



Scotchlite™ Reflective Graphic Film 5000 and IJ5000

For Screen Printing, Piezo Ink Jet Printing and Electrostatic Imaging

Description

3M™ Scotchlite™ Reflective Graphic Film 5000 and 3M™ Scotchlite™ Reflective Graphic Film IJ5000 are permanent, retroreflective films that are well suited for short-term emblems, commercial vehicle markings, stickers and non-regulated industrial signage. They are durable and flexible with superior angularity. They can be screen printed, piezo ink jet printed or electrostatically imaged.

Recommended Types of Graphics and End Uses

These types of graphics and end uses may be warranted by the 3M™ MCS™ Warranty. Please read the entire bulletin for details.

- Outdoor graphics such as:
 - Most commercial vehicle or fleet graphics
 - Non-regulated industrial signage
 - Emblems and stickers

Limitations of End Uses

We do not normally warrant other applications, but please contact us to discuss your needs or let us suggest other 3M products.

Unsuitable End Uses for This Film

- Graphics applied to:
 - Corrugated or highly irregular surfaces or to sharply raised areas like huck bolts
 - Substrates with compound curves
 - Substrates that do not have a clean, smooth surface or have poor paint-to-substrate adhesion
 - Stainless steel on vehicles
 - Flexible substrates
 - Buses
- Graphics regularly subjected to gasoline vapors or spills such as gas pumps, automobile fuel-tank ports or top-feeding petroleum tankers.
- Graphics made for automotive Original Equipment Manufacturers (OEM); contact 3M Automotive Division at 1-800-328-1684 for alternatives.

Compatible Products for 3M™ MCS™ Warranted Graphics

Screen Printing Inks for Film 5000

This film is forward wound on a 3-inch unnotched core.

- 3M™ Scotchlite™ Transparent Screen Printing Ink Series 2900 *line color and four-color*
- 3M™ Screen Printing Ink Series 1900 *line color and four-color*
- 3M™ Screen Printing UV Ink Series 9800 *line color and four-color*

Electrostatic Imaging Materials for Film 5000

This film is forward wound on a 3-inch unnotched core.

- Scotchprint® Printer 2000
- 3M™ Trident Transfer Paper
- Scotchprint® Toner Series 8700/8800 ES

Piezo Ink Jet Inks and Printers for Film IJ5000

This film is forward wound on a 3-inch unnotched core.

- 3M™ Piezo Ink Jet Ink Series 1500
 - VUTEk UltraVu™ 150 Printer
 - VUTEk UltraVu™ 2360/3360 Printers
 - VUTEk UltraVu™ 3300/5300 Printers
- 3M™ Piezo Ink Jet Ink Series 6000
 - Océ Arizona 30s Printer

For the Scitex printer, order film forward wound on a 6-inch unnotched core.

- 3M™ Piezo Ink Jet Ink Series 4600
 - Scitex Pressjet-W™ Printer

Graphic Protection Options

- 3M™ Scotchlite™ Screen Print Gloss Clear 2920DR
- 3M™ Screen Print Gloss Clear 1920DR
- 3M™ Screen Print Gloss Clear 9720UV
- 3M™ Screen Print Gloss Clear 9800CL
- 3M™ Screen Print Clear 8920 ES
- 3M™ Scotchcal™ Luster Overlamine 8519
- 3M™ Scotchcal™ High Gloss Overlamine 8912 ES (not for use on rivets)
- 3M™ Scotchcal™ Optically Clear High Gloss Overlamine 8914 ES

Note: For the full product names of the 3M products listed on this page, please see page 1.

Other Products

- 3M™ Scotchlite™ Edge Sealer 4433
- 3M™ Prespacing Tape SCPS-2
- 3M™ Prespacing Tape SCPS-53X
- 3M™ Premasking Tape SCPM-3
- 3M™ Premasking Tape SCPM-44X

Characteristics

All values given are typical for unprocessed film unless noted otherwise and are not for use in specifications. Processing film may change certain values. If you have questions about your construction, contact the Technical Service helpline at 1-800-328-3908.

Physical Characteristics

Characteristic	Description
Film color	White
Thickness	With adhesive: 6 mils (0.15 mm)
Adhesive and color	Pressure sensitive, white
Liner	Polyethylene-coated layflat paper
Removal	Permanent
Retroreflectivity <i>typical</i>	85 candlepower at -4° entrance angle and 0.2° observation angle. <i>See further explanation below tables.</i> Note: Overlamine is required for electrostatically imaged graphics to complete the reflective properties of the graphic

Application Characteristics

Characteristic	Description
Finished graphic application recommendation	Surface type: Flat, with and without rivets; simple curves Substrate type: Etched aluminum, FRP, painted metal Application temperature: 32° to 85°F (0° to 30°C) <i>air and substrate</i>
Temperature range after application	-30° to +200°F (-34° to +93°C)

Characteristic	Description
Chemical resistance	Resists mild acids, mild alkalis, and salts Excellent water resistance <i>does not include immersion</i>
Graphic removal	Removable with heat from flat and riveted surfaces

Retroreflection

At a -4° entrance angle and a 0.2° observation angle, unprinted films 5000 and IJ5000 has the following typical coefficient of retroreflection. It is expressed in candlepower per foot-candle per square foot (candela/lux/square meter) per ASTM E 810.

The entrance angle is formed by a light beam striking the surface at a point and at a line that is perpendicular to the surface at the same point.

An observation angle is formed by the light beam striking the reflective surface and returning to the observer. From 800 feet (249 meters), a motorist normally views a graphic at a 0.2° angle.

Warranty Information

Graphic Performance Life

The actual performance depends on the:

- Correct combination of 3M-recommended graphics products
- Ink formulation (screen printing)
- Adequate ink drying or UV curing
- Selection and preparation of the substrate
- Surface texture
- Application methods
- Angle and direction of sun exposure
- Environmental conditions
- Cleaning or maintenance methods

3M™ MCS™ Warranted Graphic Constructions

The warranty given in the Product Bulletin that is current at the time you purchased the film is the one that 3M will honor.

The warranties in this table are for graphics exposed in the U.S. in a vertical orientation. See **Warranty Notes** for how to determine other warranty combinations.

Continued on the next page.

Note: For the full product names of the 3M products listed on this page, please see page 1.

Warranted Durability		
Film Plus		U.S. Vertical Exposure <i>in years</i>
Ink Series	Graphic Protection	Fleet & Comm'l Vehicle Graphics, Outdoor Signs, Indoor Signs
Film 5000 or IJ5000		
Unprinted	None	1.5
Screen Printing with Film 5000		
2900 <i>line or 4-color</i>	2920DR 9720UV	1.5 1.5
1900 <i>line or 4-color</i>	1920DR 9720UV	1.5 1.5
9800 <i>line or 4-color</i>	9720UV 9800CL	1.5 1.5
Electrostatic Imaging with Film 5000		
8700/8800	8519 8912 ES 8914 ES 8920 ES 1920DR	1.5 1.5 1.5 1.5 1.5
Piezo Ink Jet Printing with Film IJ5000		
1500 6000	8519 2920DR 1920DR 9720UV	1.5 1.5 1.5 1.5
4600	8519 2920DR 1920DR	1.5 1.5 1.5

Warranty Details

Graphic Exposure Definitions



Vertical Exposure

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



Non-Vertical Exposure

The face of the graphic is 10° to 45° from vertical.

How to Determine U.S. Desert Southwest and Non-Vertical Warranties

All other outdoor warranties are based on a percentage of the vertical U.S. warranties given in the Warranted Durability Table. The calculation for determining these warranties is given below. A “construction” is the base film, inks and clear or overlaminate (if required). The examples are based on a vertical U.S. warranty of 1.5 years.

- **Warranty for Non-Vertical U.S. Exposure**

50% (0.5) of the vertical warranty for your construction

Example: $0.5 \times 1.5 \text{ years} = 0.75 \text{ years}$

- **Warranty for U.S. Desert Southwest Exposure**

For graphics exposed to solar energy more than half of the time in Arizona, New Mexico and the desert areas of California, Nevada, Utah and Texas. A detailed map is available upon request.

- **Vertical U.S. Desert Southwest**

70% (0.7) of the U.S. vertical warranty for your construction

Example: $0.7 \times 1.5 \text{ years} = 1.05 \text{ years}$

- **Non-vertical U.S. Desert Southwest**

35% (0.35) of the U.S. vertical warranty for your construction

Example: $0.35 \times 1.5 \text{ years} = 0.52 \text{ years}$

Application Outside the U.S.

Contact the 3M organization for that country.

Using Opaque Inks 1900 and 9800

Opaque inks prevent retroreflection in printed areas.

Graphic Protection

Electrostatically imaged graphics require graphic protection. Fleet graphics and all other graphics subjected to abrasion or mild chemicals must have graphic protection.

Clears

Four color inks require a clear coat. Screen print clears must be applied by screen printing.

Overlaminates

Overlaminates must be cold roll applied. See Instruction Bulletin 4.22.

Rivets

This film may tent around rivets, which is not covered by the MCS warranty.

Application to Glass

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

Note: For the full product names of the 3M products listed on this page, please see page 1.

Graphics Made with Components Not Sold or Recommended by 3M

The user is solely responsible for the graphic appearance, performance and durability when this film is used with any other manufacturers' inks, graphic protection and/or application tapes. See the 3M Performance Guarantee for other options.

Warranty and Limited Remedy

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: 3M graphics materials 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. 3M will replace or refund the price of any 3M materials that do not meet this warranty within the specified time periods. See the worldwide 3M™ MCS™ Warranty (www.Scotchprint.com or Fax-on-Demand), which gives the terms and limitations of the warranty.

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.

Screen Printing

Formulations and processing conditions can affect ink durability. Refer to the Product and Instruction Bulletins for your ink for limitations and proper usage.

Ink series 1900 and some colors in ink series 9800 are opaque. Be aware that opaque ink can prevent the film from retroreflecting in the screen printed areas. Ink series 2900 and the transparent colors from ink series 9800 are good choices when retroreflection is important in the screen printed areas.

Electrostatic Imaging

For electrostatic imaging, refer to Product Bulletin Trident and Instruction Bulletin 4.7.

Piezo Ink Jet Printer Support Information

Ink

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


Total Ink Coverage

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


Color Profiles

Many color profiles are available on our website at www.scotchprint.com.

Drying

 Caution
Always build enough time into your process to ensure adequate 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 the graphic, and applying the film. See the ink's Instruction Bulletin for more details.

Cutting

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

The following are common cutting methods for this film. See Instruction Bulletin 4.1 for details.

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

Minimum Cutting Heights

Based on cutting and weeding evaluations that used Helvetica medium upper case, the recommended minimum cutting height for text is 3 inches (0.95 cm) and 3/8 inch stroke width. Because of the differences in electronically-controlled cutting equipment and font characteristics, users should determine their own cutting and weeding capability.

Application Tapes

The type of application tape to use depends on the type of graphic produced and the ink or graphic protection that was applied last. See Instruction Bulletin 4.3 for details.

Ink/Toner	Graphic Protection	Prespacing Tape	Premasking Tape <i>optional</i>
9800	1920DR 9720UV 9800CL	SCPS-53X	SCPM-44X
1900	1920DR	SCPS-2	SCPM-3
2900	2920DR 1920DR	SCPS-2	SCPM-3
8700	8912 8914 8915 1920DR	SCPS-2	SCPM-3
	8920	SCPS-53X	SCPM-44X
1500 4600 6000	8519 1920DR	SCPS-2	SCPM-3
	9720UV	SCPS-53X	SCPM-44X

Note: For the full product names of the 3M products listed on this page, please see page 1.

Application

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

Apply this film using the dry application method. Moisture that has condensed on the substrate will prevent good adhesion. Install on a dry substrate.

For improved graphic appearance, we suggest cutting around rivets.

Maintenance and Cleaning

Use a cleaner such as the kind used 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.)

Shelf Life, Shipping, and Storage

Activity	Recommendation
Shelf life	Total shelf life: 2 years Up to 2 years unprocessed, <i>OR</i> process within 1 year <i>and</i> apply within 1 year of processing
Storage conditions	<ul style="list-style-type: none"> • 100°F (38°C) maximum • Out of sunlight • Clean dry area • Original container
Shipping finished graphics	Flat, or rolled printed side out on 5 inch (13 cm) or larger core; processed film may block if wound too tightly

See Instruction Bulletin 6.5 for details.

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:

- By fax, call 1-800-364-0768 in the US and Canada or 1-650-556-8417 for all other locations.
- Electronically, visit us at <http://www.3M.com/MSDS>.
- 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.

Attention:

Authorized Graphics Manufacturers

Visit our password-protected website for exclusive product information, profiles and services. Certain restrictions apply.

1. Go to www.scotchprint.com.
 2. Select a country.
 3. Click *Login* on upper left side of screen.
 4. Click Register.
 5. Enter authorization code: **CGD_SGN**.
 6. Complete the information and submit.
An e-mail will be sent when your authorization is completed.
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3M Related Literature

Before starting any job, be sure you have the most current product and instruction bulletins.

The information in 3M bulletins is subject to change. Current bulletins, as well as a list of all bulletins updated within the last three months, are available at www.scotchprint.com or through our Fax-on-Demand system. Any warranty, if offered, is based on information in the bulletin that was current at the time you purchased the 3M products. The following bulletins provide the information and processes you need to properly make the graphics described in this bulletin.

Fax-on-Demand phone numbers:
United States or Canada: 1-800-364-0768
International: 1-651-732-6506

Subject	Bulletin No.	FOD No.
Product Bulletins		
3M™ Screen Printing Ink Series 1900 and Overprint Clear VI0402	1900	2501
3M™ Scotchlite™ Screen Printing Ink Series 2900	2900	2512
3M™ Screen Printing Ink Series 9700UV	9700	2507
3M™ Screen Printing UV Ink Series 9800	9800	2513
3M™ Piezo Ink Jet Ink Series 1500	1500	4578
3M™ Piezo Ink Jet Ink Series 4600	4600	4582
3M™ Piezo Ink Jet Ink Series 6000	6000	4560
Scotchprint® Toner Series 8700/8800	8700	3514
3M™ Trident Transfer Paper	Trident	3567
3M™ Scotchal™ High Gloss Graffiti Resistant Overlaminate 8912 ES	8912	3521
3M™ Screen Print Gloss Clear 8920 ES	8920	2510
3M™ Scotchal™ Optically Clear Overlaminate 8914	8914	3542
3M™ Scotchal™ Overlaminates 8519 and 8520	8519	4524

Subject	Bulletin No.	FOD No.
Instruction Bulletins		
Screen printing with ink series 1900 - line color - 4-color	3.12 3.11	6012 6011
Screen printing with ink series 2900 - line color - 4-color	3.18 3.19	6018 6019
Screen printing with ink series 9700UV	3.4	6004
Screen printing with UV ink series 9800 - line color - 4-color	3.20 3.21	6020 6021
Printing with piezo ink jet series 1500	4.45	6545
Printing with piezo ink jet ink series 4600	4.43	6543
Printing with piezo ink jet ink series 6000	4.39	6539
Using toner series 8700/8800	4.12	6512
Transferring electrostatically printed images	4.7	6507
Screen printing with screen print clear 8920 ES	3.15	6015
Cold roll lamination	4.22	6522
Scoring and cutting	4.1	6501
Application, substrate selection, preparation and substrate-specific application techniques	5.1	7001
Application, special applications and vehicles	5.4	7004
Application: Special Considerations for Complex Contours of Automobiles, Vans and Buses and Inspection Forms	5.36	7036
Storage, handling, maintenance, removal	6.5	8505
Warranties		
Worldwide 3M™ MCS™ Warranty		9503

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Pressjet-W is a trademark of Scitex Corporation Ltd.

Bulletin Change Summary

Ink series 9700UV has been replaced by UV ink series 9800 with the same warranty, except vehicle graphics using UV ink series 9800 require a clear. Ink series 1900 was added. Other changes are marked by a black bar in the margin.



Regional Phone Numbers:
North East: 1-800-257-8226
South East: 1-800-537-4606
Great Lakes: 1-800-733-9942

Midwest: 1-800-736-7636
West: 1-800-252-7767
Mexico: 011-525-55-576-6667
www.sourceoneonline.com