



Controltac™ Graphic Film

with Comply™ Adhesive

Series 1000C

For Cut Graphic Decoration and Screen Printing

Product Description

Film series 1000C are 2-mil films that offer versatility along with slideable, positionable, pressure-activated adhesive and air release channels for fast and easy, bubble-free graphic installations. This long-term permanent, durable film offers a wide color selection, including three with both a layflat liner and gray adhesive for excellent hiding power, and a transparent film with a layflat liner. Use for original equipment manufacturer's (OEM) graphic applications, including cut graphic decoration and screen printing.

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.

Labels, emblems, striping on:

- Lawn and garden equipment
- Recreational products
- Farm equipment
- Construction equipment
- Appliances

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.

This film is not suitable for these purposes

- Graphics applied to:
 - Corrugated or highly irregular surfaces
 - Stainless steel
 - Low surface energy materials such as polyethylene or polypropylene without flame treatment
 - Surfaces that are regularly subjected to gasoline vapors or spills
 - Class 1 through 8 trucks or trailers
 - Railroad rolling stock and locomotives
- Printed graphics without a clear coat
- 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.

Screen Printing

- 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 Options

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

Graphic Protection Options, *continued*

OEM Inks and Clears

Warranted for OEM applications only

- 3M™ Screen Print Gloss Clear 9720UV
- 3M™ Screen Print Low Gloss Clear 9730UV
- 3M™ Screen Print UV Gloss Clear 9800CL
- Sericol™ Duracal™ UV Screen Print Inks
- Sericol™ Duracal™ Overprint Clear

To order, go to 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
- 3M™ Prespacing Tape SCPS-55

Characteristics

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

Physical Properties

Characteristic	Value
Film	Vinyl
Thickness	Without adhesive: 2 mil (0.5 mm) With adhesive: 2.5 to 3.5 mil (0.06 to 0.09 mm)
Colors	See Color Chart on next page
Adhesive type and color	1000C-10 1000C-12, 1000C-114 1000C-120: Pressure sensitive, gray All other colors: Pressure sensitive, clear
Liner	1000C-10 1000C-12, 1000C-114 1000C-120: Polyethylene-coated layflat paper All other colors: White kraft paper
Tensile strength	5 pound/inch at 73°F (0.9 kg/cm at 23°C) <i>minimum</i>
Adhesion	ABS: 4 pounds/inch (0.7 kg/cm) Acrylic enamel: 4 pounds/inch (0.7 kg/cm) Aluminum, anodized: 8 pounds/inch (1.4 kg/cm) Chrome: 5 pounds/inch (0.9 kg/cm) Urethane paints: 4 pounds/inch (0.7 kg/cm)
Chemical resistance	Resists mild alkalis, mild acids, and salt Excellent resistance to water (<i>not including immersion</i>)

Application Properties

Characteristic	Value
Finished graphic application recommendation	Surface type: Flat or moderate compound curves, with and without rivets Substrate type: Glass, metal, paint, rigid plastic Application temperature: 50°F (10°C) <i>minimum</i>
Applied shrinkage	0.007 inch (0.18 mm)
Service temperature range	-65° to +225°F (-60° to +107°C)
Graphic removal	None, permanent

Color Chart	Film Color No.	Color Name	Film Color No.	Color Name
	1000C-10*†	White	1000C-54	Light orange
	1000C-11	Pearl gray	1000C-56	Dark green
	1000C-12*†	Black	1000C-57	Olympic blue
	1000C-13	Tomato red	1000C-58	Burgundy
	1000C-14	Bright orange	1000C-63	Geranium
	1000C-15	Bright yellow	1000C-64	Apricot
	1000C-17	Vivid blue	1000C-77	Peacock blue
	1000C-19	Deep mahogany brown	1000C-89	Sandstone
	1000C-25	Sunflower	1000C-98	Dark violet
	1000C-27	Indigo	1000C-120*†	Satin aluminum
	1000C-31	Medium gray	1000C-131	Satin gold
	1000C-37	Sapphire blue	1000C-196	Apple green
	1000C-38	Royal purple	1000C-197	Light navy
	1000C-41	Dark gray	1000C-307	Dark aqua
	1000C-46	Kelly green		Transparent
	1000C-47	Intense blue		
	1000C-53	Cardinal red	1000C-114†	Transparent

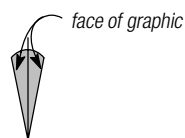
* gray adhesive; all others have clear adhesive.

† polyethylene-coated layflat paper liner; all others have white kraft paper liner.

Definitions

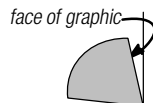
Exposure

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 Types

OEM

Labels and decorative graphics produced for and used by original equipment manufacturers.

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

Overlamine 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 OEM 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.

Graphic Protection	No Printing	Ink Series 1900	Ink Series 9800
1920DR	—	5	—
1930	—	3	—
9720i	—	5	5
9720UV	—	5	5
9730UV	—	2	3
9800CL	—	—	5
None	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
3M inks and clears ONLY

Use the years indicated in the applicable Warranted Durability Table 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 5 years = 2.5 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.

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.

Graphic Performance Life

The actual performance life of a graphic is affected by all of the following.

- 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.

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. See Instruction Bulletin 4.1 for details.

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

Design Considerations

Weeding can be difficult with small text. The following minimum values for electronically-cut text are based on upper case, Helvetica, medium type.

- Use a minimum letter height of 1.0 inches (25.4 mm).
- Use a minimum stroke width of 0.19 inches (4.76 mm).
- Use a minimum radius for a point of 0.024 inches (0.6 mm).
- For the inside corners of cut-out letters and symbols, and the pointed end of stripes, cut the largest radii consistent with an acceptable appearance. This helps avoid stress cracking due to age and lifting of pointed ends during maintenance.

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 and/or large letters, and/or wide stroke width, use premasking tape.
- For graphics that have very little exposed liner,

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 and/or small letters and/or narrow stroke width

How to Select a Tape

Determine whether you want to premask the graphic or prespace cut pieces of film such as letters. In the table below, locate the last coating applied to your graphic and use the corresponding tape. See Instruction Bulletin 4.3 for complete details.

EXAMPLE: If the film is protected by clear 1920DR, use SCPM-3 for premasking and SCPS-2 for prespacing.

Application Tape	Last Coating			
	Film Only, No ink or clear	1920DR 1930	9720UV 9720i	9730UV 9800CL
Premasking SCPM-3	■	■		
Prespacing SCPS-2	■	■		
Premasking SCPM-44X				■
Prespacing SCPS-53X				■

Application

Refer to 3M Related Literature at the end of this document for complete application information.

Adhesive

This film has a pressure-activated adhesive that allows the film to slide easily on the substrate, be positioned with light finger pressure, and repositioned if it is not in the right place. However, so that a good adhesive bond is established, the positionability feature is lost when:

- firm pressure with a squeegee or other application tool is applied
- application temperatures are above 100°F (38°C), even if only light finger pressure was used for tacking
- if any part of the film is removed from the original liner and reapplied to the same or another liner.

Comply™ Adhesive

This film also has air release channels, a characteristic of Comply adhesive. Removing and attempting to change liners or reapply the same liner damages air release channels.

Squeegee Technique

Always work from the center out to the edges of the graphic to allow trapped air to exit through the air release channels. If the channels are closed off by firm pressure and air is trapped, use an air release tool to aid in removing air bubbles. See Instruction Bulletin 5.4 for details.

Application Method

Dry or wet. However, do not use detergent and water or a commercial application liquid to position the graphic over rivets and textured surfaces.

Finishing

If an application requires edge sealing, use edge sealer 3950.

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.)

Chalking on unprinted film can be washed off with normal graphic cleaning methods.

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

Removal

This film is intended to be permanent. Removal will likely damage the substrate. If you need to try it, a chemical remover system is available for graphics printed with solvent-based ink. Follow the procedures in Instruction Bulletin 6.5 for using film remover R-221 and adhesive remover R-231 and for additional removal details.

Health and Safety



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.

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 from popping off.

3M Related Literature

Before starting any job, be sure you have the most current Product and Instruction Bulletins.

The information in 3M Product and Instruction Bulletins is subject to change. Current Bulletins are available at 3Mgraphics.com. The following applicable Bulletins provide information and processes you need to properly make the graphics described in this Bulletin. 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 Printing Ink Series 1900 and Overprint Clear VI0402	PB	1900
• Screen printing with ink series 1900	IB	3.12
- line color	IB	3.11
- 4-color		
3M™ Screen Printing UV Ink Series 9800	PB	9800
• Screen printing with UV ink series 9800	IB	3.20
- line color	IB	3.21
- 4-color		
3M™ Screen Print UV Gloss Clears 9720	PB-IB	Clears 9720
Design of graphics	IB	2.1
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
3M Graphics Center Warranty Brochure	go to www.3Mgraphics.com , Warranties	

Bulletin Change Summary

Added UV clear 9720i as an alternative to clear 9720UV. Total shelf life has been increased from 2 years to 3 years.



Commercial Graphics Division
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

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
350 Chardon Avenue, Suite 1100
San Juan PR 00918
787-620-3000
Fax 787-620-3018

www.3Mgraphics.com

©3M 2009. All rights reserved.