



Controltac™ Plus

Graphic Film Series 180

For Screen Printing Only

Description

3M™ Controltac™ Plus Graphic Film Series 180, designed for screen printing, is a 2-mil film with a positionable, pressure-activated adhesive that is removable with heat. This versatile, long term durable film offers a wide color selection, most with excellent hiding power, and is perfect for indoor and outdoor signs and fleet graphics, including large graphics and surfaces with corrugations and rivets.

Recommended Types of Graphics and End Uses

These types of graphics and end uses may be warranted by the 3M™ MCS™ Warranty. Please read the entire bulletin for details.

- Screen printed or cut out graphics
- Indoor and outdoor graphics and signs
- Commercial vehicle and fleet graphics, emblems or striping*
- Bus graphics
- Film 180-114 can be used for two-way emblems for windows, except on buses or other vehicles
- Small format original equipment manufacturer's (OEM) decorative and identification graphics, cautionary and safety labeling

*See *Special Warranty Stipulations for automobile and vehicle graphics on page 5.*

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

- Graphics applied to:
 - Stainless steel vehicles
 - Non-3M films (see Removal Warranty, page 5)
 - Substrate surfaces that are not clean and smooth (little or no variation in texture)

- Graphic removal from:
 - Applications with poor paint-to-substrate adhesion
 - Under-cured paint
 - Outdoor, horizontal applications
 - Existing graphics that must remain intact; damage may occur during removal of this film
 - Aged paint and metals must be tested to ensure removability. Surface oxidation or chalking may result in adhesive residue upon removal.
- Graphics 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 so as to restrict the safe use of emergency window exits. See the most current version of Instruction Bulletin 5.4 for details.

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 Ink and Clear

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

Note: See page 5 for how to obtain Duracal inks.

Other Products

- 3M™ Edge Sealer 3950
- 3M™ Prespacing Tape SCPS-2
- 3M™ Prespacing Tape SPCS-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
Film	Cast vinyl
Thickness	Without adhesive: 2 mils (0.05 mm) With adhesive: 3-4 mils (0.08-0.10 mm)
Colors	See the Color Chart on page 2
Adhesive	Pressure activated, positionable
Adhesive color	Films with * in color chart: clear All other films: gray-pigmented
Liner	Polyethylene-coated layflat paper
Tensile strength	5 pounds/inch at 73°F (0.9 kg/cm at 23°C) <i>minimum</i>
Adhesion <i>24 hours after application</i>	ABS: 4.0 pounds/inch (0.7 kg/cm) Acrylic enamel: 4.0 pounds/inch (0.7 kg/cm) Aluminum, anodized: 6.0 pounds/inch (1.1 kg/cm) Aluminum, etched: 6.0 pounds/inch (1.1 kg/cm) Chrome: 5.0 pounds/inch (0.9 kg/cm) Fruehauf pre-painted panels: 4 pounds/inch (0.7 kg/cm)

Color Chart

Solid Colors

180-10	White	180-22	Matte Black*
180-12	Black	180-23	Deep Red
180-13	Tomato Red	180-25	Sunflower*†
180-14	Bright Orange	180-27	Indigo (Navy)
180-15	Bright Yellow*†	180-29	Russet Brown
180-17	Vivid Blue	180-31	Medium Grey*
180-19	Deep Mahogany Brown		

Solid Colors, continued

180-37	Sapphire Blue	180-77	Peacock Blue
180-38	Royal Purple*	180-88	Violet*
180-39	Tan	180-96	Teal*
180-41	Dark Gray*	180-98	Dark Violet*
180-46	Kelly Green	180-103	Magenta*
180-47	Intense Blue	180-120	Satin Aluminum
180-49	Beige	180-131	Satin Gold*
180-53	Cardinal Red	180-173	Salmon Pink*
180-54	Light Orange	180-176	Aqua*
180-56	Dark Green	180-186	Bright Green*
180-57	Olympic Blue	180-193	Mauve
180-58	Burgundy*	180-196	Apple Green*
180-63	Geranium*	180-307	Dark Aqua*

Metallic and Transparent Colors

180-201	Slate*	180-227	Bright Blue*
180-203	Red*	180-228	Dark Burgundy*
180-211	Charcoal*	180-229	Copper*
180-216	Sage Green*	180-237	Silver Blue*
180-217	Dark Blue*	180-239	Chocolate Brown*
180-220	Light Silver*	180-241	Gold*
180-221	Grey*	180-114	Transparent*†

* Indicates clear adhesive; all other adhesive is gray-pigmented

† Indicates minimal or no hiding power

Application Characteristics

Characteristic	Description
Finished graphic application recommendation	Surface type: Flat, with and without rivets, simple curves, moderate compound curves, and corrugations Substrate type: ABS resins, aluminum, chrome, glass, fiberglass reinforced plastics, paint (check adhesion to powder-coated or water-based paints) Application temperature: - Flat surfaces with and without rivets: 40° to 100°F (4° to 38°C) - Corrugated surfaces with rivets: 50° to 100°F (10° to 38°C)
Applied shrinkage	0.015 inches (0.4 mm)
Finished graphic exposure temperature	-65° to +225°F (-60° to +107°C)
Graphic removal	Removable with heat and/or chemicals from most substrates within the warranty period at 50°F (10°C) minimum (air and substrate)

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

Warranty Information

Graphic Performance Life

The actual performance life of a graphic depends on the:

- Correct combination of 3M-recommended graphics products
- Ink formulation
- 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

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 this table 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 <i>in years</i>					
Film colors					
180-10♦	180-19	180-49	180-103	180-193	
180-12♦	180-22	180-58	180-173	180-196	
180-13♦	180-23	180-63	180-176	180-307	
180-14♦	180-29	180-88	180-186		
180-15♦	180-39	180-96			
Ink Series	Clear	Fleet & Comm'l Vehicle	OEM	Railroad	Sign Graphics
No print	None	7, Lifetime trailers only	0	8	6
1900	1902DR*	5	0	5	5
	1920DR**	6	0	6	5
	1930	2	0	2	2
	9720UV	6	0	6	5
9730UV	3	0	3	3	
9800	None	2	0	2	2
	9720UV	7	0	7	5
	9730UV	3	0	3	3
	9800CL	5	0	5	5
Duracal	Duracal	0	3	0	0

Warranted Durability - U.S. Vertical <i>in years</i>					
Ink Series	Clear	Fleet & Comm'l Vehicle	OEM	Railroad	Sign Graphics
Film colors					
180-17	180-37	180-53♦	180-56	180-77	
180-25♦	180-46	180-54	180-57		
No print	None	6, Lifetime trailers only	0	6	6
1900	1902DR*	5	0	5	5
	1920DR**	6	0	6	5
	1930	2	0	2	2
	9720UV	6	0	6	5
	9730UV	3	0	3	3
9800	None	2	0	2	2
	9720UV	6	0	6	5
	9730UV	3	0	3	3
	9800CL	5	0	5	5
9800 <i>metallic</i>	9720UV	5	5	0	5
	9800CL	5	5	0	5
Duracal	Duracal	0	3	0	0
Film colors					
180-120	180-131				
No print	None	6	0	0	5
1900	1902DR*	5	0	0	5
	1920DR**	6	0	0	5
	1930	2	0	0	2
	9720UV	6	0	0	5
	9730UV	3	0	0	3
9800	None	0	0	0	2
	9720UV	5	0	0	5
	9730UV	3	0	0	3
	9800CL	5	0	0	5
9800 <i>metallic</i>	9720UV	5	5	0	5
	9800CL	5	5	0	5
Duracal	Duracal	0	3	0	0
Film colors					
180-114	180-211	180-220	180-228	180-239	
180-201	180-216	180-221	180-229	180-241	
180-203	180-217	180-227	180-237		
No print	None	6	0	0	5
1900	1902DR*	5	0	0	5
	1920DR**	6	0	0	5
	1930	2	0	0	2
	9720UV	6	0	0	5
	9730UV	3	0	0	3
9800	None	0	0	0	2
	9720UV	5	0	0	5
	9730UV	3	0	0	3
	9800CL	5	0	0	5
9800 <i>metallic</i>	9720UV	5	5	0	5
	9800CL	5	5	0	5
Duracal	Duracal	0	3	0	0

♦ Only these films are warranted for railroad graphics

* Air dry

** Oven dry the last color of ink series 1900 and screen print 1920DR for 2 hours at 150°F (65°C).

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

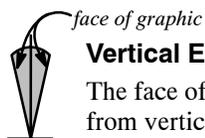
Lifetime Warranty for Trailers Only

For films listed as having a Lifetime Warranty, 3M warrants the performance for as long as the original graphics purchaser owns the fleet vehicle according to the following reimbursement schedule. This is in addition to the provisions of the 3M™ MCS™ Warranty.

U.S.	U.S. Desert Southwest	Replace Material:%	Labor: %
<i>Failure occurs during year:</i>			
8	5	100	100
9	6	80	50
10	7	60	25
11	8	40	10
12	9	20	0
13	10	10	0
14	N/A	10	0
15	N/A	10	0
16 plus	N/A	10	0

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

Other outdoor warranties are based on a percentage of the vertical U.S. warranties given in the Warranted Durability Tables. The calculation for determining these warranties is given below. A “construction” is the base film, inks and graphic protection (if required). The examples are based on a vertical U.S. warranty of 7 years.

- Warranty for Non-Vertical U.S. Exposure**
 50% (0.5) of the vertical warranty for your construction
 Example: $0.5 \times 7 \text{ years} = 3.5 \text{ years}$

- 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: $0.7 \times 7 \text{ years} = 4.9 \text{ years}$

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

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

Example: $0.35 \times 7 \text{ years} = 2.45 \text{ years}$

- Warranty for Horizontal Exposure for Vehicle Graphics Requiring Legibility Only**

Horizontal applications, which are subjected to the maximum sunlight and environmental conditions, can be used on the rooftops of commercially-owned vehicles where identification from the air is needed. The graphic will change color, lose gloss, and chalk.

Legibility Warranty for Horizontal Exposure of Vehicle Graphics <i>in years</i>			
Film colors			
180-10	180-13	180-15	180-53
180-12	180-14	180-25	180-54
Ink Series	Clear	U.S.	U.S. Desert Southwest
No print	None	5	3
1900 9800	1920DR* 9720UV	5	3

*Oven dry the last color of ink series 1900 and screen print 1920DR for 2 hours at 150°F (65°C).

Warranty for Vertical Rail Applications

Requirements for graphics used on railroad applications:

- Use only those film colors marked with a ♦ in the Warranty Durability tables.
- Use only line color inks.
- The warranty for film colors 180-10 and 180-12 have an additional 2 year warranty for legibility only.

Labor Warranty for Fleet Applications Only

3M will reimburse 100% of the labor costs associated with the removal, remanufacture, and reapplication of the graphic to the extent that 3M determines such amount is reasonable and necessary in the circumstances. This labor cost reimbursement will be determined by 3M on a case-by-case basis taking into account the expected amount of labor needed to make such repairs and other considerations.

Warranty Notes continued on the next page.

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

Removal Warranty from Standard Vehicle and Sign Substrates

Removal requires heat and/or chemicals. The ease and rate of removal depends on a number of factors. See Instruction Bulletin 6.5 for details.

- **Vertical:** 7 years or the **Warranted Durability**, whichever comes first.
- **Non-vertical:** 50% of the vertical **Warranted Durability**, not to exceed 3-1/2 years.

Application Outside the U.S.

Contact the 3M organization for that country.

Chalking

This film, when unprinted, has a tendency to chalk in outdoor applications. Film that cannot be cleaned must be printed with clear 1920DR, 9720UV or 9730UV. The warranty is the same as for the ink series being used.

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.

Application to Glass

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

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.

Warranty and Limited Remedies

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 material charges.

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

The following are common cutting methods for this film. See Instruction Bulletin 4.1 for details.

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

The following minimum values for electronic cutting text of this film 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)
 Minimum radius for end of stripe: 0.125 inch (3.18 mm)

Application Tapes

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

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

Screen Print Clear	Prespacing Tape	Premasking Tape
Unprinted	SCPS-2	SCPM-3
1920DR 1930	SCPS-2	SCPM-3
9720UV 9730UV 9800 no clear 9800CL	SCPS-53X	SCPM-44X

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

Application

Refer to the Instruction Bulletins listed in the **3M Related Literature** section, located at the end of this Bulletin, for more complete information.

Adhesive

The pressure-activated adhesive on this film allows you to position and reposition it on the application substrate when tacked with light hand pressure. Applying firm pressure bonds the adhesive to the substrate, and by design, destroys the positionability feature.

The adhesive characteristics may be reduced under these conditions:

- The film has been removed, even partially, from the original liner and reapplied to the same liner or another liner.
- Application at higher than 100°F (38°C) causes the film to lose its positionability even with light hand pressure.

Method

Do not use detergent and water or a commercial application liquid to position the graphic on a vehicle.

Finishing

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

Removal

Removing this film from a pre-existing graphic will damage that graphic. Follow the procedures in Instruction Bulletin 6.5. 3M™ Controltac™ Film Remover R221 and 3M™ Controltac™ Adhesive Remover R231, are available. See Instruction Bulletin 6.6 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"> • 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

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 Screen Print Clear Coat VI0402	1900	2501
3M™ Screen Printing UV Ink Series 9800	9800	2513
3M™ Screen Printing Ink Series 9700UV	9700	2507
Instruction Bulletins		
Design of graphics	2.1	5501
Screen printing with ink series 1900	3.11	6011
Screen printing with UV ink series 9800 - line color	3.20	6020
- 4-color	3.21	6021
Screen printing with ink series 9700UV	3.4	6004
Scoring and cutting	4.1	6501
Application, substrate selection, preparation and substrate-specific application techniques	5.1	7001
Applying 3M Graphic Films with Comply™ Adhesive	5.31	7031
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
Storage, handling, maintenance, removal	6.5	8505
Warranties		
Worldwide 3M™ MCS™ Warranty		9503

Bulletin Change Summary

Ink series 9700UV has been replaced by UV ink series 9800 with the same warranty. The way the warranty information is presented for non-vertical and desert southwest warranties has been changed to provide consistency. Other information in this bulletin has been reorganized; most changes or new information are marked with a black bar in the margin.



Graphics Market Center

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 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: 1005
www.scotchprint.com

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 1-800-265-1840
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