



# Scotchcal™ Translucent Graphic Film

## Series 3630

### For Screen Printing, Cut Graphics and Thermoforming

#### Product Description

These are 2-mil, long-term films with a synthetic layflat liner that is not affected by water or humidity. Use these electronic cuttable films for flat or thermoformed, internally-illuminated signs with crisp, clear colors (many with simulated PANTONE® color references). A matte surface finish eliminates glare and provides uniform color in reflected and transmitted light.

#### 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.

- For indoor or outdoor use on internally-illuminated vertical sign faces
- For indoor or outdoor flat and thermoformed signs and flexible or rigid sign facings
- First and second surface applications
- Thermoforming on rigid plastic surfaces

#### Limitations of End Uses

3M specifically does not recommend or warrant the following uses, but please contact us to discuss your needs or recommend other products.

#### Unsuitable Applications for this Film

- Fleet graphics
- Thermoforming before weeding, especially with some red films. Pigments currently used in all manufacturer's translucent films are less stable than in the past and can cause staining of plastic when thermoformed. This can be especially noticeable in red film, so we recommend weeding before thermoforming.
- Using films 3630 and 3632GPS on the same sign
- Graphic constructions with more than two layers of film, including the overlamine, except as described in Three Film Layer Constructions
- Graphics that require the same color density in front lit and backlit graphics
- Graphics applied to:
  - surfaces with rivets or corrugations.
  - non-3M flexible substrates.
  - substrates with coatings such as silicone.
- Graphics made for automotive Original Equipment Manufacturers (OEM); contact 3M Automotive Division at 1-800-328-1684 for alternatives.

#### Compatible Products

##### 3M Graphic Materials

This Bulletin provides details about the base film and construction options and warranty. Additional specific information about compatible products can be found in the Product and Instruction Bulletins listed in **3M Related Literature** at the end of this bulletin.

##### Screen Printing Inks

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

## Graphic Protection Options

- 3M™ Screen Printing Gloss Clear 9800CL
- 3M™ Scotchcal™ Luster Overlamine 3619
- 3M™ Scotchcal™ Matte Overlamine 3620
- 3M™ Scotchcal™ Matte Overlamine 3640GPS
- 3M™ Scotchcal™ Luster Overlamine 3642GPS
- 3M™ Screen Print Gloss Clear 1920DR
- 3M™ Screen Print UV Gloss Clear 9720i
- 3M™ Screen Print Clear 9720UV
- 3M™ Scotchcal™ Luster Overlamine 8519
- 3M™ Scotchcal™ Matte Overlamine 8520

## Light Control Films

- 3M™ Diffuser Films 3635-30
- 3M™ Diffuser Films 3635-70
- 3M™ Blockout Film 3635-20B
- 3M™ Blockout Film 3630-22B

## Substrates

- 3M™ Panaflex™ Awning and Sign Facing 945GPS
- 3M™ Panagraphics™ III Wide-Width Flexible Substrate
- Flat, rigid substrates such as flat acrylic, polycarbonate, high temperature copolyester sheet, glass

## Other Products

- 3M™ Prespacing Tape SCPS-2
- 3M™ Prespacing Tape SCPS-53X
- 3M™ Premasking Tape SCPM-3
- 3M™ Premasking Tape SCPM-44X

## Characteristics

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

### Physical Characteristics

Characteristic	Value
Film	Vinyl
Colors	Translucent, 57 colors. See Color Chart
Thickness	<b>Without adhesive:</b> 2 mils (0.05 mm) <b>With adhesive:</b> 3 to 4 mils (0.08 to 0.1 mm)
Adhesive type	Pressure sensitive
Adhesive color	Clear
Liner	Translucent synthetic liner
Adhesion <i>24 hours after application</i>	<b>Acrylic and uncoated, clear polycarbonate:</b> 4 pounds/inch (0.7 kg/cm)
Chemical resistance	Resists mild alkalis, mild acids, and salt Excellent resistance to water ( <i>not immersion</i> )
Flammability	Call 1-800-328-3908 for information

## Application Characteristics

Characteristic	Value
Finished graphic application recommendation	<p><b>Application temperature:</b> 60°F (16°C) <i>minimum air and substrate</i></p> <p><b>Application method:</b> Wet, typical</p> <p><b>Surface type:</b> Flat, without rivets</p> <p><b>Substrate type:</b> 3M flexible substrates; Rigid substrates such as flat acrylic, polycarbonate, high temperature copolyester sheet, glass</p> <ul style="list-style-type: none"> <li>- These films typically adhere to solar-grade polycarbonate substrate. However, some lots of this substrate may inhibit film adhesion. Contact Technical Service if you are having difficulty with this combination. See Instruction Bulletin 5.7 for additional information.</li> <li>- Polycarbonate substrates may require oven drying before use because outgassing of moisture from the polycarbonate may cause the film to bubble. Refer to the manufacturers' instructions.</li> </ul>
Finished graphic exposure temperature	<p>-50° to +170°F (-45° to +77°C)</p> <p>Impact at low temperatures of film applied to flexible substrates may result in cracking of the film and/or substrate.</p>
Graphic removal	None, permanent

## Color Chart

Selected 3M product colors are a simulation of a PANTONE® -identified color standard. You can view these colors at 3Mgraphics.com. Go to Helpful tools, then Pantone Color Simulator. Consult the current PANTONE Color Publications for accurate color. PANTONE® is the property of Pantone, Inc. ©Pantone, Inc., 2000 Produced under License Agreement No. 813R between 3M and Pantone, Inc. Special colors are available by request. Pigment durability and manufacturing limitations do not permit exact color matching of all color shades.

Product Color	PANTONE Color	Product Color	PANTONE Color
3630-005 Ivory	n/a	3630-106 Brilliant Green	PANTONE 376 C
3630-015 Yellow	PANTONE 109 C	3630-108 Pink	PANTONE 224 C
3630-20 White	n/a	3630-109 Light Rust Brown	PANTONE 181 C
3630-22 Black*	PANTONE Process Black C	3630-115 Lt. Lemon Yellow	PANTONE 3995 C
3630-25 Sunflower	PANTONE 123 C	3630-116 Bright Jade Green	n/a
3630-26 Green	PANTONE 349 C	3630-118 Intense Magenta	PANTONE 241 C
3630-33 Red	n/a	3630-121 Silver	PANTONE 877 C
3630-36 Blue	PANTONE 281 C	3630-125 Golden Yellow	PANTONE 1235 C
3630-43 Lt. Tomato Red	n/a	3630-126 Dk Emerald Green	PANTONE 3435 C
3630-44 Orange	PANTONE 1655 C	3630-127 Intense Blue	PANTONE 300 C
3630-49 Burgundy	PANTONE 188 C	3630-128 Plum Purple	PANTONE 2622 C
3630-51 Silver Gray	PANTONE 439 C	3630-129 Bronze	PANTONE 471 C
3630-53 Cardinal Red	n/a	3630-131 Gold Metallic	PANTONE 873 C
3630-57 Olympic Blue	n/a	3630-133 Raspberry	PANTONE 220 C
3630-59 Dark Brown	PANTONE 4625 C	3630-136 Lime Green	PANTONE 368 C
3630-61 Slate Gray	n/a	3630-137 European Blue	PANTONE 281 C
3630-63 Rust Brown	PANTONE 483 C	3630-141 Gold Nugget	n/a
3630-68 Rose Mauve	PANTONE 190 C	3630-143 Poppy Red	n/a
3630-69 Duranodic*	PANTONE Black C	3630-146 Light Kelly Green	PANTONE 347 C
3630-71 Shadow Gray	PANTONE 409 C	3630-147 Lt. European Blue	n/a
3630-73 Dark Red	n/a	3630-149 Light Beige	PANTONE 468 C
3630-74 Kumquat Orange	PANTONE 1375 C	3630-156 Vivid Green	PANTONE 355 C
3630-75 Marigold	n/a	3630-157 Sultan Blue	PANTONE 288 C
3630-76 Holly Green	n/a	3630-167 Bright Blue	PANTONE 2945 C
3630-78 Vivid Rose	PANTONE 206 C	3630-236 Turquoise	PANTONE 3282 C
3630-83 Regal Red	PANTONE 187 C	3630-246 Teal Green	PANTONE 322 C
3630-84 Tangerine	PANTONE 151 C	3630-317 Evening Blue	PANTONE 658 C
3630-87 Royal Blue	PANTONE 274 C	3630-337 Process Blue	n/a
3630-97 Bristol Blue	PANTONE 294 C	* Films 3630-22 and 3630-69 are effectively opaque for most sign uses.	

**3M™ MCS™ Warranty**  
for Finished Graphics

Application Surface	Substrate	Decoration Method	Graphic Protection	Therm-oform	Exposure	
					Vertical	Non-Vertical
First	Panaflex	Unprinted cut film	None*	No	6	0
First	Panaflex	Unprinted cut film	3640-114 3642-114	No	9	6
First	Panagraphics III	Unprinted cut film	None*	No	6	0
First	Panagraphics III	Unprinted cut film	8519, 8520 3619, 3620	No	5	0
First	Panagraphics III	Unprinted cut film	3640-114 3642-114	No	6	0
First	Panagraphics III	Film printed with 1900 ink	1920DR	No	5	0
First	Panagraphics III	Film printed with UV 9800 ink	9800CL, 9720i 9720UV	No	5	0
First	PETG, glass	Unprinted cut film	3640-114 3642-114	No	6	0
First	PETG, glass	Unprinted cut film	3640-114 3642-114	Yes	4	0
First	PETG, glass	Film printed with 1900 ink	1920DR	No	5	4
First	PETG, glass	Film printed with UV 9800 ink	9800CL or 9720i or 9720UV	No	5	4
Second	PETG	Unprinted cut film	3640-114 or 3642-114	Yes	4	4
Second	Acrylic	Unprinted cut film	None	No	6	4
Second	Acrylic	Unprinted cut film	None	Yes	4	4
Second	Non-solar grade polycarbonate	Unprinted cut film	None	No	6	4
Second	Non-solar grade polycarbonate	Unprinted cut film	None	Yes	4	4
Second	Solar grade polycarbonate	Unprinted cut film	None	No	9	6
Second	Solar grade polycarbonate	Unprinted cut film	None	Yes	6	6

Note: Although the durability of these constructions are warranted without graphic protection in a vertical orientation, 3M strongly recommends using graphic protection to keep the graphic looking good even when subjected to roof run-off.

**3M™ MCS™ Warranty**  
for Desert Southwest

Use the following formula to determine the Desert Southwest Warranty for your construction based on the durability given in the table above. A map of the US Desert Southwest is available at [3Mgraphics.com](http://3Mgraphics.com) under Warranties.

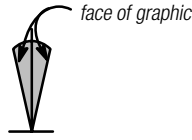
Durability x 70% (0.7).

Example: 9 (years) x 0.7 = 6.3 years  
6 (years) x 0.7 = 4.2 years

# Warranty Details and General Exceptions

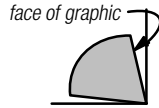
## Definitions

### Vertical Exposure



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

### Non-vertical Exposure



The face of the graphic is greater than  $10^\circ$  from vertical and greater than  $5^\circ$  from horizontal.

### Desert Southwest

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.

## 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

## Application Outside the U.S.

Contact the 3M organization for that country.

## Graphics Made with Components Not Sold or Recommended by 3M

The 3M™ MCS™ Warranty does not cover finished graphics made with other manufacturers' inks, film, flexible substrate, graphic protection and/or application tapes. The user is solely responsible for the graphic appearance, performance and durability of graphic constructions that include non-3M graphic products.

## Application to Glass

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

## Graphic Protection

Graphic protection is required to obtain a warranty when using this film on an awning. The graphic protection helps protect the graphic from roof run off and improves performance and appearance.

Overlaminates must be cold roll applied.

## 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 or implied warranty arising out of a course of dealing, custom or usage of trade: 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. 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 damages, including any labor or non-3M materials charges.**

See the *3M Graphics Market Center Warranty Brochure* at [3Mgraphics.com](http://3Mgraphics.com), which gives the terms, additional limitations of the warranty, if any, and limitations of liability.

## Backlit Signs Require Special Consideration

Clear and translucent films tend to be more sensitive to shrinkage due to high total ink coverage. Film that is not sufficiently dried prior to creating an overlap may shrink and result in a light leak. Rather than increasing the total ink coverage to increase the density of the backlit image, we recommend printing two layers of film at lower ink levels. Refer to Instruction Bulletin 4.26 for details and construction options.

Backlighting any film, no matter how it is imaged, reduces the density of the colors on the image.



### CAUTION

Before using any equipment, always read the manufacturer's instructions for safe operation.

## Screen Printing

Refer to the 3M Related Literature section for a list of the Product and Instruction Bulletins that may be needed to make a graphic.

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

Graphic protection can improve the appearance, performance and durability of your graphic. A clear coat also prevents chalking on unprinted films.

Whether you apply screen print clears with traditional screening methods or roller coating, use equipment designed to handle high viscosity materials and make sure the coating is evenly applied to the specifications in the clear's Instruction Bulletin.

## Construction Options

### Important Note!

A third layer of film on any one surface is warranted *only* if the top layer is overlaminated 3640GPS or 3642GPS and no more than two layers of any film are even with the edges of the substrate. Therefore:

FIGURE 1  
Three Film Layer Constructions

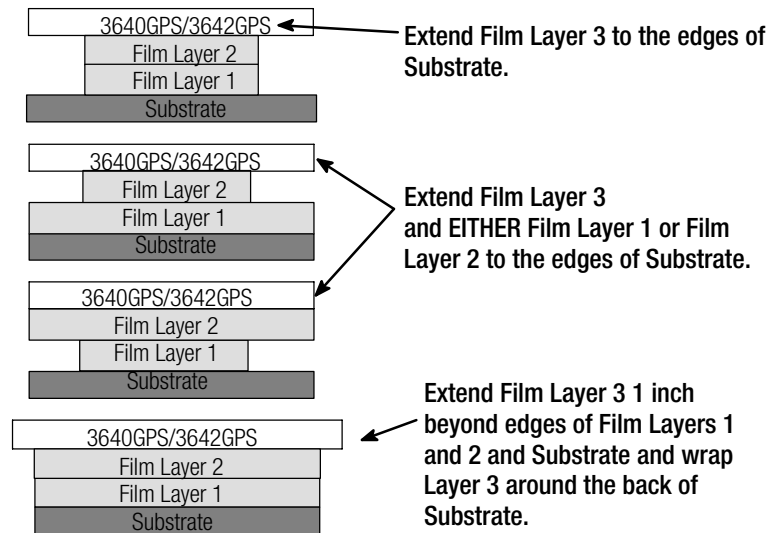
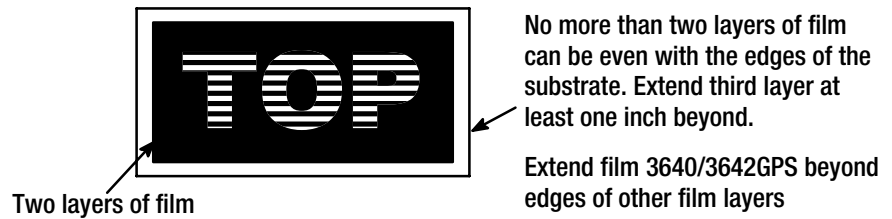


FIGURE 2  
Color By Day/White By Night  
Visual Example



FIGURE 3  
Color By Day/White By Night  
Construction  
Three film layers



## Thermoforming

Refer to Instruction Bulletin 5.16 for detailed information.



### CAUTION

Film series 3630 emits vapors during the thermoforming process. Be sure to read and follow the information contained in the Material Safety Data Sheet (MSDS), the box label, and the Instruction Bulletin 5.16 before thermoforming.

## Channel Letter Faces

When using film series 3630 on rigid plastic channel letter faces, avoid contact with the adhesive used to attach the trim cap edge. These adhesives attack film series 3630 and cause curling, lifting and premature failure of the film.

## Spray Painting

Film series 3630 can be spray painted with Grip-Flex™ or Lacryl™ diffuser paints with good performance. However, the performance or application of the paints is not warranted.

## Cutting

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

For individual pieces, use one of these cutting methods.

- Hand cut
- Die cut
- Kiss cut
- Electronic cutter

For multiple pieces, use one of these cutting methods.

- Guillotine
- Die cut

## Minimum Cutting Heights

Based on cutting and weeding evaluations that used Helvetica medium upper case, the recommended minimum cutting height for text is 1 inch (2.54 cm). Because of the differences in electronically-controlled cutting equipment and font characteristics, users should determine their own cutting and weeding capability.

For inside and outside corners of cut out letters and symbols, and the pointed end of stripes, cut the largest radius consistent with an acceptable appearance. This technique helps avoid stress cracking due to age, and lifting of pointed ends during maintenance.

## Factors that Affect Cutting Quality and Ability

- Sharpness of the knife blade. Dull blades create a serrated look to the cut edge of the film scores the liner. Too little weight does not cut completely through the film and the adhesive. Excessive weight cuts the liner. It also causes the blade to drag, accelerating wear and eventually creating a serrated cut edge on the film.
- Temperature and relative humidity are minor considerations, but avoid extreme or rapidly fluctuating conditions.
- Store the film in the same environment as the cutting equipment.
- Consider the stroke width of characters, style of serifs or extensions, and small details of scanned or digitized artwork.
- The minimum recommended stroke width is 0.040 inch (1.0 mm) when film is exposed to cleaning or other physical stress

## Application Tapes

### When to Use Premasking Tape

- As an application aid to increase stiffness, and prevent stretching and damage during application.

### 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.

### How to Select a Tape

Determine whether you want to premask the graphic or prespace film elements. Then locate the graphic protection on your graphic in the table below, and use the corresponding tape. See Instruction Bulletin 4.3 for complete details.

**EXAMPLE:** If the film has no graphic protection and you want to premask the film, use premasking tape SCPM-3.

#### Graphic Protection

Refer to the Warranty table to determine what graphic protection is approved for your graphic construction.

Tape	Graphic Protection			
	Unprinted	3640GPS 3642GPS 8519,8520 3619,3620	1920DR Ink Series 1900	9800CL 9720i 9720UV UV Ink Series 9800
Premasking SCPM-3	■	■	■	
Prespacing SCPS-2	■	■	■	
Premasking SCPM-44X				■
Prespacing SCPS-53X				■

## Application

For application by hand, the detergent and water application method is recommended. Dry application by hand may leave some dark streaks or bubbles that could be visible in transmitted light.

For roll application, the dry method is acceptable.

## 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.)

Refer to Instruction Bulletin 6.5 for general maintenance and cleaning information.

## Shelf Life, Storage and Shipping

<b>Shelf Life</b>	<b>Total shelf life: 3 years</b> from the date of manufacture on the original box. Up to 3 years unprocessed, <b>OR</b> process within 2 years <b>and</b> then apply within 1 year of processing.
<b>Storage Conditions</b>	<ul style="list-style-type: none"> <li>• 40° to 100°F (4° to 38°C)</li> <li>• Out of sunlight</li> <li>• Clean dry area</li> <li>• Original container</li> <li>• Bring the film to print room temperature before using</li> </ul>
<b>Shipping Finished Graphics</b>	Flat, or rolled printed side out on 5 inch (13 cm) or larger core. This helps prevent the liner and, if used, the application tape from popping off.

## 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 go to [3M.com/MSDS](http://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.

## 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](http://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.

Subject	Type	Bulletin No.
3M™ Screen Printing Ink Series 1900 and Overprint Clear V10402	PB	1900
<ul style="list-style-type: none"> <li>• Screen printing with ink series 1900 - line color</li> <li>- 4-color</li> </ul>	IB	3.12 3.11
3M™ Screen Printing UV Ink Series 9800	PB	9800
<ul style="list-style-type: none"> <li>• Screen printing with UV ink series 9800 - line color</li> <li>- 4-color</li> </ul>	IB	3.20 3.21
3M Graphic Protection Products <i>overview of all graphic protection products and specific information on most overlaminates</i>	PB	GP-1
3M™ Screen Print Gloss Clear 1920DR	PB	1900
- Applying screen printing clear 1920DR	IB	3.12
3M™ Screen Print UV Clears 9720i, 9720UV, 9730UV	PB-IB	Clears 9720
3M™ Panaflex™ Awning and Sign Facing 945GPS	PB	945
3M™ Panagraphics™ III Wide-Width Flexible Substrate	PB	P3
- Application of 3M pressure sensitive films to Panagraphics substrate	IB	5.30
3M Light Management Films	PB	3635
-3M™ Blockout Films 3635-20B, 3635-22B		
-3M™ Diffuser Films 3635-30, 3635-70		
-3M™ Day/Night Films 3635-91		
Cold roll lamination	IB	4.22

Subject	Type	Bulletin No.
Scoring and cutting	IB	4.1
Using 3M application tapes; premasking and prespacing for films	IB	4.3
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 and cut graphics	IB	5.7
Application, special applications and vehicles	IB	5.4
Storage, handling, maintenance, removal	IB	6.5
Performance Guarantee Printer Matrix	PB	PG Matrix
3M Graphics Center Warranty Brochure	go to <a href="http://www.3Mgraphics.com">www.3Mgraphics.com</a> , Warranties	

## Warranties

*3M, MCS, Panaflex, Panagraphics and Scotchcal are trademarks of 3M Company.  
Grip-Flex is a trademark of AKZO Wyandotte; Lacryl is a trademark of Spraylat Corporation.*

## Bulletin Change Summary

Added clears 3619 and 3620 for certain constructions. Upgraded format and warranty details. Changed Panagraphics II substrate to the newer Panagraphics III substrate. Added application limitation about thermoforming before weeding, especially with some red films. Increase storage life from 2 years to 3 years.



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