9720i, 9720UV, 9730UV	PB-IB	Clears 9720

Bulletin types: PB = Product Bulletin; PB-IB = Product & Instruction Bulletin; IB = Instruction Bulletin

Subject	Type	Bulletin No.
Scoring and cutting	IB	4.1
Design of graphics	IB	2.1
Using 3M application tapes; premasking and prespacing for films	IB	4.3
Cold roll lamination	IB	4.22
Application, substrate selection, preparation and substrate-specific application techniques	IB	6.5
Application, special applications and vehicles	IB	5.4
Application, general procedures for indoor and outdoor dry applications	IB	5.5
Application techniques for automobiles, vans and buses, and inspection forms	IB	5.36
A guide to understanding and applying graphics to common indoor and outdoor wall surfaces	IB	5.37
Application: special considerations for watercraft	IB	5.42
Storage, handling, maintenance, removal	IB	6.5
3M Graphics Market Center Warranty Brochure		www.3Mgraphics.com, Warranties

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15. Bulletin Change Summary

Added Compatible Product GSr 3M™ Premium UV Inks for EFI™ VUTEk® GS5000r Printer. Added Expected Performance Life value to section C.(2). Added overlamine 8528 as an approved overlamine, with unique 3M™ MCS™ Warranty table and 3M Performance Guarantee table that address the horizontal warranty.



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