



Light Management Films

3M™ Blockout Films 3635-20b, 3635-22b

3M™ Diffuser Films 3635-30, 3635-70

3M™ Day/Night Films 3635-91, 3635-0171

1. Product Description

The 3M Light Management Films discussed in this Bulletin include three distinct categories: blockout films, diffuser films, day/night film and light control film. Each category of film has different properties to control light or to achieve special effects for various types of signs.

Note: Also see 3M™ Light Enhancement Film 3635-100 and 3M™ Dual-Color Film 3635-200, which also have unique light management properties.

2. Recommended Types of Graphics and End Uses

Always refer to the base film or flexible substrate's [Product Bulletin and Instruction Bulletin 4.26](#) for additional construction or product usage details. In general, the warranty for a first surface application on flexible substrates is the same as the translucent film.

Product	Recommended Uses	Limitations of End Uses
3M™ Blockout Film 3635-20b and 3635-22b	<ul style="list-style-type: none"> Blocks out light Internally-illuminated signs First surface applications Second surface applications 	<ul style="list-style-type: none"> May be printed with 3M™ Screen Printing Ink Series 1900 Second surface applications with 3M™ Panaflex™ Awning and Sign Facing 945GPS
3M™ Diffuser Film 3635-30 and 3635-70	<ul style="list-style-type: none"> Provides light diffusion Internally-illuminated signs Thermoformable under controlled conditions First surface application if completely covered by a UV-resistant 3M film Second surface applications without adding another film 	<ul style="list-style-type: none"> Cannot be printed First surface applications required that this film be completely covered by a UV-resistant 3M film Second surface applications with 3M™ Panaflex™ Awning and Sign Facing 945GPS
3M™ Day/Night Film 3635-91 and 3635-0171	<ul style="list-style-type: none"> Internally-illuminated signs Produce the appearance of dark graphics during the day Produce the appearance of white or colored graphics at night First and second surface applications Second surface applications with 3M™ Panaflex™ Awning and Sign Facing 945GPS 	<ul style="list-style-type: none"> Cannot be printed

3. Compatible Products for 3M™ Blockout Film 3635-20b and 3635-22b ONLY

Note: Only films 3635-20b and 3635-22b can be printed or have an overlamine applied directly to them.

- 3M™ Screen Printing Ink Series 1900 (opaque inks only)
- 3M™ Scotchcal™ Gloss Overlamine 3640GPS
- 3M™ Scotchcal™ Matte Overlamine 3642GPS

4. Physical and Application Characteristics

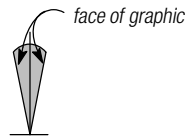
These are typical values for unprocessed product; processing may change the values. Contact your 3M representative for a custom specification.

	3M™ Blockout Film 3635-20b and 3635-22b	3M™ Diffuser Film 3635-30 and 3635-70	3M™ Day/Night Film 3635-91 and 3635-0171
Characteristic	Description	Description	Description
Film description	3635-20b: Uniformly white on face side with a matte surface 3635-22b: Uniformly black on face side with a matte surface	3635-30: White, uniform in both reflective and transmitted light 3635-70: White, uniform in both reflective and transmitted light	3635-91: Greenish gray color 3635-0171: Charcoal gray color
Light transmission	Less than 1%, typical	3635-30: 30%, typical 3635-70: 60%, typical	3635-91: 47%, typical 3635-0171: 8.3%, typical
Thickness	With adhesive: 4-5 mils (10-13 mm)	With adhesive: 3-4 mils (0.08 - 0.10 mm)	With adhesive: 3-4 mils (0.08 - 0.10 mm)
Adhesive type	Pressure sensitive		
Adhesive color	Clear		
Liner	78 pound, white kraft paper		
Tensile strength	5 pounds/inch at 73°F (0.9 kg/cm at 23°C)		
Application substrates	3M™ Panaflex™ Awning and Sign Facing 945GPS, 3M™ Panagraphics™ III Flexible Substrate, flat acrylic, polycarbonate, PETG (glycol-modified polyethylene terephthalate)		
Application temperature	60°F (16°C) <i>minimum</i>		
Adhesion	Acrylic panels; first surface of sign facing 945GPS or Panagraphics substrate: 3 pounds/inch (0.5 kg/cm)		
Service temperature range	-20° to +175°F (-29° to +80°C)		
Applied shrinkage	0.015 inch (0.4 mm)		
Chemical resistance	Resists mild alkalis, mild acids, and salt; excellent resistance to water (<i>but not immersion</i>)		

5. Definitions

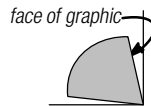
A. Exposure

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.

B. Graphic Construction

The products used to make a graphic, which may include film and/or flexible substrate, graphic protection, ink, printer and application tape.

C. Graphic Protection

Overlamine films or clear coats used to protect the graphic and/or change gloss.

D. Graphic Types

Indoor Signs	Stationary graphics applied indoors and <i>not</i> exposed to the elements.
Outdoor Signs	Stationary graphics applied outdoors and exposed to the elements.
First Surface	Film applied to a substrate so the viewer sees the film before the substrate.
Second Surface	Film applied to a substrate so the viewer sees through the substrate to the film.

6. Warranty Information

**A. Limitations and Disclaimers
Applicable to All Warranties
& Warranty Coverage
Overview**

Both the warranty coverage and the durability for each graphic is 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 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.

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. 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, including any labor or non-3M materials charges.**

See the [3M Commercial Graphics Warranty Brochure](#) at 3Mgraphics.com/warranties, which gives the terms, additional limitations of the warranty, if any, and limitations of liability.

B. 3M Basic Product Warranty

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 and as further set forth in the [3M Commercial Graphics Warranty Brochure](#).

C. 3M™ MCST™ Warranty

Subject to Stipulations set forth in Section D., below

Finished graphics constructed with the materials specified and the exposure specified in the Warranted Durability Tables, Section C.(1), are eligible for the 3M™ MCST™ Warranty. For warranties for other exposures, see Section D.1.

							Warranted Durability in Years	
Surface	Substrate	Thermoform	Film, First Layer	Printing	Film, Second Layer	Graphic Protection	U.S. Vertical Sign	U.S. Non-Vertical Sign
First ²	3M flexible substrates; acrylic; polycarbonate; PETG	No	3635-20b	No	No	None	5	0
		No	3635-22b	No	No	None	5	0
		No	3635-91 3635-0171	No	No	None	4	0
First ²	3M flexible substrates; acrylic; polycarbonate; PETG	No	3635-20b	No	No	3640 3642-114	9	6
		No	3635-22b	No	No	3640 3642-114	9	6
		No	3635-91 3635-0171	No	No	3640 3642-114	7	4
Second	Acrylic, polycarbonate, PETG	No	3635-30 ¹	No	No	None	5	5
		No	3635-70 ¹	No	No	None	5	5
First ²	Acrylic, polycarbonate, PETG	No	3635-30 ¹	No	Completely covered with UV-resistant film ¹	None	4	0
		No	3635-70 ¹	No		None	3	0
Second	Acrylic, polycarbonate, PETG	Yes	3635-30 ¹	No	No	None	4	0
		Yes	3635-70 ¹	No	No	None	3	0

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							Warranted Durability in Years	
Surface	Substrate	Thermoform	Film, First Layer	Printing	Film, Second Layer	Graphic Protection	U.S. Vertical Sign	U.S. Non-Vertical Sign
First ²	3M flexible substrates; acrylic; polycarbonate; PETG	No	3635-20b	Ink series 1900	No	1920DR	4	0
		No	3635-22b		No	1920DR	3	0
		No	3635-20b		No	3640 3642-114	5	4
		No	3635-22b		No	3640 3642-114	9	6

1. The diffuser film must be used second surface or be completely covered by a Scotchcal translucent film 3630, IJ3630 or 3632GPS, which are UV-resistant.

2. The warranty for a first surface application on flexible substrates is the same as the translucent film.

D. General Warranty Stipulations for 3M™ MCS™ Warranty

These stipulations apply to graphics covered by the 3M™ MCS™ Warranty. Specific provisions of these stipulations are found in the [3M Commercial Graphics Warranty Brochure](#) at 3Mgraphics.com.

(1) Reduced Warranted Durability for Non-vertical Graphics

For graphics oriented in a non-vertical, outdoor exposure, multiply the warranted durability years for your graphic construction as shown in the applicable Warranted Durability Tables, Section C, by the percentage shown for the intended graphic exposure.

If the Graphic Exposure is:	Use this Percentage of U.S. Vertical Exposure Warranted Durability	Calculation Examples
U.S. Non-vertical	50% (0.5)	0.5 x 5 years = 2.5 years 0.5 x 9 years = 4.5 years
Desert Southwest Vertical	70% (0.7)	0.7 x 5 years = 3.5years 0.7 x 9 years = 6.3 years
Desert Southwest Non-vertical	35% (0.35)	0.35 x 5 years = 1.65 years 0.35 x 9 years = 3.15 years
U.S. Horizontal (most graphics protection options)	0%	0

(2) 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.

(3) Application to Glass

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

(4) Application Outside the U.S.

Contact the 3M organization for that country.

(5) Graphics Made with Components Not Sold or Recommended by 3M

The 3M™ MCS™ Warranty does not, under any circumstances, cover 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 non recommended or qualified products.

7. Factors that Affect Graphic Performance Life

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

- Combination of inks, printers and drying or curing, as appropriate
- Selection and preparation of the substrate
- Method of decoration
- Application methods
- Exposure conditions
- Cleaning methods

8. Fabrication

This Bulletin does not contain detailed printing, processing, or application procedures. Refer to the 3M Related Literature section for further information.

9. Application Tapes

A. 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.
- Use SCPS-2 for the constructions shown in the Warranty table of this Bulletin.

B. 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.
- Use SCPM-3 for the constructions shown in the Warranty table of this Bulletin.

C. 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 overlamine 8519 and you want to premask the film, use premasking tape SCPM-3.

10. Shelf Life, Storage and Shipping

A. Shelf Life

Total shelf life: 3 years from the date of manufacture on the original box.

If you do process the film, do so within 2 years and apply within 1 year.

If you do not process the film, apply it within 3 years.

B. 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

C. Shipping Finished Graphics

Flat, or rolled printed side out on 6 inch (15 cm) or larger core. This helps prevent the liner and, if used, the application tape from popping off.

11. 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

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Subject	Type	Bulletin No.
3M™ Panaflex™ Awning and Sign Facing 945GPS	PB	945
3M™ Panagraphics™ III Wide Width Flexible Substrate	PB	P3
3M Graphic Protection Products <i>overview of all graphic protection products and specific information on most overlaminates</i>	PB	GP-1
-Cold roll lamination	IB	4.22
3M™ Screen Printing Ink Series 1900 and Overprint Clear VI0402	PB	1900
- Screen printing with ink series 1900 - line color	IB	3.12
- Screen printing with ink series 1900 - 4-color	IB	3.11
Design of graphics	IB	2.1
Design of cabinets for light boxes and channel letters	IB	2.4
Using 3M application tapes; premasking and prespacing for films	IB	4.3
Scoring and cutting	IB	4.1
Making backlit signs with 3M digitally imaged graphics	IB	4.26
Application, substrate selection, preparation and substrate-specific application techniques	IB	5.1
Application, general procedures for indoor and outdoor dry applications	IB	5.5
Application, wet method for translucent screen printed, thermal mass transfer and cut graphics	IB	5.7
Thermoforming	IB	5.16
Storage, handling, maintenance, removal	IB	6.5
3M Commercial Graphics Warranty Brochure	go to www.3Mgraphics.com , Warranties	

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12. Bulletin Change Summary

3M™ Panaflex™ Awning and Sign Facing 645EI was discontinued. 3M™ Day/Night Film 3635-0171 has been added to the bulletin. Total shelf life has been changed from 2 years to 3 years. The bulletin has been rearranged to allow easier comparison between the various products.



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