



Scotchcal™

Graphic Film Series 3690

For Screen Printing Only

Description

3M™ Scotchcal™ Graphic Film Series 3690 is a premium 2-mil, screen printable film with an aggressive, pressure sensitive adhesive that has good adhesion to sand cast, moderately-rough surfaces and some low surface energy materials. Designed with a gray adhesive for good hiding power, this long-term permanent film withstands 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.

- Use for multicolor graphics including labels, emblems, and striping
- Use for original equipment manufacturer's decorative and identification graphics, cautionary, safety and vandal-resistant labeling

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

- 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 for 3M™ MCS™ Warranted Graphics

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

3M Graphic Protection Options

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

OEM Inks and Clears

- Sericol™ Duracal™ UV Screen Print Inks
- Sericol™ Duracal™ Overprint Clear
(warranted for OEM applications only)

Note: See page 4 for how to order Duracal inks.

Other Products

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

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. Please contact the Technical Service helpline at 1-800-328-3908 if you need more detailed information.

Physical Characteristics

| Characteristic | Description |
|--|---|
| Material | Vinyl |
| Color | White: 3690-10, 3690LF-10 Black: 3690-12, 3690LF-12 |
| 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 |
| Liner | 3690-10, 3690-12: white kraft paper 3690LF-10, 3690LF-12: Polyethylene-coated layflat paper |
| Tensile strength (<i>minimum</i>) | 5 pound/inch at 73°F (0.9 kg/cm at 23°C) |
| Adhesion 24 hours after application <i>Note: The adhesive becomes more aggressive as the surface temperature increases.</i> | 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>this does not include immersion</i>) |

Application Characteristics

| Characteristic | Description |
|---|--|
| Finished graphic application recommendation | Surface type: Flat or moderate compound curves, with and without rivets 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> ² |
| Applied film shrinkage | 0.047 inch (1.2 mm) |
| Finished graphic exposure temperature | -65° to +225°F (-54° to +107°C) |
| Graphic removal | Permanent |

Warranty Information

Graphic Performance Life

The graphic performance life is based on field experience and exposure tests conducted throughout the United States. When the graphics are processed and used according to 3M recommendations, they should have the performance life shown in the chart below.

The actual performance depends on the:

- Correct combination of 3M-recommended 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

Continued on the next page

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

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.

| Warranted Durability | | |
|-------------------------------------|------------------|--------------------------------------|
| Ink Series | Clear | U.S. Vertical Exposure (in years) |
| | | Labels, Emblems, Striping |
| Unprinted | None | 7 |
| 1900 <i>line color</i> | 1920DR 1930 | 5 <i>2 may haze</i> |
| 1900 <i>4-color</i> | 9720UV | 5 |
| | 9730UV | 3 |
| 9800 <i>line color</i> | None | 0 |
| | 9720UV | 5 |
| | 9730UV | 3 |
| | 9800CL | 5 |
| 9800 <i>4-color</i> | 9720UV | 5 |
| | 9800CL | 5 |
| Duracal UV <i>Ink line color</i> | Duracal Clear | 5 |

Note: Sericol Duracal UV Inks are warranted for Original Equipment Manufacturer (OEM) applications only.

Warranty Notes

Warranty Exceptions

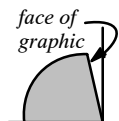
Unprinted film 3690-10 has a tendency to chalk in exterior applications. Film that cannot be cleaned must be printed with a recommended 3M screen print clear. The warranty is the same as in the table above for printed graphics.

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 exterior warranties are based on a percentage of the U.S. vertical warranties given in the Warranted Durability Table. The calculations for determining these warranties are given below. A “construction” is the base film, ink and graphic protection, if required. The examples are based on a U.S. vertical warranty of 5 years.

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

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

Example: $0.5 \times 5 \text{ years} = 2.5 \text{ years}$

- **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.

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

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

Example: $0.7 \times 5 \text{ years} = 3.5 \text{ years}$

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

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

Example: $0.35 \times 5 \text{ years} = 1.75 \text{ years}$

Application Outside the U.S.

Contact the 3M organization for that country.

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.

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

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.

How to Order Sericol Inks

Sericol's Duracal inks can be obtained through their distributor network. Please refer to this web site for details: <http://www.sericol.com/Distributors/distribFR.htm>. You can also contact Sericol at: Sericol Inc. Corporate Office 1101 W. Cambridge Drive, Kansas City, KS 66103 Tel: 913-342-4060, Fax: 913-342-4752

Cutting

These are the common cutting methods for film series 3690.

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

Application Tape

The type of application tape used depends on the type of graphic produced and the ink or screen print clear that was applied last.

- Use a premasking tape if very little of the liner is exposed.
- Use a prespacing tape if the graphic has large amounts of exposed liner.

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

Application

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 that adheres to the substrate on contact. It is not positionable. Refer to Instruction Bulletin 5.5.

Application Method

Use a dry application method. Do not use a detergent and water or a commercial application liquid to position the graphic.

Maintenance and Cleaning

Use a mild 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). See Instruction Bulletin 6.5.

Removal

This film is not removable. A solvent-based remover system may be needed.

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"> • 80°F (27°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; this helps prevent the liner and premasking tape from wrinkling or 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:

- 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



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: 1512
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

| Subject | Bulletin No. | FOD No. |
|---|--------------|--------------|
| Product Bulletins | | |
| 3M™ Screen Printing Ink Series 1900 | 1900 | 2501 |
| 3M™ Screen Printing Ink Series 9700UV | 9700 | 2507 |
| 3M™ Screen Printing UV Ink Series 9800 | 9800 | 2513 |
| Instruction Bulletins | | |
| Design of graphics | 2.1 | 5501 |
| Screen printing with ink series 1900 - line color - 4-color | 3.11 3.12 | 6011 6012 |
| Screen printing with UV ink series 9800 - line color - 4-color | 3.20 3.21 | 6020 6021 |
| Screen printing with ink series 9700UV | 3.4 | 6004 |
| 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 | 7505 |
| Warranties | | |
| Worldwide 3M™ MCS™ Warranty | | 9503 |

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Bulletin Change Summary

Ink series 9700UV has been replaced by UV ink series 9800 with the same warranty. Other changes are marked by a black bar in the margin.