



Dual-Color Film Series 3635-200

For Screen Printing and Solvent Inkjet Printing

1. Product Description

A. Product Features

- Create the special effect of a color/image by day (non lighted) and a different color by night (backlit)
- Dual-color perforation pattern lets background color/image display when backlit*
- Available in black, white or a customer-specified color for a variety of lighting effects
- Exceptional color clarity and backlit brightness both day and night
- Pressure-sensitive adhesive designed specifically for light management applications

* From a typical viewing distance for large format graphics, viewers will see little or no perforation pattern. However, the colors and construction used will have an effect on how visible the perforation pattern is.

B. Recommended Types of Graphics and End Uses

Refer to the base film or flexible substrate's Product Bulletin for details on specific constructions and any warranty that may apply when using this product.

- Backlit channel letters, signs and displays (several construction options are shown later in this bulletin)
- First or second surface application to acrylic, polycarbonate and high temperature copolyester sheet, channel letters and sign faces
- First surface application to selected 3M flexible substrates

C. Performance Overview

3M tests the performance of both individual products and finished graphic constructions. This table shows the best performance expected from this product without a Warranty Period and with a Warranty Period.

For detailed graphic construction and application options along with specific Warranty Periods, please see the Warranty Information, Section 5.

Expected Performance Life. This is the estimated period of time the product should perform satisfactorily.	
Unprinted film with no graphic protection, applied to a flat vertical outdoor surface in a non-abusive environment.	7 years Unwarranted Period
3M™ MCS™ Warranty. This is the maximum period of time 3M will warrant the finished graphic performance.	
Printed film with the best 3M ink and graphic protection option, applied to a flat, vertical surface.	5 years Warranty Period

D. Limitations of End Uses

This 3M product is not designed or recommended for the following uses. Please contact us to discuss other options.

(1) Unsuitable End Uses for This Product

- Application to non-vertical surfaces
- Second surface application to flexible substrate
- Use on any surface where an obstruction of view would present a hazard
- Thermoforming

2. Compatible Products

This section provides a list of products that are approved by 3M for use with the base film covered in this Bulletin, and used for the creation of a graphic that is covered by the 3M™ MCST™ Warranty. Refer to the Product and Instruction Bulletins listed in 3M Related Literature at the end of this Bulletin for more information about the compatible products.

See the **Warranty Information** section to determine which compatible products are approved for your graphic construction.

(1) Solvent Inkjet Inks and Printers

- 3M™ Piezo Inkjet Ink Series 1500v2 EFI™ VUTEk® 150, 2360/3360, 3300/5300 and 3000/5000 Printers
- 3M™ Piezo Inkjet Ink Series 4400 HP XLJet 1200 and 1500 Printers
- SIIT GX 3M Ink Series Seiko I Infotech ColorPainter™ H Series H-74s, H2-74s, H-104s, H2-104s Printers

(2) Screen Printing Inks

- 3M™ Screen Printing Ink Series 1900
- 3M™ Screen Printing UV Ink Series 9800

(3) Films and Substrates

- 3M™ Scotchcal™ Translucent Graphic Film Series 3630
- 3M™ Envision™ Translucent Film Series 3730
- 3M™ Diffuser Films 3635-30 and 3635-70
- 3M™ Envision™ Diffuser Films 3735-50 and 3735-60
- 3M™ Light Enhancement Film 3635-100
- 3M™ Panaflex™ Awning and Sign Facing 945GPS
- 3M™ Panagraphics III™ Wide Width Flexible Substrate

(4) Graphic Protection Options

- 3M™ Scotchcal™ Luster Overlaminates 3619
- 3M™ Scotchcal™ Matte Overlaminates 3620

(5) Other Substrates

- Flat acrylic, polycarbonate*, high temperature copolyester sheet

*Film series 3635-200 typically adheres to solar-grade polycarbonate substrate. However, some lots of this substrate may inhibit the adhesion of these films. Contact Technical Service if you are having difficulty with this combination. See [Instruction Bulletin 5.1](#) for additional information.

Polycarbonate substrates may require drying by baking before use. Refer to the manufacturers' instructions.

3. Characteristics

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

A. Physical Characteristics

Characteristic	Value
Color	Film 3635-200: perforated film in your color choice with a matte surface Film 3635-210: white perforated film with a matte surface Film 3635-222: black perforated film with a matte surface
Film thickness	Without adhesive: 4.5 mil (0.11 mm) With adhesive: 5.5 mil (0.14 mm)
Adhesive type	Pressure sensitive
Adhesive color	Film 3635-210: white Film 3635-222: clear
Liner	White kraft paper
Tensile strength	5 pounds/inch at 73°F (0.9 kg/cm at 23°C) <i>minimum</i>
Chemical resistance	Resists mild alkalis, mild acids, and salt Excellent resistance to water (<i>except immersion</i>)

A. Application Characteristics

Characteristic	Value
Finished graphic application recommendation	<p>Surface type: Flat without rivets</p> <p>Substrate type: Acrylic, polycarbonate, high temperature copolyester sheet; Panagraphics III substrate and Panaflex awning and sign facing</p> <p>Application temperature: 60°F (16°C) <i>minimum air and substrate</i></p>
Adhesion 24 hours after application	<p>Acrylic panels</p> <p>First surface of Panaflex sign facing: 3 pounds/inch (0.5 kg/cm).</p>
Applied shrinkage	0.015 inch (0.4 mm)
Temperature range after application	-65° to +225°F (-60° to +107°C)
Graphics removal	Permanent

4. Definitions

A. Exposure

U.S. Vertical Exposure



face of graphic

The face of the graphic is +/- 10° from vertical

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. Click here for a [detailed map](#).

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 *not* 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

5. Warranty Information

A. Warranty Coverage Overview

The warranty coverage for each graphic is based on the user(s) both reading and following all applicable and current 3M Product and Instruction Bulletins. 3M will honor the Warranty Period stated in the base film's Product Bulletin that is current when the film was purchased. The Warranty Period 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.

B. 3M Basic Product Warranty

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

C. Limited Remedy

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.

D. Limitation of Liability

Except where prohibited by law, 3M SHALL NOT UNDER ANY CIRCUMSTANCES BE LIABLE TO PURCHASER OR USER FOR ANY DIRECT (EXCEPT FOR THE LIMITED REMEDY PROVIDED ABOVE), INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, LABOR, NON-3M MATERIAL CHARGES, LOSS OF PROFITS, REVENUE, BUSINESS, OPPORTUNITY, OR GOODWILL) RESULTING FROM OR IN ANY WAY RELATED TO SELLER'S PRODUCTS, SERVICES or THIS BULLETIN. This limitation of liability applies regardless of the legal or equitable theory under which such losses or damages are sought including breach of contract, breach of warranty, negligence, strict liability, or any other legal or equitable theory.

E. Additional Limitations

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

F. 3M™ MCS™ Warranty

Subject to Stipulations set forth in Section G., below

Finished graphics constructed with the materials specified and the exposure specified in the Warranty Period Tables, Section F.(1), is eligible for the 3M™ MCS™ Warranty. For warranties for other exposures, see Section G.(1).

(1) SCREEN PRINT Warranty Period for Finished Graphics in a Standard U.S. Vertical Exposure

OUT = Outdoor Signs
IN = Indoor Signs

SCREEN PRINT Warranty Period for Finished Graphics, in Years

Film*	Graphic Protection	No Printing		Solvent Ink Series 1900		UV Ink Series 9800	
		OUT	IN	OUT	IN	OUT	IN
3635-200	1920DR	—	—	5	5	—	—
3635-210	1930	—	—	5	5	—	—
	9730UV	—	—	5	5	—	—
	9740i	—	—	5	5	5	5
	9800CL	—	—	—	—	5	5
3635-200 3635-210 3635-222	None	5	5	—	—	—	—

*Visual appearance of screen printing on custom colors is not warranted.

(1) INKJET Warranty Period for Finished Graphics in a Standard U.S. Vertical Exposure

OUT = Outdoor Signs
IN = Indoor Signs

INKJET Warranty Period for Finished Graphics, in Years

SOLVENT INKS AND PRINTERS		EFI™ VUTEk® 150, 2360/3360, 3300/5300, 3000/5000 Printers		HP XLJet Series 1200, 1500 Printers		SIIT ColorPainter H Series H-74s, H-104s, H2-74S and H2-104s Printers	
		3M Ink Series 1500v2		3M Ink Series 4400		GX 3M Ink Series	
Film	Graphic Protection	OUT	IN	OUT	IN	OUT	IN
3635-210	3619 3620	5	5	5	5	5	5

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

(1) Reduced Warranty Period for Other Graphic Exposures

These stipulations apply to the 3M™ MCS™ Warranty. General provisions for these stipulations are covered in the [3M Commercial Graphics Brochure](#) at 3Mgraphics.com.

For graphics oriented in a non-vertical or desert southwest, outdoor exposure, multiply the Warranty Period (in years) for your graphic construction as shown in the applicable Warranty Period Table, Section F.(1), by the percentage shown for the intended graphic exposure.

If the Graphic Exposure is:	Use this Percentage of U.S. Vertical Exposure, Warranty Period	Calculation Examples
U.S. Non-vertical	0%	0
Desert Southwest Vertical	70% (0.7)	0.7 x 5 years = 3.5 years 0.7 x 3 years = 2.1 years
Desert Southwest Non-vertical	0%	0
Horizontal	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. However, to help maintain the appearance of your graphic, use the recommended graphic protection whenever:

- it is required for the construction and end use as shown in the Warranty Period tables.

(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.

6. Factors that Affect 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.

7. Graphics Manufacturing

Refer to the 3M Related Literature section for further information on printing, processing, or application procedures.



CAUTION

Before using any equipment, always follow the manufacturers' instructions for safe operation.

A. Screen Printing

This film series has perforations, or holes. The screen printer must periodically insert scrap paper to clear the screen of buildup.

Formulations and processing conditions can affect ink durability. Refer to the Product and Instruction Bulletins for your ink for limitations and proper usage.

B. Inkjet Printing

Always read and follow the ink manufacturer's written instructions on usage.

(1) Total Ink Coverage

The maximum recommended total ink coverage for this film is:

- **270%** when printed with all approved 3M solvent inkjet inks.

Do not exceed the recommended total ink coverage for the ink series used on this film. Too high a total physical ink amount on the film results in media characteristic changes, incomplete drying, overlamine lifting, and/or poor graphic performance. Refer to the Product & Instruction Bulletin for the 3M ink being used for additional details about total ink coverage.

(2) Completely Dry Graphics

Important Note!

Incomplete drying can result in graphic failure including curling, increased shrinkage and adhesion failure, which are not covered under warranty.

Always build enough time into your process to ensure complete drying of the graphic. Poorly dried film may become soft and stretchy, and the adhesive may become too aggressive. This can cause difficulty when applying an overlamine, rolling or applying the graphic. See the ink's Instruction Bulletin for more details.

C. Cutting

The following are common cutting methods for this film. See [Instruction Bulletin 4.1](#) for details.

(1) Methods

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

D. Overlaps

While keeping the dual-color film oriented in the same direction, make an overlap by using two rows of holes.

E. Graphic Protection

Graphic protection may improve the appearance, performance and durability of the graphic.

- See [Instruction Bulletin 4.22](#) for details on lamination procedures.

F. Application Tapes

See [Instruction Bulletin 4.3](#) for complete details on how to use application tapes.

(1) When to Use Premasking Tape

- Use as an application aid to increase stiffness, and prevent stretching and damage during application.
- Use when little or no liner is exposed.

(2) 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.

(3) How to Select a Tape

Determine whether you want to premask the graphic or prespace cut pieces of film such as letters. Then locate the graphic protection used on your graphic in the table below, and use the corresponding tape. See [Instruction Bulletin 4.3](#) for complete details.

EXAMPLE: To premask a film that includes overlamine 3619, use premasking tape SCPM-3. To prespace a film that includes clear 1920DR, use prespacing tape SCPS-2.

Select the tape based on what is on top of the graphic

Tape	Unprinted	1920DR 1930	3619 3620	9730UV 9740i	9800CL
Premasking SCPM-3	■	■	■	—	—
Premasking SCPM-44X	—	—	—	■	■
Prespacing SCPS-2	■	■	■	—	—
Prespacing SCPS-53X	—	—	—	■	■

— = The use of an application tape is not recommended in this construction.

8. Construction Options

The construction options provided here give the basic guidelines for creating effective backlit channel letters, signs and displays. You can expand the options by experimenting with these as well as creating your own unique ideas. Here are just a few additional ideas:

- Screen print an image on film 3635-210. The image is visible during the day but with the creative use of blackout film and an additional layer of translucent film, you can have a totally different looking sign when backlit at night.
- Substitute selected areas of a translucent 3M film with cut out letters of dual color film series 3635-200. Place yet another color behind the dual-color film.

See page 4 for illustrated examples of how to use this film.

A. Light Enhancement Film 3635-100

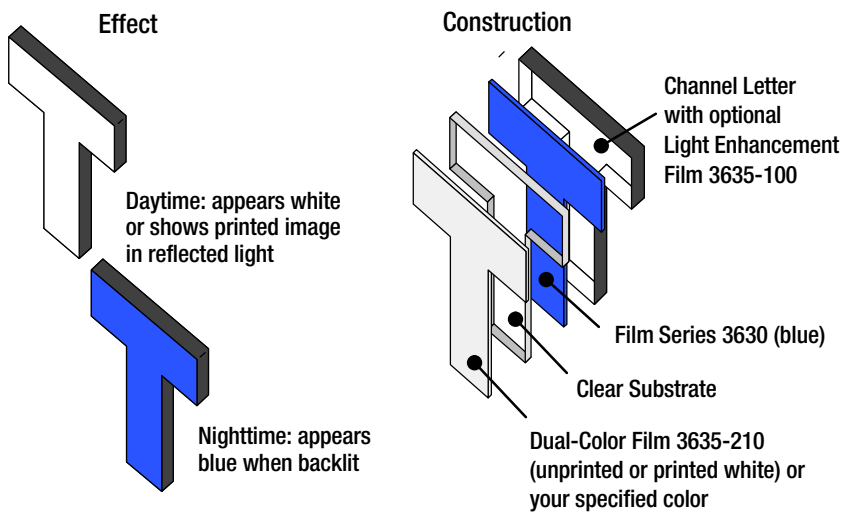
Light enhancement film can be used to line channel letters for increased sign luminance. Refer to the 3M Related Literature section for further information.

B. Construction Option 1: White Dual-Color Film with Colored Translucent Film

This construction typically provides the best daytime color density using white or your specified dual-color film. See FIGURE 1.

Note: If you are not viewing this in color, the Nighttime example shows the channel letter as glowing blue, which is created by using blue film from series 3630.

FIGURE 1
Construction Option 1,
White Dual-Color Film
(unprinted or printed)

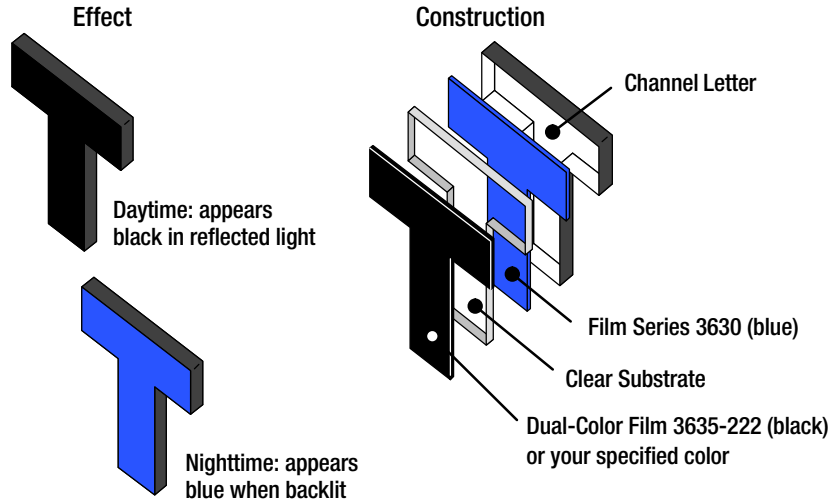


**C. Construction Option 2:
Black Dual-Color Film with
Colored Translucent Film**

This is the same construction as Option 1 except it uses black or your specified dual-color film. See FIGURE 2.

Note: If you are not viewing this in color, the Nighttime example shows the channel letter as glowing blue, which is created by using blue film from series 3630.

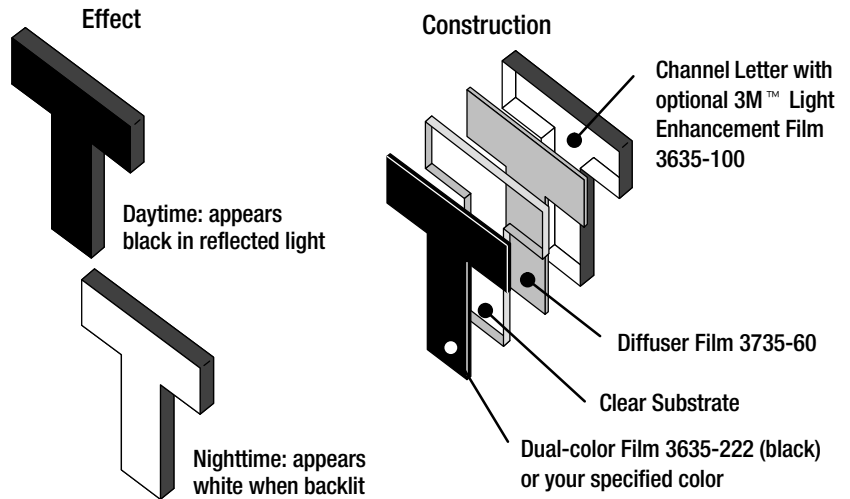
**FIGURE 2
Construction Option 2,
Black Dual-Color Film**



**D. Construction Option 3:
Black Dual-Color with No
Color**

This is the simplest option for channel letters that appear black during the day and glow white at night.

**FIGURE 3
Black Dual-Color
with No Color**

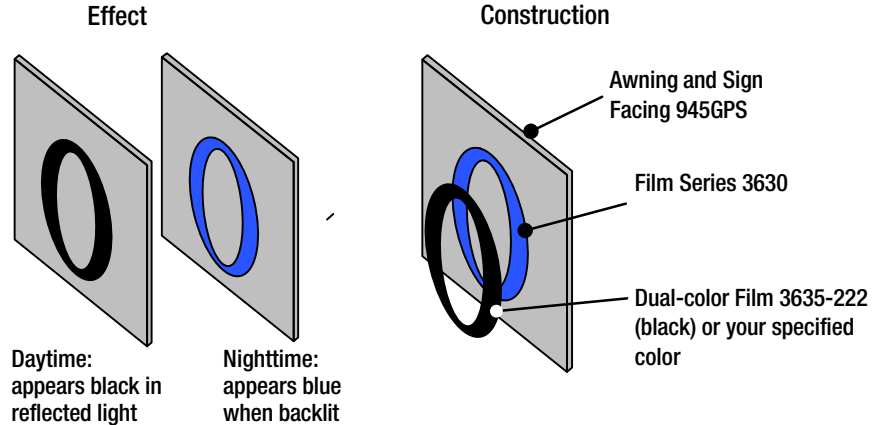


**E. Construction Option 4:
Dual-Color Film on
Flexible Substrate**

This option uses 3M™ Panaflex™ Awning and Sign Facing 945GPS as a substrate. Film can be applied only to the first surface of this substrate.

Note: If you are not viewing this in color, the Nighttime example shows the channel letter as glowing blue, which is created by using blue film from series 3630.

**FIGURE 4
Dual-Color Film
on Flexible Substrate**



9. Application and Installation

Install the film using the dry application method.

Refer to the 3M Related Literature section, located at the end of this bulletin, for a list of the Instruction Bulletins that may be needed to apply or install this film.

10. 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.)

11. 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.

12. Shelf Life, Storage and Shipping

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.

Storage Conditions

- 40° to 80°F (4° to 27°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 6 inch (15 cm) or larger core. This helps prevent the liner and, if used, the application tape from popping off.

13. 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™ Piezo Inkjet Ink Series 1500v2	PB-IB	1500
3M™ Piezo Inkjet Ink Series 4400	PB-IB	4400
SIIT GX 3M Ink Series	PB-IB	GX
3M™ Panaflex™ Awning and Sign Facing 945GPS	PB	945
3M™ Panagraphics™ III Wide-Width Flexible Substrate	PB	P3
3M™ Scotchcal™ Translucent Graphic Film Series 3630	PB	3630
3M™ Blockout Films 3635-20B, 3635-22B 3M™ Day/Night Films 3635-91	PB	3635
3M™ Diffuser Films 3635-30, 3635-70 3M™ Envision™ Diffuser Film 3735-50, 3735-60	PB	Diffuser
3M™ Light Enhancement Film 3635-100	PB	3635-100
3M Graphic Protection Products <i>overview of all graphic protection products and specific information on most overlaminates</i>	PB	GP-1
3M™ Screen Printing Ink Series 1900 and Overprint Clear VI0402 - Screen printing with ink series 1900 - line color - Screen printing with ink series 1900 - 4-color	PB IB IB	1900 3.12 3.11
3M™ Screen Printing UV Ink Series 9800 - Screen printing with UV ink series 9800 - line color - Screen printing with UV ink series 9800 4-color	PB IB IB	9800 3.20 3.21
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
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
Storage, handling, maintenance, removal	IB	6.5
3M Commercial Graphics Warranty Brochure		www.3Mgraphics.com, Warranties

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ColorPainter is a trademark of Seiko I Infotech. EFI is a trademark and VUTEK is a registered trademark of EFI Inc.

14. Bulletin Change Summary

Dual-color film can now be solvent inkjet printed. 3M™ Panagraphics™ II Flexible Substrate has been discontinued. Total shelf life increased from 2 years to 3 years. Reformatted page layout of entire bulletin, along with Product Description and Warranty Information sections. Warranted Durability is now referred to as Warranty Period.



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