



Scotchlite™

Flexible Reflective Graphic Film IJ680-10

For Piezo Ink Jet Printing Only

Description

Use 3M™ Scotchlite™ Flexible Reflective Graphic Film IJ680-10 to create colorful, long term graphics for vehicles, railroad, signs and striping. Graphics printed on this film have a similar daytime and nighttime appearance. This film features 3M's repositionable, pressure activated adhesive to aid in large graphic application.

Advantages

- Approved for use with selected piezo ink jet printers
- Durable, flexible, enclosed-lens, retroreflective film
- Positionable, pressure-activated adhesive (a 3M technology that is a mechanical feature, not an adhesive property)
- Resists cracking in cold climates
- Ideal for both large graphics and graphics applied to corrugated substrates
- Excellent angularity
- Retains 90% of its retroreflectivity when totally wet
- Similar daytime and nighttime appearance

Applications and Uses

Film IJ680-10 is intended for making vertical (only) permanent, durable graphics when used with the listed Compatible Products in the following applications. These applications may be warranted by the 3M™ MCS™ Warranty.

- Multicolor commercial vehicle graphics, railroad graphics, commercial signs, and striping

Limitations of Uses

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

Specifically, we do not warrant this film for the following:

- Application to stainless steel vehicles
- Permanent, regulatory traffic signs
- Graphics made for automotive Original Equipment Manufacturers (OEM); contact 3M Automotive Division at 1-800-328-1684, Ext. 444, for alternatives.

Compatible Products for Warranted Graphics

Note: This film may be used with inks and ink jet printing platforms not listed below. Please refer to the Warranted Information section, page 2, for details.

Inks and Printer Platforms

- 3M™ Piezo Ink Jet Ink Series 1600
 - Scitex PressJet-W™ Digital Press
- 3M™ Piezo Ink Jet Ink Series 2300
 - VUTEK UltraVu™ 2360/3360 Printers
- 3M™ Piezo Ink Jet Ink Series 4000
 - VUTEK UltraVu™ 3000/3300 and 5000/5300 Printers
- 3M™ Piezo Ink Jet Ink Series 2500UV
 - Scotchprint® Printer 2500UV

Overlaminates and Screen Print Clears

- 3M™ Screen Print Clear 2920DR
- 3M™ Screen Print Clear IJ9720UV
- 3M™ Scotchcal™ Luster Overlamine 8519

Other Products

- 3M™ Edge Sealer 4433
- 3M™ Prespacing Tape SCPS-2
- 3M™ Premasking Tape SCPM-3

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

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 | 7-8 mils (0.18 to 0.20 mm) <i>with adhesive</i> |
| Adhesive type | Pressure-activated, positionable |
| Adhesive color | Clear with silver underneath |
| Liner | Polyethylene-coated liner |
| Retroreflectivity <i>typical</i> | 100 at -4° entrance angle and 0.2° observation angle. <i>See further explanation below tables.</i> |
| Chemical resistance | Resists mild alkalis, mild acids, and salt Excellent resistance to water (<i>this does not include immersion</i>) Resists occasional fuel spills |
| Flammability | Call 1-800-328-3908 for information |
| Roll sizes | 48 inch x 50 yard (122 cm x 45 m) |

Application Characteristics

| Characteristic | Description |
|--|---|
| Finished graphic application recommendation Note: For applications nearing the minimum temperature range, please contact your local technical service representative to confirm suitability of application. | Surface type: Flat, with and without rivets; moderate compound curves Substrate type: Aluminum, FRP, paint Application temperature: 50° to 100°F (10° to 38°C) flat surfaces without rivets 55° to 100°F (13° to 38°C) flat, curved or corrugated surfaces with rivets |
| Service temperature range | -30° to +200°F (-34° to +93°C) |
| Graphic removal | Permanent |

Retroreflection Definition

The typical coefficient of retroreflection defined in Physical Characteristics is measured at a -4° entrance angle and a 0.2° observation angle. 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.

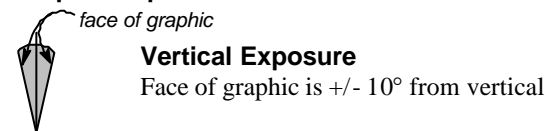
An observation angle is formed by the light beam striking the reflective surface and returning to the observer. From 800 feet (249 meters), a motorist normally views a graphic at a 0.2° angle.

Effective Performance Life

Only a Scotchprint® Graphics Authorized Manufacturer or 3M Piezo Ink Jet Registered Fabricator can produce 3M™ MCS™ Warranted Graphics. The effective performance life is based on field experience and exposure tests conducted throughout the United States. When the graphics are processed and used according to the 3M recommendations, they should have the performance life shown in the table below. The actual performance depends on the:

- Correct combination of film, ink and screen print clear or overlaminates
- Adequate drying
- Proper selection and preparation of the substrate
- Application methods
- Angle and direction of exposure
- Environmental conditions
- Cleaning and maintenance methods

Graphic Exposure Definition



Warranty Details

3M™ MCS™ Warranty

See the worldwide 3M™ MCS™ Warranty bulletin, which gives the terms and limitations of this warranty.

3M Performance Guarantee

The 3M Performance Guarantee covers product performance of 3M films and compatible 3M overlaminates and screen print clears for applications as specified in the corresponding 3M Product Bulletins.

3M Performance Guarantee, continued on the next page.

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

3M Performance Guarantee, continued.

Approved 3M films and overlaminates/screen print clears are guaranteed to be free of media induced artifacts that can cause misprints and are guaranteed to adhere to recommended substrates as referenced in this bulletin. The duration of any given durability varies according to the material combinations and applications described in this bulletin. Piezo inks may contain a high percentage of solvent. If the inks are not adequately dried during or shortly after printing, the residual solvent may have an adverse effect on product performance.

This 3M Performance Guarantee covers replacement cost of 3M materials only. The graphics must be fabricated and installed according to 3M recommendations. This guarantee does not cover image fade, cracking, peeling or any other performance issues.

Warranted Durability Tables

Only a Scotchprint® Graphics Authorized Manufacturer or 3M Piezo Ink Jet Registered Fabricator can produce 3M™ Warranted Graphics.

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

| 3M™ MCS™ Warranted Constructions | | | | | | | | | |
|--|----------------------|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| For constructions using 3M ink series 1600, 2300, 4000, film IJ680-10, specified overlaminates or clears and approved printers. | | | | | | | | | |
| Type of Graphic | Ink Series | Overlamine or Screen Print Clear ¹ | | | | | | | |
| | | 8519 | | 2920DR ² | | IJ9720UV ² | | None | |
| | | US ³ years | SW ⁴ years | US ³ years | SW ⁴ years | US ³ years | SW ⁴ years | US ³ years | SW ⁴ years |
| Fleet ⁵ | 1600 2300 4000 | 5 | 3 | 5 | 3 | 5 | 3 | 0 | 0 |
| | 2500UV | 2 | 1 | 0 | 0 | 2 | 1 | 0 | 0 |
| Exterior Signs | 1600 2300 4000 | 4 | 2.5 | 4 | 2.5 | 4 | 2.5 | 3 | 2 |
| | 2500UV | 2 | 1 | 0 | 0 | 2 | 1 | 0 | 0 |
| Interior Signs | 1600 2300 4000 | 8 | 8 | 0 | 0 | 0 | 0 | 3 | 3 |
| | 2500UV | 5 | 5 | 0 | 0 | 5 | 5 | 5 | 5 |
| 3M Performance Guarantee Constructions in years | | | | | | | | | |
| For constructions using Mimaki JV3-S (OEM solvent inks only), Mutoh Toucan, Mutoh Falcon II Outdoor, Roland SoJet Pro II EX Printers, and Seiko ColorPainter™ with OEM inks. | | | | | | | | | |
| Type of Graphic | Ink Series | 8519 | | 2920DR ² | | IJ9720UV ² | | None | |
| Fleet | OEM inks | 2 | 1 | 2 | 1 | 2 | 1 | 0 | 0 |
| Exterior Signs | | 2 | 1 | 2 | 1 | 2 | 1 | 0 | 0 |
| Interior Signs | | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |

¹ See **When to Use an Overlamine or Screen Print Clear**.

² 2920DR and IJ9720UV must be screen printed in order to be warranted.

³ For warranty periods outside the United States, contact the 3M sales organization for that country.

⁴ The U.S. Desert Southwest includes Arizona, New Mexico, and the desert areas of California, Nevada, Utah and Texas. A detailed map is available by request. The warranty for this area is reduced because there is more solar energy. This warranty applies to graphics exposed to solar energy in the U.S. Desert Southwest more than 50% of the time.

⁵ The film may tent around rivets, which is not covered by the 3M MCS Warranty.

When to Use an Overlaminate or Screen Print Clear

An overlaminate or screen print clear provides protection to a graphic as well as changing gloss. Typically, only graphics that are subjected to harsh conditions require this protection in order to be warranted. They include:

- Vehicle and fleet graphics; such graphics are subjected to occasional petrochemical spills and to abrasion such as road debris and automatic/power washing.
- Any graphic exposed to abrasive washing conditions, including automatic/power washing, harsh cleaners or chemicals.

Printing with Solvent-Based Piezo Ink Jet Inks

The ink Instruction Bulletin provides detailed information for successful printing and graphic application. You must follow these instructions to get the durability given in the Effective Performance Life. See **3M Related Literature** on page 6.

The operator who has an excellent understanding of pre-press operations, including color management and using software profiles, and who understands the relationship between film characteristics, printer setup, total ink coverage and drying time can produce graphics that achieve the performance expectations of the film and the customer.

The operator should work with the graphic designer and/or color conversion operator so there is a common understanding of print and media parameters.

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, overlaminate lifting, and/or poor graphic performance.

| Total Ink Coverage | Printer |
|--------------------|--|
| 270% | UltraVu 2360/3360 Printers |
| 300% | UltraVu 3000/3300 and 5000/5300 Printers |
| 300% | Pressjet-W Digital Press |
| 300% | Scotchprint Printer 2500UV |
| 300% | Most other printers |

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

Color Profiles for Printers

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.

Recommended Cutting Methods

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

Note: Electronically-cut graphics may be difficult to cut and weed. The customer must assume responsibility for testing and approving this cutting method.

Weed the film within 24 hours of cutting it. The adhesive may flow after cutting.

Refer to Instruction Bulletin 4.1 for more details.

Design Factors

The following minimum values for electronic cutting text from film IJ680-10 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)

Flat bed cutter with dual edge blade

6.0 inch (152 mm)

Standard friction feed plotter

Minimum radius for end of stripe:

0.125 inch (3.18 mm)

Order "roll applicator splices" for roll striping. Butt splices may have a small gap.

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

Application Tape

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

- Use prespacing tape SCPS-2 if the graphic has large amounts of the liner exposed.
- Use premasking tape SCPM-3 if very little of the liner is exposed.

Premask IS NOT recommended for:

- Continuous rolls or striping wider than 12 inches (31 cm)
- Rolls wider than 12 inches (31 cm) that will be slit

Premask IS recommended for:

- Graphics larger than 4 square feet (0.4 m²)
- Striping greater than 4 inches (10 cm) wide

Application

This Bulletin does not contain detailed application procedures. Refer to the **3M Related Literature** section for further information.

- The adhesive on film IJ680-10 is positionable when tacking, but not after applying pressure. The pressure used to apply the film bonds the adhesive to the substrate.
- Do not apply graphics if the air or surface temperature is lower than 50°F (10°C) on a flat surface without rivets, or 55°F (13°C) on riveted or corrugated surfaces.
- At surface temperatures higher than 100°F (38°C), the film loses its positionability.
- Some substrates such as under-cured polyurethane paint, fiberglass, and some paint systems may continue to outgas for some time. Two-part polyurethane paints and screen print clears may stop curing when the air and surface temperatures are lower than 75°F (24°C). Be aware that outgassing causes this film to bubble.
- Film IJ680-10 can be applied over other recommended 3M graphic systems. Base graphics printed with screen print clear 2920 must be weathered for at least 1 year before applying film IJ680-10 over the top.
- Use edge sealer 4433 on processed and unprocessed graphics subjected to fuel vapors or occasional fuel spills.

- Edge sealing in the following applications is not required, but it may help keep the edges adhered when subjected to external sources such as abrasion and/or high pressure washing. Edge sealer 4433 is recommended for processed and unprocessed graphics.

- graphics exposed to severe abrasion or high pressure washing (see Note, below)
- graphics applied to chrome substrates
- graphics applied to locomotives and rolling railroad stock
- graphics applied to truck rollup doors

Note: Refer to Instruction Bulletin 6.5 for details on pressure cleaning. Exceeding 3M's recommendations will void the warranty whether or not an edge sealer was properly used.

Removal

Caution

Solvents may ignite near heat or open flame. Do not use heat sources near solvents. Failure to avoid the use of heat sources near solvents can cause flash fires.

Film IJ680-10 is not a removable product. Heat helps take off the top layer, but removing the adhesive requires a solvent-based remover.


Refer to Instruction Bulletin 6.5 for more details.

Shelf Life, Shipping and Storage

- The combined shelf life as processed and unprocessed film cannot exceed two years from the date of receipt from 3M. However, the film must be used within one year of processing even if the combined shelf life is less than two years.
- Leave the rolls of film in the original shipping carton or suspend the rolls horizontally.
- Store cut sheets lying flat.
- Store the film and the processed graphics in a clean, dry area and away from direct sunlight.
- Ship the finished graphics lying flat or in a roll. To roll the graphic, wrap it printed-side-out on a minimum 6 inch (15 cm) diameter core. These methods help prevent the film from wrinkling or popping off the liner.

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

Health and Safety

| |
|---|
|  Caution |
| <p>When handling any chemical products, read the manufacturers' container labels and the Material Safety Data Sheets (MSDS) for important health, safety and environmental information.</p> <p>To obtain MSDS sheets for 3M products:</p> <ul style="list-style-type: none">• 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. <p>When using any equipment, always follow the manufacturers' instructions for safe operation.</p> |

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:* Film IJ680-10 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. 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 bulletin, 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.

Attention:

Scotchprint® Graphics Authorized Manufacturers

Visit our password-protected website (www.scotchprint.com, then Login) for exclusive product information, services and product promotions.

To register, login as above and click "Register" on the right side of the screen. Certain restrictions apply.

3M Related Literature

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

Listed below is related 3M technical literature that may be of interest. You may view and print these Bulletins from our Web site at www.scotchprint.com, or order them via our Fax-on-Demand (FOD) system. Call one of these phone numbers to order the desired bulletins, and specify the FOD document number provided in the chart.

United States or Canada: 1-800-364-0768
International: 1-651-732-6506

| Subject | Bulletin No. | FOD No. |
|---|---------------|---------|
| Product Bulletins | | |
| 3M™ Piezo Ink Jet Ink Series 1600 | 1600 | 4526 |
| 3M™ Piezo Ink Jet Ink Series 2300 | 2300 | 4538 |
| 3M™ Piezo Ink Jet Ink Series 2500UV | 2500UV | 4575 |
| 3M™ Piezo Ink Jet Ink Series 4000 | 4000 | 4515 |
| 3M™ Scotchlite™ Screen Printing Ink Series 2900 | 2900 | 2512 |
| 3M™ Screen Printing Ink Series 9700UV | 9700 | 2507 |
| 3M™ Scotchcal™ Overlamine 8519 and 8520 | 8519/ 8520 | 4524 |
| Instruction Bulletins | | |
| Design of graphics | 2.1 | 5501 |
| Printing with piezo ink jet ink series 1600 | 4.30 | 6530 |
| Printing with piezo ink jet ink series 2300 | 4.35 | 6535 |

| | | |
|---|------|------|
| Printing with piezo ink series 2500UV | 4.41 | 6541 |
| Printing with piezo ink jet ink series 4000 | 4.27 | 6527 |
| Screen printing with line ink series 2900 | 3.18 | 6018 |
| Screen printing with ink series 9700 UV | 3.4 | 6004 |
| Cold roll lamination | 4.22 | 6522 |
| Scoring and cutting | 4.1 | 6501 |
| Using 3M application tapes; premasking and prespacing for films | 4.3 | 6503 |
| Application, substrate selection, preparation and substrate-specific application techniques | 5.1 | 7001 |
| Application, special applications and vehicles | 5.4 | 7004 |
| Application, general procedures for interior and exterior dry applications | 5.5 | 7005 |
| Storage, handling maintenance, removal | 6.5 | 8505 |

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Pressjet-W is a trademark of Scitex Corporation Ltd.
All other trademarks are the property of their respective companies.*

Bulletin Change Summary

A special 3M Performance Guarantee was added that covers the use of this film on a variety of ink jet printers; see details on pages 2 and 3. All information previously given in "Product Information" was moved to the Characteristics section. Other changes or additions are noted by black bars in the margin.



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For the United Kingdom and Republic of Ireland

Health & Safety

Refer to the package label and the Material Safety Data Sheet for health, safety, and handling information on the products referenced in this bulletin. For 3M products, if necessary, you may contact our Toxicology/Product Responsibility Department on 01344 858000.

Important Notice to Purchaser

The 3M products described in this publication are covered by a 3M warranty and limitation of liability.

3M's warranty provides that if 3M finds that goods are defective in material or workmanship they will be replaced or the price refunded at 3M's option but note that 3M does not accept liability for other direct losses (except for personal injury or death) or consequential losses relating to defective products or from information supplied by 3M.

Purchasers and users of 3M products, and not 3M supplying companies, are always solely responsible for deciding on the suitability of the 3M product for their required or intended use.

Technical Assistance

For help on specific questions relating to 3M Commercial Graphics Division Products, contact your local Technical Service Representative.

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