



Scotchcal™

Graphic Film Series 3470

For Screen Printing Only

Description

3M™ Scotchcal™ Graphic Film Series 3470, designed for screen printing, is a 4-mil film with a pressure-sensitive adhesive that is removable with heat, making it ideal for medium-term graphics for fleet or commercial vehicles and indoor or outdoor graphic applications.

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. Please read the entire bulletin for details.

- Commercial vehicle, transit or fleet graphics, emblems or striping
- Outdoor and indoor graphics and signs
- Vending or dispensing machine and cooler graphics

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.

Wall Graphics

This film can be used for wall graphics; however, the user must determine the product's suitability and whether it has the necessary adhesion for their application. The user is solely responsible for the graphic adhesion to the substrate. For guidelines, see Instruction Bulletin 5.37.

Unsuitable End Uses for This Film

- Graphics applied to:
 - Corrugated or highly-irregular surfaces or sharply raised areas
 - Flexible substrates
 - Non-3M films
 - Substrate surfaces that are not clean and smooth (little or no variation in texture)
 - Paint that is not thoroughly cured or dried

- Stainless steel on vehicles (use film 181-10 instead)
- Graphic removal from:
 - Applications with poor paint-to-substrate adhesion
 - Wallboard
 - Existing graphics that must remain intact; damage may occur during removal of film
 - Aged paint or metal that may have surface oxidation or chalking
 - Exterior, horizontal surfaces
- Graphic subjected to gasoline vapors or spills at 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.

Important Information About Bus Applications

Film used on buses must not be applied in a way that restricts the safe use of emergency window exits. See the most recent version of Instruction Bulletin 5.4.

Compatible Products for 3M™ MCS™ Warranted Graphics

3M Screen Printing Inks

- 3M™ Screen Printing Ink Series 1900
line color and four-color
- 3M™ Screen Printing UV Ink Series 9800
line color and four-color

3M Graphic Protection Options

- 3M™ Screen Printing Gloss Clear 1920DR
- 3M™ Screen Printing Low Gloss Clear 1930
- 3M™ Screen Printing Gloss Clear 9720UV
- 3M™ Screen Printing Low Gloss Clear 9730UV
- 3M™ Screen Printing Gloss Clear 9800CL

Other Products

- 3M™ Edge Sealer 3950
- 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 help line at 1-800-328-3908.

Physical Characteristics

Characteristic	Description
Material	Vinyl
Color	3470: opaque white 3475: opaque black
Gloss	Matte
Thickness	Without adhesive: 4 mils (0.10 mm) With adhesive: 4.5 –5 mils (0.11-0.13 mm)
Adhesive type	Pressure sensitive
Adhesive color	Gray
Liner	Polyethylene-coated paper
Tensile strength <i>minimum</i>	13 pounds/inch at 73°F (2.3 kg/cm at 23°C)
Adhesion <i>24 hours after application</i>	Aluminum, anodized: 5.5 pounds/inch (0.97 kg/cm) Fruehauf pre-painted panels: 2.7 pounds/inch (0.48 kg/cm)
Chemical resistance	Resists mild alkalis, mild acids, and salt Excellent resistance to water (<i>this does not include immersion</i>)
Flammability	Call 1-800-328-3908 for information

Application Characteristics

Characteristic	Description
Finished graphic application recommendation	Surface type: Flat, with and without rivets Substrate type: Acrylic, aluminum, glass (uncoated), painted metal, polycarbonate, and painted wood (smooth) Application temperature: 40° to 100°F (4° to 38°C) <i>air and substrate</i>
Applied film shrinkage	0.032 inch (0.8 mm)
Finished graphic exposure temperature	-30° - +200°F (-34° - +93°C)
Graphic removal	Removable with heat Removal temperature: Minimum ambient and substrate temperature 40°F (4°C)

Warranty Information

Graphic Performance Life

The actual performance depends on the:

- Correct combination of 3M–recommended graphics products
- Ink formulation
- Adequate ink drying and/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.

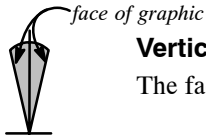
The warranties in these table(s) are for graphics exposed in the U.S. in a vertical orientation. See **Warranty Notes** for how to determine other warranty combinations.

Warranted Durability				
		U.S. Vertical Exposure <i>in years</i>		
Film 3470				
Ink Series	Graphic Protection	Fleet & Comm'l Vehicle	Outdoor Signs	Indoor Signs
None	None	3	3	3
1900	1920DR	3	3	5
	1930	2	2	
	9720UV	3	3	
9800	None	0	2	5
	9720UV	3	3	
	9730UV	3	3	
	9800CL	3	3	
9800 metallic	9720UV	3	3	5
	9800CL			
Film 3475				
None	None	3	3	3

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

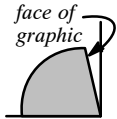
Warranty Notes

Graphic Exposure Definition



Vertical Exposure

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



Non-Vertical Exposure

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

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

All other outdoor warranties are based on a percentage of the vertical U.S. warranties given in the Warranted Durability Table(s). The calculation for determining these warranties is given below. A “construction” is the base film, ink and graphic protection. The examples are based on a vertical U.S. warranty of 3 years.

- **Warranty for Non-Vertical U.S. Exposure**
50% (0.5) of the vertical warranty for your construction
Example: $0.5 \times 3 \text{ years} = 1.5 \text{ years}$
- **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: $0.7 \times 3 \text{ years} = 2.1 \text{ years}$
 - **Non-Vertical U.S. Desert Southwest**
35% (0.35) of the U.S. vertical warranty for your construction
Example: $0.35 \times 3 \text{ years} = 1.05 \text{ years}$

Application Outside the U.S.

Contact the 3M organization for that country.

Special Warranty Stipulations for Automobile, Van and Bus Graphics

Automobiles, vans and buses require the completion of a Pre-Installation and Inspection Report for each vehicle that must be readily available if a claim is made. Refer to Instruction Bulletin 5.36 for the appropriate form.

Rivets

The film will 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.

Clear 1930

This clear may haze.

Graphics Without a Clear

There is no warranty for vehicle graphics without a clear. Abrasion damage and gloss loss are not covered for any graphic without a clear.

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.

Removal Warranty

The removal warranty for standard vehicle and sign substrates is the same as the Warranted Durability. Refer to page 1, *Limitations of End Uses, Graphic removal from*, for restrictions.

Warranty and Limited Warranty

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.Scotch-print.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.

Printing

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

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

Application Tapes

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

Graphic Protection	Prespacing Tape	Premasking Tape
Unprinted	SCPS-2	SCPM-3
1920DR 1930	SCPS-2	SCPM-3
9800 (no clear) 9720UV 9730UV 9800CL	SCPS-53X	SCPM-44X

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.

Adhesive

This film has a pressure-sensitive adhesive. It bonds to the surface even with light pressure and cannot be repositioned.

Rivets

This film will tent when applied over rivets. If the rivets are closely spaced, the film will bridge between rivets. Tented or bridged film may fail prematurely, which is not covered by the 3M warranty. For the best appearance and durability, 3M recommends cutting around the rivet, removing the circle of film, and then re-squeegeeing around the rivet.

Maintenance and Cleaning

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

Refer to Instruction Bulletin 6.5 for general maintenance and cleaning information.

Removal

This film can be removed with heat only. No other accessories or chemicals are needed. Most graphics can be removed and leave little or no adhesive residue on the substrate. The ease and rate of removal depends on several factors. See Instruction Bulletin 6.5 for details.

Shelf Life, Storage and Shipping

Activity	Recommendation
Shelf life	Total shelf life: 2 years Up to 2 years unprocessed, OR process within 1 year and 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.

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™ Screen Printing UV Ink Series 9800	9800	2513
3M™ Screen Printing Ink Series 9700UV	9700	2507
Instruction Bulletins		
Screen printing with ink series 1900	3.12	6012
Screen printing with ink series 9700 UV	3.4	6004
Screen printing with UV ink series 9800 - line color	3.20	6020
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
Application: special considerations for complex contours of automobiles, vans and buses and inspection forms	5.36	7036
Application for architectural windows and walls	5.37	7037
Storage, handling, maintenance, removal	6.5	7505
Warranties		
Worldwide 3M™ MCS™ Warranty		9503

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Graphics Market Center

3M Center, Building 220-12E-04
 PO Box 33220
 St. Paul, MN 55144-3220 USA
 General Info. 1-800-374-6772
 Technical Info. 1-800-328-3908
 Fax 1-651-736-4233

Fax-on-Demand 1-800-364-0768 US/Canada or 1-651-732-6506 International
 Fax-on-Demand document: 1504
www.scotchprint.com

3M Canada

P.O. Box 5757
 London, Ontario
 Canada N6A 4T1
 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
 52-55-52-70-04-00
 Fax 52-55-52-70-22-77

3M Puerto Rico, Inc.

Puerto Rico Industrial Park
 P.O. Box 100
 Carolina, PR 00986-0100
 787-620-3000
 Fax 787-750-3035

Bulletin Change Summary

UV ink series 9800 has replaced ink series 9700UV; the warranties are the same except we no longer offer a warranty for vehicles graphics without a clear.