Controltac™ *Plus*

Graphic Film with Comply™ Performance Series 180C

For Screen Printing Only

Description

3M™ Controltac™ *Plus* Graphic Film with Comply™ Performance Series 180 is a versatile, removable, two mil film with a positionable, pressure activated adhesive to make handling large format graphics easier. It also features Comply performance for easier, high quality installations. This film can be used on flat and corrugated with rivet surfaces.

Advantages

- Screen printable
- Wide color selection
- Lifetime warranty for trailers;
  up to 7 years for other applications
- Easy to temporarily position during application
- Removable with heat or a chemical system

Application and End Uses

Film series 180C is intended for making removable, durable graphics when used with the listed Compatible Products in the following applications. These types of applications are warranted by the 3M™ MCS™ Warranty with the Special Warranty Stipulations when used for automobile or vehicle graphics. See page 5.

- Interior and exterior graphics and signs
- Commercial vehicle and fleet graphics, emblems or striping
- Bus 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.

Specifically, we do not warrant this film for the following:

- Graphics applied to:
  - Stainless steel.
  - Non-3M films (also see Removal on page 7).
  - Substrates that do not have a clean, smooth surface.
- Graphic removal from:
  - Applications with poor paint-to-substrate adhesion.
  - Existing graphics that must remain intact. Damage may occur during removal of film series 180C.
- 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, Ext. 444, for alternatives.

NOTE: Film used on buses must not be applied so as to restrict the safe use of emergency window exits. See Instruction Bulletin 5.4, Release G, July 2003 or later for details.

Compatible Products

- 3M™ Screen Printing Ink Series 1900 (line & 4-color)
- 3M™ Screen Printing Ink Series 9700UV (line & 4-color)
- 3M™ Edge Sealer 3950
- 3M™ Prespacing Tape SCPS-2 and SPCS-53X
- 3M™ Premasking Tape SCPM-3 and SCPM-44X

Characteristics

Characteristic	Description
Film	Cast vinyl
Thickness	2 mils (0.05 mm) *without adhesive* 3-4 mils (0.08-0.10 mm) *with adhesive*
Color	See the Color Chart on page 2.
Adhesive type	Positionable, pressure activated with Comply performance feature
Adhesive color	Films with * in color chart: Clear All other films: Gray-pigmented
Liner	Polyethylene-coated layflat paper
Application surface	Flat, with and without rivets, corrugated, simple curves, moderate compound curves
Application substrates	ABS resins, aluminum, chrome, glass, fiberglass reinforced plastics, paint (check adhesion to powder-coated or water-based paints)
Application temperature range	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)
Removal	Removable with heat or chemicals within 7 years
Removal temperature	50° F (10°C) minimum (air and substrate)

Color Chart

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

Solid Colors

180C-10 White
180C-12 Black
180C-13 Tomato Red
180C-14 Bright Orange
180C-15 Bright Yellow*
180C-17 Vivid Blue
180C-19 Deep Mahogany Brown
180C-22 Matte Black*
180C-23 Deep Red
180C-25 Sunflower*
180C-27 Indigo (Navy)
180C-29 Russet Brown
180C-31 Medium Grey*
180C-37 Sapphire Blue
180C-38 Royal Purple*
180C-39 Tan
180C-41 Dark Gray*
180C-46 Kelly Green
180C-47 Intense Blue
180C-49 Beige
180C-53 Cardinal Red
180C-54 Light Orange
180C-56 Dark Green
180C-57 Olympic Blue
180C-58 Burgundy*
180C-63 Geranium*
180C-77 Peacock Blue
180C-88 Violet*
180C-96 Teal*
180C-98 Dark Violet*
180C-103 Magenta*
180C-120 Satin Aluminum
180C-131 Satin Gold*
180C-173 Salmon Pink*
180C-176 Aqua*
180C-186 Bright Green*
180C-193 Mauve
180C-196 Apple Green*
180C-307 Dark Aqua*

Metallic Colors

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

Transparent Film

180C-114 Transparent*

Effective Performance Life

The effective performance life is based on field experience and exposure tests conducted throughout the United States. When the graphics are processed and used according to the 3M recommendations, they should have the performance life shown in the table in the next column. The actual performance depends on the:

- Use of 3M compatible products.
- Correct combination of film, ink and clear coat.
- Ink formulation.
- Ink drying methods.
- Selection and preparation of the substrate.
- Application methods.
- Cleaning and maintenance methods.
- Exposure conditions.

Warranted Durability

Fleet Graphics - Unprinted 3M™ Controltac™ *Plus* Graphic Film with Comply™ Performance 180C [4]

Film	Vertical Exposure *face of graphic is ± 10° from vertical*				Non-Vertical Exposure *face of graphic is 10°-45° from vertical*				Horizontal Exposure [5] *for legibility only*	
	U.S.[1] *years*		S.W.[2] *years*		U.S. NO TAG *years*		S.W.[2] *years*		U.S. NO TAG *years*	S.W.[2] *years*
	Trailers	Other Vehicles	Trailers	Other Vehicles	Trailers	Other Vehicles	Trailers	Other Vehicles		
180C-10 180C-12 180C-13 180C-14 180C-15 180C-54	Lifetime[3]	7	Lifetime[3]	5	4	4	3	3	5	3
180C-53	Lifetime[3]	6	Lifetime[3]	5	4	4	3	2	5	3
180C-37 180C-46 180C-47 180C-56 180C-57 180C-77	Lifetime[3]	6	Lifetime[3]	5	4	4	2	2	-	-
180C-25	Lifetime[3]	6	Lifetime[3]	4	4	4	2	2	5	3
180C-17	Lifetime[3]	6	Lifetime[3]	4	4	4	2	2	-	-
180C-120 180C-131	6	5	4	4	4	4	2	2	-	-
180C-114 or Metallic 180C colors	5	5	3	3	3	3	2	2	-	-
All other colors not listed in this column	Lifetime[3]	7	Lifetime[3]	4	4	4	2	3	-	-

See table notes following the tables on page 3.

Vehicle or Sign Graphics - Printed 3M™ Controltac™ *Plus* Graphic Film with Comply™ Performance 180C							
		Vertical Exposure *face of graphic is ± 10° from vertical*		**Non-Vertical Exposure** *face of graphic is 10°-45° from vertical*		**Horizontal Exposure** [5] *for legibility only*	
Film / Ink	**Clear Coat**	**U.S.**[1] *years*	**S.W.**[2] *years*	**U.S.**[1] *years*	**S.W.**[2] *years*	**U.S.**[1] *years*	**S.W.**[2] *years*
3M™ Screen Printing Ink Series 1900 (line color and four color)							
180C-10 180C-12 180C-13 180C-14 180C-15 180C-25 180C-53 180C-54	1920DR Air dry 1920DR Oven dry 1930	5 6 2, *may haze*	3 4 1, *may haze*	4 4 1, *may haze*	2 2 1, *may haze*	- 5 -	- 3 -
	9720UV 9730UV	6 3	4 2	4 2	2 1	5 -	3 -
180C-114 or metallic 180C colors	1920DR Air dry 1920DR Oven dry 1930	5 5 2, *may haze*	3 3 1, *may haze*	3 3 1, *may haze*	2 2 1, *may haze*	- - -	- - -
	9720UV 9730UV	5 3	3 2	3 2	2 1	- -	- -
All other 180C colors not listed for this ink	1920DR Air dry 1920DR Oven dry 1930	5 6 2, *may haze*	4 4 1, *may haze*	3 4 1, *may haze*	2 2 1, *may haze*	- - -	- - -
	9720UV 9730UV	6 3	3 2	4 2	2 1	- -	- -
3M™ Screen Printing Ink Series 9700UV (line color)							
180C-10 180C-12 180C-13 180C-14 180C-15 180C-25 180C-53 180C-54	None 9720UV 9730UV	2 7 3	1 4 2	1 4 2	1 2 1	- 5 -	- 3 -
All other 180C colors not listed for this ink	None 9720UV 9730UV	2 6 3	1 4 2	1 4 2	1 2 1	- - -	- - -
180C-114 or metallic 180C colors	None 9720UV 9730UV	2 5 3	1 3 2	1 3 2	1 2 1	- - -	- - -
3M™ Screen Printing Ink Series 9700UV (metallic inks)							
180C-10 180C-12 180C-13 180C-14 180C-15 180C-25 180C-53 180C-54	9720UV	5	3	3	2	5	3
All other 180C colors	9720UV	5	3	3	2	-	-
3M™ Four Color Screen Printing Ink Series 9700UV							
180C-10	9720UV 9730UV	7 3	4 2	4 2	2 1	5 -	3 -

[1] For warranty periods outside the United States, contact the 3M sales organization for that country.

[2] The U.S. Desert Southwest includes Arizona, New Mexico, and the desert areas of California, Nevada, Utah, and Texas. A detailed map is available by request. The warranty for this area is reduced because there is more solar energy. This warranty applies to graphics exposed to solar energy in the U.S. Desert Southwest more than 50% of the time.

[3] For vehicle graphics only, refer to the Lifetime Warranty information, page 6.

[4] Unprinted film series 180C has a tendency to chalk in exterior applications. Film that cannot be cleaned must be printed with clear coat 1920DR, clear coat 9720UV or 9730UV. The warranty is the same as for the ink series being used.

[5] See **Horizontal Exposure Warranty** on page 6.

Sign Graphics - Unprinted 3M™ Controltac™ *Plus* Graphic Film with Comply™ Performance 180C [4]				
	Vertical Exposure *face of graphic is ± 10° from vertical*		**Non-Vertical Exposure** *face of graphic is 10°-45° from vertical*	
Film	**U.S.**[1] *years*	**S.W.**[2] *years*	**U.S.**[1] *years*	**S.W.**[2] *years*
180C-10 180C-12 180C-22	7	4	4	2
180C-114 180C-120 180C-131 Metallic 180C colors	5	3	3	2
All other colors not listed in this column	6	4	4	2

See table notes following the tables on page 3.

Railroad Graphics - Printed and unprinted 3M™ Controltac™ *Plus* Graphic Film with Comply™ Performance 180C					
		Vertical Exposure *face of graphic is ± 10° from vertical*		**Non-Vertical Exposure** *face of graphic is 10°-45° from vertical*	
Film / Ink	**Clear Coat**	**U.S.**[1] *years*	**S.W.**[2] *years*	**U.S.**[1] *years*	**S.W.**[2] *years*
Unprinted film [4]					
180C-10 180C-12	None	8 *plus 2 more, legibility only*	6	5	4
180C-14 180C-15 180C-23	None	8	5	5	3
180C-37	None	7	4	4	2
180C-25	None	6	4	4	2
180C-114	None	5	3	3	2
3M™ Screen Printing Ink Series 1900 (line color and four color)					
180C-114	1920DR Air dry 1920DR Oven dry 1930	5 5 2, *may haze*	3 3 1, *may haze*	3 3 1, *may haze*	2 2 1
	9720UV 9730UV	5 3	3 2	3 2	2 1
All other 180C films listed in **Unprinted film**, above	1920DR Air dry 1920DR Oven dry 1930	5 6 2, *may haze*	3 4 1, *may haze*	3 4 1, *may haze*	2 2 1
	9720UV 9730UV	6 3	4 2	4 2	2 1
3M™ Screen Printing Ink Series 9700UV (line color; does not include metallic or 4-color)					
180C-10 180C-12	None 9720UV 9730UV	2 7 3	1 4 2	1 4 2	1 2 1
180C-14 180C-15 180C-23 180C-25 180C-37	None 9720UV 9730UV	2 6 3	1 4 2	1 4 2	1 2 1
180C-114	None 9720UV 9730UV	2 5 3	1 3 2	1 3 2	1 2 1

See table notes following the tables on page 3.

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

3M™ MCS™ Warranty

3M warrants the performance of the Product from the date of installation for the number of years stated in the **Warranted Durability** chart. In the event that the Product does not perform as stated within the warranted time, and the graphics are fabricated as specified by the 3M MCS Warranty, then 3M shall at 3M's option either (a) refund the entire purchase price of the material, or (b) replace all 3M materials consumed in the manufacture of the graphics. In addition, ***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.

Lifetime Warranty

For the colors of film series 180C listed on pages 2 and 3 as having a Lifetime Warranty, 3M warrants the performance for as long as the original graphics purchaser owns the vehicle. If the film fails, the following reimbursement schedule applies.

U.S. Failure occurs during year:	**Desert Southwest** Failure occurs during year:	**Replace Material: %**	**Labor %**
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	-	10	0
15	-	10	0
16 plus	-	10	0

Horizontal Exposure Warranty for Vehicle Graphics Requiring Legibility Only

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

Ink Series 1900

- Use ink series 1900 and clear coat 1920DR or 9720UV.
- Oven dry the last color and clear coat 1920DR for 2 hours at 150°F (65°).

Ink Series 9700UV

- Use clear coat 9720UV.

Special Warranty Stipulations for Automobile and Bus Graphics

When applied to an automobile, an Auto Graphics Pre-installation And Inspection Record (Instruction Bulletin 5.36) must be completed for each vehicle and readily available if a warranty claim is made.

When applied to a bus, a Bus Graphics Pre-installation And Inspection Record (Instruction Bulletin 5.36) must be completed for each vehicle and readily available if a warranty claim is made.

Screen Printing

To get the durability given in the **Effective Performance Life** section for film series 180C, use the correct combination of ink and clear coat. Check the appropriate Product Bulletins and Instruction Bulletins for the limitations of each particular ink.

The compatible screen printing inks are listed in the Compatible Products section on page 1.

If ink series 1900 is used and the graphic is being applied to a corrugated surface, then the last color and the clear coat must be oven dried.

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 from film series 180C 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 radius for end of stripe: 0.125 inch (3.18 mm)
- Minimum height:
  - Flat bed cutter with dual edge blade 3.0 inch (76.2 mm)
  - Standard friction feed plotter 6.0 inch (152 mm)

Note: Weed carefully! Cut graphics are difficult to re-adhere to the liner if mistakenly pulled off.

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

Application Tapes

The type of prespace tape or premask tape to use depends on the type of graphic produced and the ink or 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.

Clear Coat	Prespacing Tape	Premasking Tape
Unprinted	SCPS-55	SCPM-3
1920DR 1930	SCPS-55	SCPM-3
9720UV 9730UV 9700UV (no clear coat)	SCPS-55	SCPM-44X

Application

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

The following application details are for film series 180C.

Temperature

The application temperature range is:

- Flat surfaces with and without rivets is 40° to 100°F (4° to 38°C).
- Corrugated surfaces with rivets is 50° to 100°F (10° to 38°C).

Positioning

This film has a positionable adhesive. Application pressure bonds the adhesive to the substrate and destroys the positionability feature. The film loses its positionability feature at application temperatures above 100°F (38°C).

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

Method

Film series 180C has the Comply performance feature. This 3M technology is a mechanical feature, not an adhesive property. This feature allows air to travel through the adhesive. The film can be applied with time saving techniques such as larger squeegees. In addition, applications usually have fewer air bubbles. Refer to Instruction Bulletin 5.31 for additional information on the application of Comply performance products.

Finishing

This film does not require edge sealing. However, certain applications, such as cut graphics, may benefit from using edge sealer. If needed, use edge sealer 3950.

Maintenance and Cleaning

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.)

Removal

Film series 180C is warranted to be removable using heat, accessories, and/or chemicals. Removing film 180C from a pre-existing graphic will damage that graphic. Refer to the Instruction Bulletin 6.5 for removal details.

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.

Removal Warranty

The ease and rate of removal depends on a number of factors. See Instruction Bulletin 6.5 for details.

- Substrate type and condition
- Screen printing ink, amount and type
- Graphic age and weathering conditions
- Pull-off angle, which should be less than 90 degrees

The removal warranty for standard vehicle and sign substrates is:

- **Vertical:** 8 years or the **Warranted Durability**, whichever comes first.
- **Non-vertical:** 50% of the vertical **Warranted Durability**, not to exceed 3-1/2 years.

Removability Exceptions

- A signed Pre-installation Review is required as a condition for warranty on buses. See *Instruction Bulletin 5.36* and *Vehicle Graphics Warranty.*

Note: This film is not designed for short-term graphics and may cause damage upon removal from painted surfaces.

- Exterior, horizontal applications.
- Aged paint and metals must be tested to ensure removability. Surface oxidation or chalking may result in adhesive residue upon removal.
- Paint that is not firmly bonded to the substrate may be damaged when removing the film.
- Paint that is not properly cured may prevent the film from being removed.

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

Shelf Life, Shipping, and Storage

- Unprocessed film series 180C has a shelf life of 2 years after receipt. Processed film has a shelf life of 1 year. However, the total shelf life of a graphic before and after processing cannot exceed 2 years.
- Store the film in a clean, dry area in the original container.
- Store the film out of the direct sunlight and at less than 100°F (38°C).
- Ship the finished graphic lying flat or in a roll. To roll the graphic, roll it film side out onto a core that is 5 inches (13 cm) or larger in diameter. These methods help prevent the film and premasking from wrinkling or popping off the liner.
- 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.

Product Data

Values given are typical for film series 180C and are not for use in specifications. For a custom specification, submit a request to your 3M sales representative. The data given below are for unprinted film.

Physical Characteristics

Property	Value
Tensile strength (minimum)	5 pounds/inch at 73°F (0.9 kg/cm at 23°C)
Applied shrinkage	0.015 inch (0.4 mm)
Service temperature range	-65° to +225°F (-60° to +107°C)

Adhesion Characteristics

These adhesion values are 24 hours after application.

Substrate	Value
ABS	4.2 pounds/inch (0.75 kg/cm)
Acrylic enamel	3.5 pounds/inch (0.63 kg/cm)
Aluminum, anodized	7.9 pounds/inch (1.42 kg/cm)
Aluminum, etched	5.2 pounds/inch (0.93 kg/cm)
Chrome	4.8 pounds/inch (0.87 kg/cm)

Chemical Resistance Characteristics

- Resists mild alkalis, mild acids, and salt.
- Excellent resistance to water.

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:* Film series 180C is 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 bulletin, 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.

Attention:
Scotchprint® Graphics Authorized Manufacturers

Visit our password-protected website (www.scotchprint.com, then *Login*) for exclusive product information, services and product promotions for 3M's Scotchprint® Graphics Authorized Manufacturers.

Ask your Commercial Graphics Division sales representative to sign you up today!

3M Related Literature

Before starting any job, be sure you have the most recent product and instruction bulletins.

Listed below is related 3M technical literature that may be of interest. You may view and print these Bulletins from our Web site at www.scotchprint.com, or order them via our Fax-on-Demand (FOD) system. Call one of these phone numbers to order the desired bulletins, and specify the FOD document number provided in the chart.

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	1900	2509
3M™ Screen Printing Ink Series 9700UV	9700	2507
Instruction Bulletins		
Design of graphics	2.1	5501
Screen printing with ink series 1900 - line color - 4-color	 3.12 3.11	 6012 6011
Screen printing with ink 9700UV - line color - 4-color	 3.4 3.13	 6004 6013
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
Applying 3M™ Graphic Films with Comply™ Performance	5.31	7031
Application: Special Considerations for Complex Contours of Automobiles, Vans and Buses and Inspection Forms	5.36	7036
Storage, handling, maintenance, removal	6.5	8505
Other Documents		
Vehicle Graphics Warranty		9509

Bulletin Change Summary

Added information about using this film for Vehicle and Bus graphics, including Special Warranty Stipulations on page 6 and two bulletins on this page.

3M

Commercial Graphics Division
3M Center, Building 220-6W-06
PO Box 33220
St. Paul, MN 55133-3220 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
P.O. Box 100
Carolina, PR 00986-0100
787-620-3000
Fax 787-750-3035

Fax-on-Demand 1-800-364-0768 US/Canada or 1-651-732-6506 International
Fax-on-Demand document: 1009
www.scotchprint.com

©3M 2004. All rights reserved.