



Controltac™ Plus Removable Graphic Film with Comply™ Adhesive 3545C and RG3545C

For Piezo Ink Jet Printing Only

Description

3M™ Controltac™ Plus Removable Graphic Film with Comply™ Adhesive 3545C and 3M™ Controltac™ Plus Removable Graphic Film with Comply™ Adhesive RG3545C are designed for piezo ink jet printing. These 4-mil films have a positionable, pressure-activated adhesive with air removal channels for easy application and removal. These films are ideal for medium-term graphics for fleet or commercial vehicles and indoor or outdoor graphic applications.

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. A Performance Guarantee is also offered for film 3545C; see page 3 for details.

- Commercial vehicle, transit or fleet graphics, emblems or striping
- Outdoor and indoor graphics and signs
- Vending or dispensing machine and cooler 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.

Wall Graphics

The film can be used for wall graphics; however, the user must determine the product's suitability and whether it has the necessary adhesion for their application. The user is solely responsible for the graphic adhesion to the substrate. For guidelines, see Instruction Bulletin. 5.37, *A Guide to Understanding Applying Graphics to Common Wall Surfaces*.

Unsuitable End Uses for This Film

- Graphics applied to:
 - Corrugated, channels, complex curves, highly-irregular surfaces or sharply raised areas
 - Flexible substrates
 - Non-3M films
 - Paint that is not thoroughly cured or dried.
 - Substrate surfaces that are not clean and smooth (little or no variation in texture)
 - Stainless steel
 - Surfaces exposed to abrasion when clear 1920DR is used
 - Horizontal applications
- Graphic removal from:
 - Applications with poor paint-to-substrate adhesion
 - Wallboard
 - Existing graphic that must remain intact
 - Aged paint or metal that may have surface oxidation or chalking
- 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. Refer to the most current version of Instruction Bulletin 5.4 for details.

Compatible Products

Inks and Printers for Film 3545C

This film is forward wound on a 3-inch unnotched core.

- 3M™ Piezo Ink Jet Ink Series 1500
 - VUTEk UltraVu™ 150 Printer
 - VUTEk UltraVu™ 2360/3360 Printers
 - VUTEk UltraVu™ 3300/5300 Printers

Continued on the next page.

For the Scitex printer order film forward wound on a 6-inch unnotched core.

- Scitex PressJet-W™ Digital Press
 - 3M™ Piezo Ink Jet Ink Series 4600

Inks and Printers for Film RG3545C

This film is reverse wound on a 3-inch, 4-notch core.

- 3M™ Piezo Ink Jet Ink Series 6800
 - Océ Arizona 180 Printer
 - Océ Arizona 90 Printer

Graphic Protection Options

- 3M™ Scotchcal™ Luster Overlamine 8908
- 3M™ Scotchcal™ Matte Overlamine 8909
- 3M™ Scotchcal™ Luster Overlamine 8519
- 3M™ Scotchcal™ Matte Overlamine 8520
- 3M™ Screen Printing Clear 1920DR

Other Products

- 3M™ Premasking Tape SCPM-3
- 3M™ Prespacing Tape SCPS-55

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 helpline at 1-800-328-3908.

Physical Characteristics

Characteristic	Description
Material	Polyolefin
Color	White, opaque
Gloss	Matte
Thickness	Without adhesive: 4 mils (0.10 mm) With adhesive: 4.5 - 5 mils (0.11-0.13 mm)
Adhesive type	Pressure activated with air release channels
Adhesive color	Clear with gray layer beneath
Liner	Polyethylene-coated paper
Tensile strength	8 pounds/inch (0.12 kg/cm)
Adhesion <i>24 hours after application</i>	Aluminum, anodized: 2.1 - 2.3 pounds/inch (0.37 - 0.41 kg/cm) Fruehauf pre-painted panels: 1.1 - 1.3 pounds/inch (0.19 - 0.23 kg/cm)
Chemical resistance	Resists mild alkalis, mild acids, salt and water <i>does not include immersion</i>
Flammability	Call 1-800-328-3908 for information

Application Characteristics

Characteristic	Description
Finished graphic application recommendation	Surface type: <u>Most graphics:</u> Smooth, flat with or without rivets; simple curves <u>Cleared with 1920DR:</u> Flat and smooth (no surface texture) Substrate type: Acrylic, aluminum, glass (uncoated), painted metal, polycarbonate, rigid vinyl, PETG and smooth painted substrates Application temperature: 40° - 100°F (4° - 38°C) <i>air and substrate</i> Method: Dry
Applied shrinkage	3 - 7 mils (0.27 - 0.25 mm)
Finished graphic exposure temperature	-40° to 200°F (-40° to +93°C)
Graphic removal	Removable with heat; leaves little or no adhesive residue Removal temperature: Minimum ambient and substrate temperature 28°F (-2°C)

Warranty Information

Graphic Performance Life

The actual performance depends on the:

- Use of 3M compatible products and recommended printers
- Correct combination of film, ink and graphic protection
- Adequate ink drying
- 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.

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				
Film 3545C or RG3545C plus...		U.S. Vertical Exposure <i>in years</i>		
Ink Series	Graphic Protection	Fleet & Comm'l Vehicle Graphics	Outdoor Signs	Indoor Signs
1500 4600 6800	8519 8520	3	3	5
	8908 8909	1	1	3
	1920DR	0	3	5

Warranty Notes

Exposure Definition



face of graphic

Vertical Exposure

The face of the graphic is $\pm 10^\circ$ from vertical.

How to Determine Warranties for Other Exposure Combinations

All other exterior warranties are based on a percentage of the vertical U.S. warranties given in the previous table. The calculation for determining these warranties is given below. A "construction" is the base film, ink and graphic protection. The example assumes the vertical U.S. warranty is 3 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: $0.7 \times 3 \text{ years} = 2.1 \text{ years}$

Application Outside the U.S.

Contact the 3M organization for that country.

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. See the 3M Performance Guarantee for other options.

Special Warranty Stipulations for Automobile, Van and Bus Graphics

Automobiles 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.

Rivets and Contoured Surfaces

The film will tent over rivets or contoured surfaces.

Clears

Clear 1920DR should be applied by screen printing.

Overlaminates

Overlaminates must be cold roll applied.

Application to Glass

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

Removal Warranty

This film can be removed from standard vehicle and sign substrates for the warranted durability period. See graphic removal limitations on page 1.

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: Films 3545C and RG3545C 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.Scotch-print.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.

3M Performance Guarantee

The 3M Performance Guarantee covers only product performance of 3M films and the required 3M graphic protection product when used with the printers and OEM inks listed in this table for the types of graphics, construction methods and application techniques specified in the base film's 3M Product Bulletin and related Instruction Bulletins. This is not a finished graphics warranty. The sole remedy is the replacement cost of 3M films and graphic protection product used in the construction for the durability term. See the Performance Guarantee details at www.Scotchprint.com.


Performance Guarantee		
Film 3545C with graphic protection 8519		U.S. Vertical Exposure
Printer	Ink Series	Fleet & Comm'l Vehicle Outdoor Signs Indoor Signs
Mimaki JV 3 Series	MS, SS, S2	2 years
Mutoh Falcon II Outdoor	Eco-Solvent Plus™	
Mutoh Toucan	Toucan Solvent Based	
Oce CS6060	Oce IJC610	
Roland SOLJET Pro II Ex Series	Roland Eco-SOL	
Seiko ColorPainter™ 64S	EG-Outdoor	

Total Ink Coverage for Performance Guarantee Constructions


We recommend a maximum total ink coverage of 270%. Make sure that the ink lay down is within the limits of what the drier can handle to prevent ink smearing.

Printing and Fabrication

Heat Sensitivity when Processing Film 3545C

 Caution
This film can be more heat sensitive than vinyl film. Do not subject it to excessive heat during graphic fabrication. Excessive heat may cause the graphic to shrink or curl. Heated rollers may mar the surface.

Surface Abrasion Sensitivity when Fabricating Film 3545C

 Caution
<p>Protect the Printed Graphic After printing, this film has less abrasion resistance than vinyl film. Be careful not to scratch or mar the surface prior to applying the overlamine or clear coat.</p> <p>Apply an Application Tape When Using 1920DR Screen print clear 1920DR provides limited abrasion resistance. Always use an application tape, handle gently during installation, and do not mar the surface with tools after the application tape is removed.</p>

Total Solvent-based Ink Coverage


Do not exceed 270% total ink coverage for all VUTEk UltraVu printers, or 300% total ink coverage for the Pressjet-W Printer. Refer to the Instruction Bulletin for the 3M ink system you are using for details.

Color Profiles

This film accepts ink differently than you may be accustomed to. Make sure you use the appropriate printer profile and machine calibrations.

Ink Drying

Immediately after printing with solvent ink, the top layer of the film remains soft for several hours. During this time, abrasion and pressure to the printed surface can mar it. Allow the film to dry, *unrolled*, for at least 8 hours at at least 75°F (24°C) before applying an overlamine or screen-printed clear coat, cutting, trimming, mounting or applying the graphic.

 Caution
Always build enough time into your process to ensure adequate drying of the graphic. Poor drying may result in the adhesive becoming too aggressive and causing application difficulty. See the ink's instruction bulletin for more details.

Cutting

This film is suitable for cutting shapes larger than 8 inches, but not for numbers or copy.

- Guillotine
- Hand cut
- Cold steel-rule die
- Electronic

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

Application Tapes

Graphics that are 4 square feet (0.36 m²) or larger and intricately shaped graphics should use an application tape to prevent stretching and for easier application.

Ink	Graphic Protection	Prespacing Tape <i>all applications as needed</i>	Premasking Tape <i>very little liner is exposed</i>
1500 4600 6800	8519 8520	SCPM-55	SCPM-3
	8908 8909	None	SCPM-3
	1920DR <i>(requires tape)</i>	SCPM-55	SCPM-3

Installation

Application Method

Install this film using the dry application method.

About the 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.

This film also has the Comply adhesive technology, which adds a unique characteristic to the film adhesive that enables faster application with very few air bubbles. These films have a network of microstructure air channels in the adhesive. The channels allow air to escape laterally beneath the film. An air bubble trapped under the film can be rubbed out easily and usually does not require making an air release hole.

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), the film loses its positionability even with light hand pressure.

Working with Rivets

This film will tent when applied over rivets. If the rivets are closely spaced, the film will bridge between rivets. Tented or bridged film may fail prematurely, which is not covered by the 3M warranty. For the best appearance and durability, 3M recommends cutting around the rivet, removing the circle of film, and then re-squeegeeing around the rivet.

Caution

This film can be more heat sensitive than vinyl film. Do not subject it to excessive heat during graphic application. Excessive heat may cause the graphic to shrink or curl. When applying over rivets, use a heat gun or torch only to heat only the rivets.

Maintenance and Cleaning

Use a cleaning system designed for high-quality painted surfaces. They must be wet, non-abrasive, without strong solvents, and have a pH value between 3 and 11 (neither strongly acidic nor strongly alkaline).

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"> • 100°F (38°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; processed film may block if wound too tightly

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.

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

Heavy Metals

To the best of our knowledge, film 3545C does not contain any intentionally added Lead (Pb), Cadmium (Cd), Hexavalent Chromium (Cr6+) or Mercury (Hg), polybrominated diphenyl compounds (PBB) or polybrominated diphenyl ether compounds (PBDE). The user is responsible for determining and complying with all applicable standards and regulations.

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™ Piezo Ink Jet Ink Series 1500	1500	4578
3M™ Piezo Ink Jet Ink Series 4600	4600	4582

Subject	Bulletin No.	FOD No.
3M™ Piezo Ink Jet Ink Series 6800	6800	4574
3M™ Scotchcal™ Overlamine 8519 and 8520	8519/8520	4524
3M™ Scotchcal™ Luster Overlamine 8908	8908	3554
3M™ Scotchcal™ Matte Overlamine 8909	8909	3565
3M™ Screen Printing Ink Series 1900 and Overprint Clear VI0402	1900	2501
Instruction Bulletins		
Design of graphics	2.1	5501
Printing with piezo ink jet series 1500	4.45	6545
Printing with piezo ink jet ink series 4600	4.43	6543
Printing with piezo ink series 6800	4.40	6540
Screen printing with ink series 1900	3.12	6012
Cold roll lamination	4.22	6522
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, general procedures for interior and exterior dry applications	5.5	7005
Applying 3M Graphic Films with Comply™ Adhesive	5.31	7031
Application: special considerations for complex contours of automobiles, vans and buses and inspection forms	5.36	7036
A Guide to Understanding and Applying Graphics to Common Interior Wall Surfaces	5.37	7037
Storage, handling, maintenance, removal	6.5	8505
Warranties		
Worldwide 3M™ MCS™ Warranty		9503

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Bulletin Change Summary

For our Performance Guarantee program, we are continually testing popular piezo ink jet printers and inks with our graphic films to identify those that meet our standards and ensure satisfactory results for your applications. Please refer to the 3M Performance Guarantee table on page 4 to determine the most current approved printers and inks for this film.



Graphics Market Center

3M Center, Building 220-12E-04
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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: 4593
www.scotchprint.com

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