



Scotchcal™ Graphic Film

Series 3690 and 3690LF

For Solvent or UV Screen Printing Only

Description

This is a 2-mil white or black film for screen printing graphics. The aggressive, pressure sensitive-adhesive is well suited for graphics applied to sand cast, moderately rough surfaces and some low surface energy materials. Designed with a gray-pigmented adhesive for good hiding power, this permanent film provides long term durability in severe weather and handling conditions encountered by commercial and industrial graphics.

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.

- Multicolor graphics including labels, emblems, and striping
- Small format original equipment manufacturer's decorative and identification graphics, cautionary, safety and vandal-resistant labeling

Limitations of End Uses

3M specifically does not recommend or warrant the following uses, but please contact us to discuss your needs or recommend other products.

Unsuitable End Uses for This Product

- Applications to corrugated surfaces
- Graphics regularly subjected to gasoline vapors or spills
- Graphics made for automotive Original Equipment Manufacturers (OEM); contact 3M Automotive Division at 1-800-328-1684 for alternatives.

Compatible Products

3M Graphic Materials

This Bulletin provides details about the base film and construction options and warranty. Additional specific information about compatible products can be found in the Product and Instruction Bulletins listed in **3M Related Literature** at the end of this bulletin.

3M Inks

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

Graphic Protection

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

OEM Inks and Clears

For OEM graphics only!

- Sericol™ Duracal™ UV Screen Print Inks
- Sericol™ Duracal™ Screen Print Clear (*approved for OEM applications only*)

Identify a Sericol's Duracal inks distributor at: www.sericol.com/Distributors/distribFR.htm. Or contact Sericol Inc. Corporate Office; 1101 W. Cambridge Drive, Kansas City, KS 66103; Tel: 913-342-4060, Fax: 913-342-4752.

Other Products

- 3M™ Premasking Tape SCPM-3
- 3M™ Premasking Tape SCPM-44X
- 3M™ Prespacing Tape SCPS-2
- 3M™ Prespacing Tape SCPS-53X

Characteristics

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

Physical Characteristics

Characteristic	Value
Material	Vinyl, cast
Color	3690-10, 3690LF-10: White 3690-12, 3690LF-12: Black 3690C-10: White 3690C-12: Black 2690C-114: Clear
Thickness	Without adhesive: 2 mils (0.05 mm) With adhesive: 3 to 4 mils (0.08 to 0.10 mm)
Adhesive type	Pressure sensitive
Adhesive color	Gray-pigmented adhesive
Liner	3690-10, 3690-12: white kraft paper 3690LF-10, 3690LF-12: polyethylene-coated layflat paper
Tensile strength (<i>minimum</i>)	5 pounds/inch at 73°F (0.9 kg/cm at 23°C)
Adhesion <i>24 hours after application</i> Note: The adhesive becomes more aggressive as the surface temperature increases.	ABS: 5 pounds/inch (0.9 kg/cm) Acrylic enamel: 5 pounds/inch (0.9 kg/cm) Aluminum, anodized: 6 pounds/inch (1.1 kg/cm) Aluminum, etched: 5 pounds/inch (0.9 kg/cm) Chrome: 5 pounds/inch (0.9 kg/cm) Fiberglass: 5 pounds/inch (0.9 kg/cm) Powder coat paint: 3-6 pounds/inch (0.5-1.1 kg/cm) <i>value can vary greatly; contact your 3M representative to arrange for 3M to test your substrate</i>
Chemical resistance	Resists mild acids, mild alkalis, and salts. Excellent resistance to water (<i>does not include immersion</i>)

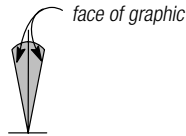
Application Characteristics

Characteristic	Value
Finished graphic application recommendation	Surface type: Flat or moderate compound curves, with or without rivets; also sand-cast, moderately rough Substrate type: Most rigid plastics (including polyethylene and polypropylene), etched and anodized aluminum, chrome, fiberglass and paint ¹ Application temperature: 40° to 90°F (4° to 32°C) <i>air and substrate</i> Application method: Dry
Applied film shrinkage	0.047 inch (1.2 mm)
Finished graphic exposure temperature	-65° to +225°F (-54° to +107°C)
Graphic removal	Permanent

Definitions

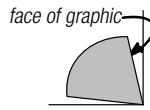
Exposure

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 graphics.

U.S. Desert Southwest Exposure

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

Graphic Construction

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

Graphic Protection

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

Warranty Information

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 or implied warranty arising out of a course of dealing, custom or usage of trade: all 3M products are warranted to be free of defects in materials and manufacture at the time of shipment and to meet the specifications stated in this Product Bulletin. 3M will replace or refund the price of any 3M materials that do not meet this warranty within the specified time periods. These remedies are exclusive. **In no case shall 3M be liable for any direct, indirect, or consequential damages, including any labor or non-3M materials charges.**

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

Warranty Coverage Overview

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

3M™ MCS™ Warranty

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

Finished graphics constructed as shown in the tables below are eligible for the MCS Warranty. For warranties for other exposures, see page 4.

Ink Series	Graphic Protection	Warranted Durability in years
		Labels, Emblems, Striping
None, unprinted	None	7
1900, line color	1920DR	5
	1930	2
1900, 4-color	9720i	5
	9720UV	5
	9730UV	3
9800, line color	None	0
	9800CL	5
	9720i	5
	9720UV	5
	9730UV	3
9800, 4-color	None	0
	9720UV	5
	9800CL	5

3M™ MCS™ Warranty Using Sericol Inks

Application: OEM graphics only

Ink and Graphic Protection: Sericol Duracal UV Screen Print Ink and Clear

Warranty: 5 years in a vertical exposure,

General Warranty Stipulations

These stipulations apply to graphics covered by the 3M™ MCS™ Warranty. Specific provisions of these stipulations are found in the *3M Graphics Market Center Warranty Brochure* at 3Mgraphics.com.

Reduced Warranted Durability

For Graphics NOT in a
U.S. Vertical Exposure

Use the years indicated in the applicable Warranted Durability Table, page 3, for your graphic construction and these formulas to determine reduced durabilities for the following graphic exposures.

If the Graphic Exposure is:	Use this Percentage of U.S. Vertical Exposure, Warranted Durability	Examples
U.S. Non-vertical	50% (0.5)	0.5 x 7 years = 3.5 years
Desert Southwest Vertical	70% (0.7)	0.7 x 5 years = 3.5 years
Desert Southwest Non-vertical	35% (0.35)	0.35 x 5 years = 1.75 years
U.S. Horizontal	0%	0 years

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.

Application to Glass

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

Application Outside the U.S.

Contact the 3M organization for that country.

Chalking

The white film, when unprinted, has a tendency to chalk in outdoor applications. Film that cannot be cleaned must be protected by a recommended screen print clear. The warranty is the same as in the table for printed graphics.

Graphics Made with Components Not Sold or Recommended by 3M

The 3M™ MCS™ Warranty does not cover finished graphics made with inks, film, graphic protection and/or application tapes that are not sold or recommended by 3M. The user is solely responsible for the graphic appearance, performance and durability of graphic constructions that include any other products.

Graphic Protection

- Clear 1930 may haze, which is not warranted.
- Any graphic exposed to abrasive conditions (including vehicles), harsh cleaners or chemicals must include graphic protection in order to be warranted. Abrasion damage and gloss loss are not covered.

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
- Ink formulation
- Adequate 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

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.

Cutting

These are the common cutting methods for this film. If adhesive flowback occurs where the film is cut, weeding may be difficult. Therefore, we do not recommend using cutters that do not cut the liner, such as electronic or hot kiss cutters.

- Band sawing
- Hand cutting
- Guillotine
- Cold / hot steel rule die cutter

Application Tapes

When to Use Premasking Tape

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

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.

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 clear 1920DR, use premasking tape SCPM-3.

Tape	Graphic Protection			
	Unprinted Film	1920DR 1930	9800CL 9720i 9720UV 9730UV	Duracal Clear
Premasking SCPM-3	■	■		
Prespacing SCPS-2	■	■		
Premasking SCPM-44X			■	■
Prespacing SCPS-53X			■	

Application

Refer to Instruction Bulletin 5.5.

Adhesive

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

Cleaning Graphics

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.)

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

Shelf Life, Storage and Shipping

Shelf Life

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

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

Shipping Finished Graphics

Flat, or rolled printed side out on 5 inch (13 cm) or larger core. This helps prevent the liner and, if used, the application tape from popping off.

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.

3M Related Literature

The information in 3M Product and Instruction Bulletins is subject to change. Current Bulletins are available at 3Mgraphics.com. The techniques described in these Bulletins are required when applying a 3M warranted graphic, but are also practical recommendations when using promotional materials for non-warranted graphics. 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™ Screen Print UV Gloss Clear 9720i, 9720UV, 9730UV	PB-IB	Clear 9720
3M™ Screen Printing Ink Series 1900 and Overprint Clear VI0402	PB	1900
- Screen printing with ink series 1900 - line color	IB	3.12
- Screen printing with ink series 1900 - 4-color	IB	3.11
3M™ Screen Printing UV Ink Series 9800	PB	9800
- Screen printing with UV ink series 9800 - line color	IB	3.20
- Screen printing with UV ink series 9800 4-color	IB	3.21
Using 3M application tapes; premasking and prespacing for films	IB	4.3
Scoring and cutting	IB	4.1
Application, substrate selection, preparation and substrate-specific application techniques	IB	5.1
Application, general procedures for indoor and outdoor dry applications	IB	5.5
Storage, handling, maintenance, removal	IB	6.5

Warranties

3M Graphics Center Warranty Brochure [Go to www.3Mgraphics.com](http://www.3Mgraphics.com), Warranties

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Sericol and Duracal are trademarks of Sericol Inc.*

Bulletin Change Summary

Added clear 9720i. Total shelf life increased from 2 to 3 years.



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