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

1. Product Description

A. Product Features

- 2-mil white, vinyl film with a luster finish
- Excellent hiding power
- Pressure-activated adhesive for easy sliding, tacking, snap up and repositioning
- Flexible; conforms to compound curves, corrugations and rivets
  - Stretch selected finished graphic constructions up to 130% (i.e., a 10 inch film piece can stretch to 13 inches) without primer or relief cuts and maintain lift resistance; see details and exceptions in Section 8.
- Films IJ180C-10 and IJ180Cv3-10 have Comply™ Adhesive air release channels for fast, easy, bubble-free installations
- Film IJ180Cv3-10 air release channels are non-visible and have improved air release
- Removable with heat and/or chemicals

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

B. 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 details.

- Indoor and outdoor graphics and signs, including point-of-purchase and displays
- Commercial vehicles, fleet trucks and trailers; emblems or striping
- Bus graphics
- Personal vehicle graphics and wraps
- Non-vertical and horizontal vehicle wraps when protected with 3M overlaminates 8528 or 8548G
- Watercraft graphics (above the static water line only)
- Small format original equipment manufacturer's (OEM) decorative and identification graphics, cautionary and safety labeling

C. Performance Overview

3M tests the performance of both individual products and finished graphic constructions. This table shows the best performance expected from this product without a Warranty Period and with a Warranty Period.

For detailed graphic construction and application options along with specific Warranty Periods, please see the Warranty Information, Section 5.

Expected Performance Life. This is the estimated period of time the product should perform satisfactorily.	
Unprinted film with no graphic protection, applied to a flat vertical outdoor surface.	10 years Unwarranted Period
3M™ MCS™ Warranty. This is the maximum period of time 3M will warrant the finished graphic performance.	
Printed film with the best 3M ink and graphic protection option, applied to a flat, vertical, vehicle surface.	7 years Warranty Period
3M Performance Guarantee. This is the maximum period of time 3M will warrant the performance of the 3M materials used.	
Printed film with the best ink and graphic protection option, applied to a flat, vertical, vehicle surface.	4 years Warranty Period

D. 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 when they are:
  - printed vehicle graphics
  - watercraft graphics
  - exposed to abrasive conditions, harsh cleaners or chemicals
  - horizontally-exposed outdoor 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 (except graphics using overlaminate 8528 or 8548G as described in this Bulletin)
- Graphics subjected to gasoline vapors or spills, including those at or on gas pumps, automobile fuel-tank ports, watercraft or top-feeding, petroleum tankers

(2) 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.

(3) 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.

2. Compatible Products

This Bulletin provides details about the base film and its compatible products and warranted graphic constructions. 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 Scitex XL 1200 and XL1500 Printers
• 3M™ Piezo Inkjet Ink Series 4800	HP Scitex TJ8300, TJ8350 Industrial Presses
• 3M™ Piezo Inkjet Ink Series 6200	Agfa :Jeti 3312, 3318, 3324, 5024 [Gandinnovations] Printers
• SIIT GX 3M Ink Series	Seiko I Infotech ColorPainter™ H Series H-74s, H2-74s, H-104s, H2-104s Printers

B. Latex Inkjet Inks and Printers

• HP 3M LX600 Specialty Latex Ink	HP Designjet L65500 & Scitex LX600, LX800, LX820 & LX850 Printers

C. UV Inkjet Inks and Printers

• 3M™ Piezo Inkjet Ink Series 2200UV	EFI™ VUTEk® PV200 Printer
• 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
• EFI™ VUTEk® GS 3M™ Premium UV Inks	EFI™ VUTEk® GS2000, GS3200 & GS3250 Printers
• EFI™ VUTEk® GSr 3M™ Premium UV Inks	EFI™ VUTEk® GS5000r, GS3250r Printer
• EFI™ R3225 3M™ UV Ink	EFI™ R3225 UV Roll-to-Roll 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 Overlaminate 8518
- 3M™ Scotchcal™ Luster Overlaminate 8519
- 3M™ Scotchcal™ Matte Overlaminate 8520
- 3M™ Scotchcal™ Luster Overlaminate 8908
- 3M™ Scotchcal™ Matte Overlaminate 8909
- 3M™ Scotchcal™ Gloss Overlaminate 8528*
- 3M™ Envision™ Gloss Wrap Overlaminate 8548G*
- 3M™ Scotchcal™ Ultra Matte Overlaminate 8915
- 3M™ Piezo Inkjet Protective Clear 8530
- 3M™ Screen Print Gloss Clear 1920DR
- 3M™ Screen Print UV Gloss Clear 9740i

* *with horizontal vehicle warranty (see page 8)*

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

3. 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	Cast vinyl	
Film color	White, opaque	
Thickness	**Without adhesive:** 2 mil (0.05 mm) **With adhesive:** 3-4 mil (0.08-0.10 mm)	
Adhesive	**Film IJ180:** Pressure-activated (slide, tack, snap up, reposition) **Films IJ180C, IJ180Cv3 (all versions):** Pressure-activated (slide, tack, snap up, reposition) with air release channels	
Adhesive color	Gray	
Liner	Polyethylene-coated paper	
Adhesion, Typical *24 hours after application*	ABS	4-5 pounds/inch (0.72-0.89 kg/cm)
	Acrylic enamel	3-4 pounds/inch (0.54-0.72 kg/cm)
	Aluminum, anodized	7-8 pounds/inch (1.26-1.43 kg/cm)
	Aluminum, etched	5-6 pounds/inch (0.89-1.08 kg/cm)
	Chrome	4-5 pounds/inch (0.72-0.89 kg/cm)
	Fruehauf pre-painted panels	3-5 pounds/inch (0.54-0.89 kg/cm)

Physical Characteristics continued…

Characteristic	Value
Tensile strength	5 pounds/inch at 73°F (0.9 kg/cm at 23°C)
Chemical resistance	• Resists mild alkalis, mild acids, and salt • Excellent resistance to water *(does not include immersion)* • Resists occasional fuel spills
Flammability	Call 1-800-328-3908 for information

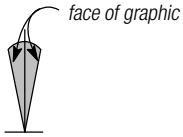
B. Application Characteristics

Characteristic	Value
Finished graphic application recommendation	**Surface type:** Flat, with and without rivets, simple curves, compound curves, and corrugations **Substrate type:** ABS resins, aluminum, chrome, glass, fiberglass reinforced plastics, paint (check adhesion to powder-coated or water-based paints),fiberglass with gel coat **Application method:** Dry **Application temperature:** *air and substrate* • 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)
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)

4. Definitions

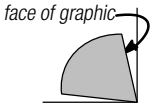
A. Exposure Types

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. Click here for a detailed map.

B. Graphic Construction

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

C. Graphic Protection

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

D. Graphic Types

As identified in Product Warranty Matrices

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. May also be called decals.

Vehicles

Vehicle. Buses, vans, passenger vehicles, delivery trucks, pickup trucks, enclosed trailers.

Straight Trucks. Semi-Tractors and Semi-Trailers. Straight trucks, semi-tractors and semi-trailers used for commercial business purposes. Excludes air shields.

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.

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.

Rail. Rail cars and lead cars of trains, light rail and subways, but not locomotives or engines.

5. Warranty Information

A. Warranty Coverage Overview

The warranty coverage for each graphic is based on the user(s) both reading and following all applicable and current 3M Product and Instruction Bulletins. 3M will honor the Warranty Period stated in the base film's Product Bulletin that is current when the film was purchased. The Warranty Period 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.

B. 3M Basic Product Warranty

This product is 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 Commercial Graphics Warranty Brochure.

C. Limited Remedy

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.

D. Limitation of Liability

Except where prohibited by law, 3M SHALL NOT UNDER ANY CIRCUMSTANCES BE LIABLE TO PURCHASER OR USER FOR ANY DIRECT (EXCEPT FOR THE LIMITED REMEDY PROVIDED ABOVE), INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, LABOR, NON-3M MATERIAL CHARGES, LOSS OF PROFITS, REVENUE, BUSINESS, OPPORTUNITY, OR GOODWILL) RESULTING FROM OR IN ANY WAY RELATED TO SELLER'S PRODUCTS, SERVICES or THIS BULLETIN. This limitation of liability applies regardless of the legal or equitable theory under which such losses or damages are sought including breach of contract, breach of warranty, negligence, strict liability, or any other legal or equitable theory.

E. Additional Limitations

See the 3M Commercial Graphics Warranty Brochure at 3Mgraphics.com, which gives the terms, additional limitations of the warranty, if any, and limitations of liability.

F. 3M Performance Guarantee

Subject to Stipulations set forth in Section H., below

Graphics constructed with the 3M materials specified and in the exposure specified in the Warranty Period, Section F.(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 H.(1).

(1) Warranty Period

for 3M Product Performance in a Standard U.S. Vertical Exposure

Warranty Period for 3M Product Performance, in Years

Film	Graphic Protection	Vehicles	Outdoor & Indoor Signs	Watercraft	Inks & Printers**
IJ180-10 IJ180C-10 IJ180Cv3-10	8518 8519 8520 8915	3	3	2	See the Performance Guarantee Matrix
	8528* 8548G*	4	3	2	
	1920DR	3	3	—	
	9740i	3	3	2	

* For information about overlaminates 8528 and 8548G horizontal warranty, please see Section H.(2).

** Some of the graphic protection products and graphic types may not be approved for this film on certain printing platforms. Always refer to the Performance Guarantee Matrix.

G. 3M™ MCS™ Warranty

Subject to Stipulations set forth in Section H., below

Finished graphics constructed with the materials specified and the exposure specified in the Warranty Period tables, Section G.(1), are eligible for the 3M™ MCS™ Warranty. For warranties for other exposures, see Section H.(1).

(1) Warranty Period

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

Warranty Period for Finished Graphics, in Years

SOLVENT PRINTERS and INKS	EFI™ VUTEk® 150, 2360/3360, 3300/5300, 3000/5000 Printers				HP Scitex XL 1200, XL 1500 Printers				HP Scitex TJ8300 and TJ8350 Industrial Presses			
	3M Ink Series 1500v2				3M Ink Series 4400				3M Ink Series 4800			
Graphic Protection	VEH	OUT	WATER	IN	VEH	OUT	WATER	IN	VEH	OUT	WATER	IN
8518, 8519, 8520, 8915	7	4	2	8	7	4	2	8	7	4	2	8
8528, 8548G ■	7/2	4	2	8	7/2	4	2	8	7/2	4	2	8
8908, 8909	—	1	—	3	—	1	—	3	—	1	—	3
1920DR	3	3	2	5	—	—	—	—	3	3	2	5
9740i	5	4	2	8	5	4	2	8	5	4	2	8
8530	2	2	—	3	2	2	—	3	2	2	—	3
none	—	2	—	2	—	2	—	3	—	2	—	3

■ Overlaminates 8528 and 8548G: first number represents the vertical warranty and the second number the horizontal warranty on vehicle graphics. Please see Section H.(2).

Continued on next page…

SOLVENT PRINTERS and INKS	Agfa :Jeti 3312, 3318, 3324, 5024 [Gandinnovations] Printers				SIIT ColorPainter H Series H-74s, H-104s, H2-74s and H2-104s Printers			
	3M Ink Series 6200				GX 3M Ink Series			
Graphic Protection	VEH	OUT	WATER	IN	VEH	OUT	WATER	OUT
8518, 8519, 8520, 8915 ●	7	4	2	8	7	4	2	8
8528, 8548G ■	7/2	4	2	8	7/2	4	2	8
8908, 8909	—	1	—	3	—	—	—	—
1920DR	5	4	2	5	3	3	2	5
9740i	5	4	2	8	5	4	2	8
8530	2	2	—	3	—	—	—	—
none	—	3	—	3	—	2	—	2

LATEX PRINTERS and INKS	Designjet L65500; Scitex LX600 & LX800 Printers			
	HP 3M LX600 Specialty Latex Ink			
Graphic Protection	VEH	OUT	WATER	IN
8518, 8519, 8520, 8915 ●	5	4	2	7
8528, 8548G ■	5/2	4	2	7
1920DR	2	2	—	3

UV PRINTERS and INKS	EFI™ VUTEk® PV200 Printer				Durst Rho 160R & 351R Printers				EFI™ VUTEK® GS2000, GS3200, GS3250 Printers			
	3M Ink Series 2200UV				3M Ink Series 2700UV				GS 3M™ Premium UV Inks			
Graphic Protection	VEH	OUT	WATER	IN	VEH	OUT	WATER	IN	VEH	OUT	WATER	IN
8518, 8519, 8520, 8915	7	4	2	8	7	4	2	8	5	4	2	8
8528, 8548G ■	7/2	4	2	8	7/2	4	2	8	5/2	4	2	8
1920DR	—	—	—	—	—	—	—	—	3	2	—	5
9740i	5	4	2	8	5	4	2	8	5	3	2	8
none	—	3	—	3	—	3	—	3	—	2	—	3

UV PRINTERS and INKS	EFI™ VUTEk® QS2000, QS3200, QS3220, QS220 Printers				HP Designjet H35000/45000 Printers				EFI™ VUTEk® GS5000r, GS3250r Printer			
	3M Ink Series 2800UV				3M Ink Series 5400UV				GSr 3M™ Premium UV Inks			
Graphic Protection	VEH	OUT	WATER	IN	VEH	OUT	WATER	IN	VEH	OUT	WATER	IN
8518, 8519, 8520, 8915	7	4	2	8	7	4	2	8	5	4	2	8
8528, 8548G ■	7/2	4	2	8	7/2	4	2	8	5/2	4	2	8
1920DR	—	—	—	—	—	—	—	—	3	2	—	5
9740i	5	4	2	8	5	4	2	8	5	3	2	8
none	—	3	—	3	—	3	—	3	—	2	—	3

UV PRINTERS and INKS	Mimaki UJV-160, JFX-1631 & 1615R Printers				Mimaki JF-1610 & 1631 Printers				EFI™ R3225 UV Roll-to-Roll Printer			
	Ink Series LF-200				Ink Series F-200				R3225 3M™ UV Inks			
Graphic Protection	VEH	OUT	WATER	IN	VEH	OUT	WATER	IN	VEH	OUT	WATER	IN
8518, 8519, 8520, 8915	7	4	2	8	7	4	—	8	5	4	2	8
8528, 8548G ■	7/2	4	2	8	7/2	4	—	8	5/2	4	2	8
1920DR	—	—	—	—	—	—	—	—	3	2	—	5
9740i	—	—	—	—	—	—	—	—	5	3	2	8
none	—	—	—	—	—	3	—	3	—	2	—	3

■ Overlaminates 8528 and 8548G: first number represents the vertical warranty and the second number the horizontal warranty on vehicle graphics. Please see Section H.(2).

● Clear 8915 is not approved for or warranted for use with Seiko I Infotech's GX 3M Ink Series.

(2) Paint Refurbishing Reimbursement Remedy

a. Paint Staining

See the General Warranty Stipulations, Section H.(3)c.

b. 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 Instruction 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.

c. 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.

H. 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 Commercial Graphics Warranty Brochure at 3Mgraphics.com.

(1) Reduced Warranty Period for Other Graphic Exposures

For other graphic exposures, multiply the Warranty Period (in years) for your graphic construction as shown in the applicable Warranty Period tables, Section G.(1) or Section F.(1), by the percentage shown for the intended graphic exposure. See page 4 for the graphic exposure definitions.

If the Graphic Exposure is:	Use this Percentage of U.S. Vertical Exposure, Warranty Period	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	0%	0

(2) Overlaminates 8528 and 8548G Horizontal Warranty

Printed film as specified in this bulletin with overlaminate 8528 or 8548G for vehicle graphics: 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 Warranty 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 Warranty 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:
  - paint staining: 3M does not warrant vehicle paint staining that may be visible after removing an inkjet printed graphic with an overlaminate. To reduce the risk of this problem, always remove the graphic by the end of the Warranty Period.
  - 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 (except graphics using overlaminate 8528 or 8548G as described in this Bulletin).

(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. However, to help maintain the appearance of your graphic, use the recommended graphic protection whenever:

- it is required for the construction and end use as shown in the Warranty Period tables.
- the graphic, **including printed vehicle or watercraft graphics**, is exposed to abrasive conditions, harsh cleaners or chemicals.

(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™ MCS™ 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.

6. 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

7. 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, overlaminate lifting, and/or poor graphic performance. For additional details about total ink coverage, refer to the Product & Instruction Bulletin for 3M inks or the Performance Guarantee Matrix for OEM inks.

(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
- Knifeless™ Tape
- 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.

- Overlaminates must be cold or hot roll applied. When overlaminating UV piezo inkjet printed graphics, 3M recommends using hot roll lamination to help minimize a silvered graphic appearance caused by bubbles being trapped within the valleys of a graphic. See Instruction Bulletin 4.22 for details.
- Clear 8530 must be applied with a liquid laminator.

D. Application Tapes

(1) When to Use Premasking Tape

- Use as an application aid to increase stiffness, and prevent stretching and damage during application.
- Use 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 that includes overlaminate 8519, use premasking tape SCPM-3. To prespace a film with Comply adhesive that includes clear 1920DR, use prespacing tape SCPS-55.

Select the tape based on what is on top of the graphic

Tape	None	8519 8520 8915	8908 8909	8530	1920DR	9740i	8518 8528 8548G
Premasking SCPM-3	■	■	■	■	■	—	—
Prespacing SCPS-2 *IJ180*	■	■	■	—	■	—	—
Premasking SCPM-44X	—	—	—	—	—	■	—
Prespacing SCPS-55 *for films with Comply Adhesive only (any version)*	■	■	—	—	■	■	—
Prespacing SCPS-53X	—	—	—	—	—	■	—

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

8. 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 using overlaminate 8548G, graphics can be stretched up to 150% (for example, a 10 inch piece of film can stretch to 15 inches) 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. Pressure-activated Adhesive

- The pressure-activated adhesive on this film offers:
  - smooth sliding into position on a substrate;
  - fast finger tacking to check position; and
  - easy snap up and repositioning when you need it.
- The **snap up and reposition feature is lost:**
  - when firm pressure with a squeegee or other application tool is applied.
  - 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 has not completely dried or cured, which affects both slide-ability and snap up.

B. Working with Air Release Channels

Air release channels are a characteristic of films with Comply adhesive. Films designated as Cv3 offer the ultimate in invisible air release channels.

- The channels will be damaged and effective air removal affected if you remove and attempt to change liners or reapply the same liner.
- For the best results, 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.

Video See how 3M's Comply adhesive technology works.

C. 3M™ Primer 94

Although this product does not require the use of 3M' Primer 94 in the areas where the film will be stretched, it is always a good practice to use primer to maximize a graphic's bond to its substrate.

D. 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.

E. 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.

F. Application to Watercraft

Read and follow all instructions, and complete the *3M Watercraft Graphics Pre-installation Inspection Record* in Instruction Bulletin 5.42 before manufacturing or applying any graphic to a watercraft.

Graphics applied to watercraft require edge sealing. Refer to Instruction Bulletin 5.42 for details.

G. Application to Other Substrates

3M offers several detailed Instruction Bulletins to help you achieve a successful graphic installation. Please see Section 13., 3M Related Literature.

H. Edge Sealing

Vehicle, indoor and outdoor graphics. These films may require edge sealing. Applications such as rail cars may benefit from using edge sealer 3950 or edge tape 8914 when subject to external sources such as abrasion and/or power-washing.

Watercraft graphics. Graphics applied to watercraft require edge sealing. Refer to Instruction Bulletin 5.42 for details.

9. 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.) See Instruction Bulletin 6.5.

10. 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 3M™ Controltac™ Plus Film Remover R-221 and Adhesive Remover R-231 and for additional removal details.

11. Shelf Life, Storage and Shipping

A. Shelf Life

Total shelf life: 3 years from the date of manufacture on the original box.
If you do process the film, do so within 2 years and apply within 1 year.
If you do not process the film, apply it within 3 years.

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.

12. 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.

13. 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 1500v2	PB-IB	1500
3M™ Piezo Inkjet Ink Series 2200UV	PB-IB	2200UV
3M™ Piezo Inkjet Ink Series 2700UV	PB-IB	2700UV
3M™ Piezo Inkjet Ink Series 2800UV	PB-IB	2800UV
3M™ Piezo Inkjet Ink Series 4400	PB-IB	4400
3M™ Piezo Inkjet Ink Series 4800	PB-IB	4800
3M™ Piezo Inkjet Ink Series 5400UV	PB-IB	5400UV
3M™ Piezo Inkjet Ink Series 6200	PB-IB	6200
EFI™ VUTEk® GS 3M™ Premium UV Inks	PB-IB	GS
EFI™ VUTEk® GSr 3M™ Premium UV Inks	PB-IB	GSr
EFI™ R3225 3M™ UV Ink	PB-IB	R3225
HP 3M LX600 Specialty Latex Ink	PB-IB	LX600
Mimaki Ink Series LF-200	PB-IB	LF-200
Mimaki Ink Series F-200	PB-IB	F-200
SIIT GX 3M Ink Series	PB-IB	GX
3M Graphic Protection Products	PB	GP-1
3M™ Piezo Inkjet Protective Clear 8530	PB	8530
3M™ Screen Print Gloss Clear 1920DR - Applying screen printing clear 1920DR	PB IB	1900 3.12
3M™ Screen Print UV Gloss Clear 9740i	PB-IB	UV Clears
3M™ Edge Sealer 3950	PB	3950
3M™ Vehicle Channel Applicator Tools	PB-IB	V-Tools
Scoring and cutting	IB	4.1
Design of graphics	IB	2.1
Using 3M application tapes; premasking and prespacing for films	IB	4.3
Hot and 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

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

Subject	Type	Bulletin No.
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 Commercial Graphics Warranty Brochure	www.3Mgraphics.com, Warranties	

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14. Bulletin Change Summary

Modified and new content is marked with a black bar in the margin. Introduced new high performance, non-PVC gloss overlaminate 8548G as a compatible graphic protection option with a horizontal warranty, and new UV printing platform, EFI™ R3225 3M™ UV Ink for EFI™ R3225 UV Roll-to-Roll Printers. Corrected 3M Performance Guarantee Warranty Periods for outdoor and indoor sign applications. Updated names of HP Scitex XL1200 and XL 1500 Printers and HP Scitex TJ8300 and TJ8350 Industrial Presses.

3M

Commercial Graphics
3M Center, Building 220-12E-04
St. Paul, MN 55144 USA
General & Technical
1-800-328-3908
Fax 1-651-736-4233

3M Canada
PO Box 5757
London, Ontario
Canada N6A 4T1
General 1-800-265-1840
Fax 519-452-6245

3M México S.A. de C.V.
Av. Santa Fe No. 55
Col. Santa Fe, Del. Alvaro Obregón
México D.F. 01210
General 5255-5270-0400
Fax 5255-5270-2277

3M Puerto Rico, Inc.
350 Chardon Avenue
Suite 1100
San Juan, PR 00918
General 787-620-3000
Fax 787-620-3018

www.3Mgraphics.com

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