



Scotchcal™

Perforated Window Graphic Film 8171

Description

3M™ Scotchcal™ Perforated Window Graphic Film 8171 has a 50 percent perforation pattern that allows a full, screen printed image to be seen on the outside while allowing viewing through the window from the inside. This removable first surface film is designed for architectural and vehicle windows and is recommended for use where restricted viewing regulations are enforced.

Advantages

- Exterior, short term durability
- High gloss, vinyl film

Applications and Uses

Film 8171 is intended for making removable window graphics only for use with the listed Compatible Products and the following applications. Any other application is NOT warranted by 3M or covered by the worldwide 3M™ MCS™ Warranty unless 3M gives its prior written approval for the application.

- For making screen printed Scotchprint® Graphics for store windows
- May be applied over 3M vinyl films or painted metal between windows

Limitations of Uses

The following uses and applications are specifically NOT warranted:

- The use of products or procedures not specifically recommended by 3M for use with this film

Architectural Windows

- Applications other than vertical window surfaces
- Application to windows that have built-in heating or defrosting elements
- Application to substrates with coatings such as anti-reflection and scratch resistance; such coatings may be damaged during film removal

Note: 3M™ Scotchcal™ Perforated Window Graphic Film 8174-10, which has less light transmission than film 8171, may be a suitable alternative when greater image density is desired.

Vehicle Windows

- 3M Commercial Graphics Division policy is not to support applications of perforated window graphic film when a driver's view is obstructed and/or where local laws prohibit its use. Therefore, we do not recommend this film on regulated vehicle or delivery truck windows.

Caution

Some states have laws or regulations requiring minimum light transmission that may limit or preclude the use of this product on vehicle windows. The user is responsible for determining and complying with all applicable standards.

- Application to windows that have built-in heating or defrosting elements or windshield wipers
- Application to windows that crank or roll down.
- Application to substrates with coatings such as anti-reflection and scratch resistance; such coatings may be damaged during film removal
- Applications that require an optically clear view but have not been laminated with overlamine 8914 ES

Warning

Applications that require an optically-clear view, such as vehicle window exteriors, must be laminated with overlamine 8914 ES. Failure to apply this overlamine could result in obstructed or impaired viewing when the product becomes wet.

- Graphics made for automotive Original Equipment Manufacturers (OEM); contact 3M Automotive Division at 1-800-328-1684, Ext. 444, for alternatives.

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

Compatible Products

- 3M™ Screen Printing Ink Series 1900 (line color and four color)
- 3M™ Screen Printing Ink Series 9700UV (line color and four color)
- 3M™ Scotchcal™ Optically Clear Overlamine 8914 ES
This overlamine provides optical clarity as well as graphic protection from environmental factors such as dust water and dirt that may collect in the perforations.
- Screen print clears for ink protection only; they do not protect from dust, water or dirt:
 - 3M™ Screen Print Gloss Clear 1920DR
 - 3M™ Screen Print Gloss Clear 9720UV
 - 3M™ Screen Print Low Gloss Clear 9730UV
- 3M™ Edge Sealer 3950
- 3M™ Premask Tape SCPM-44X

Characteristics

This information is subject to change.


Property	Description
Film	Vinyl, cast, with 50% perforation pattern
Color	White on the image side, black on the reverse side
Film thickness	4 mils (0.10 mm) <i>without adhesive</i> 5–6 mils (0.13–0.15 mm) <i>with adhesive</i>
Liner	Polyethylene-coated paper with a clear film backing
Adhesive	Pressure sensitive, removable, clear
Application substrates	Transparent acrylic, glass, polycarbonate, 3M vinyl films, painted metal between vehicle windows
Removability	Up to 1 year on glass, acrylic, polycarbonate
Application temperature range (air and surface)	40° to 100°F (4° to 38°C)

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 3M recommendations, they should have the performance life shown in the chart below. The actual performance depends on the:

- Correct combination of film, ink, and laminate or screen print clear
- Ink formulation
- Drying methods
- Selection and preparation of the substrate
- Application methods
- Exposure conditions
- Cleaning methods

Warranted Durability

Construction	 Vertical Exposure <i>face of graphic is ± 10° from vertical</i>			
	Fleet Graphics ¹ years	Exterior Signs ^{1, 3} years		Interior Signs ³ years
Film 8674–10 and one of the following:	US	US	DSW ²	
	Screen printed with ink series 1900 and protected with one of the following:			
8914 ES ⁴	1	2	1	5
1920DR	1	2	1	5
Screen printed with ink series 9700UV and protected with one of the following:				
8914 ES ⁴	1	2	1	5
9720UV	1	2	1	5
9730UV	1	2	1	5
None	0	0	0	2

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.

³ Removability is warranted for only one year.

⁴ Required when optically-clear application is needed.

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

Screen Printing

To obtain the Warranted Durability, use the correct combination of ink and screen print clear. If you are using an overlaminate, an screen print clear is not required.

Follow the processing instructions carefully. Check the ink Product Bulletins and Instruction Bulletins for limitations specific to a particular ink.

Refer to Compatible Products on page 1 for the appropriate inks.

Print a test sample. The image may appear lighter when it is printed on perforated film. Increasing the color density may make up for some image loss. Images printed on this film may not hold the same level of fine detail as on solid films.

Because film 8171 is perforated, some of the ink from the fill pass does not transfer to the film. To maintain a good image, it may be necessary to print a paper slip sheet after every 10 to 15 impressions. The clear film on the back of the liner helps maintain a vacuum and prevents the ink from getting onto the bed of the press.

Lamination

For maximum protection and/or for applications that require an optically-clear view, use overlamine 8914 ES. Apply with a cold roll laminator. See Instruction Bulletin 4.22.

Cutting

Common cutting methods are:

- Cold steel rule die
- Razor blade
- Sharp knife

Application Tapes

3M application tape may help with the application of a graphic. The tape used depends on the type of graphic produced and the screen print clear or overlaminate that is used. Graphics that have large amounts of exposed liner or are kiss cut use a prespacing application tape. If there is very little exposed liner, use a premasking application tape.

Screen Print Clear or Overlaminate	Premasking Tape	Prespacing Tape
Unprinted	SCPM-3	SCPS-2
1920 DR	SCPM-19	SCPM-19
9720 UV 9730 UV 9700 UV ink with no overprint	SCPM-44X	SCPS-53X
8914 ES	Do not use	

Application

Refer to the 3M Related Literature section for the appropriate application Instruction Bulletins. The following application details are specific to film 8171.

Note: Instruction Bulletin 5.23 is no longer available.

Please see the most recent release of Instruction Bulletins 5.4 and 5.5 for application information and Instruction Bulletin 6.5 for maintenance and removal information.

1. If the perforated film is applied to the painted metal surfaces between windows, the image may not look consistent. To maintain a consistent image, an opaque 3M vinyl film may be applied to the surfaces between windows before the perforated film is applied. The color of vinyl film used depends on the image you want.
2. Always use a dry application method. Refer to Instruction Bulletin 5.5, *General Procedures for Interior and Exterior Dry Applications*.
3. Do not apply graphics if the air or surface temperature is less than 40° F (4°C).
4. During application do not stretch the material into the window well or onto the window itself. Cut the film to the shape of the window before squeegeeing it down onto the window. To do this, tack down the graphic in the center of the window, cut the graphic to the shape of the window, then squeegee the graphic out to the window edges. Stretching the window graphic causes tension that can result in the graphic shrinking and its edges curling.
5. Do not use a heat source directly on the window substrate. This can also cause the graphic to shrink and its edges to curl.
6. Trim the film and the overlaminate away from all window edges 1/8 inch to 1/4 inch. This minimizes the chance of the graphic absorbing water that may collect in the window edge. It also eliminates the need for edge sealing on full window coverages.

Application continued on the next page.

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

Application continued from the previous page.

7. Do not apply the window graphic film, or any other film, to the rubber parts on the buses as the film will not remain adhered.
8. If two graphic panels meet side by side on a window, carefully trim the film so that the panels meet and form a butt seam. Do not overlap the panels.
9. When possible, do any trimming before applying the film. Cutting the film after applying it may permanently scratch the application substrate.

Edge Sealing

When film 8171 is overlaminated with overlaminate 8914 ES, the finished graphic usually does not need an edge sealer. However, use edge sealer 3950 if any of the following conditions exist.

- The graphic has an intricately-cut design that does not completely cover the window.
- The graphic will be cleaned frequently by high pressure spray. See Instruction Bulletin 6.5 for more details.
- On a daily basis the graphic is exposed to changes in altitude of more than 4000 feet (1219 m).

Removal

Film 8171 is removable from glass, acrylic, and polycarbonate for up to 1 year.

Use heat to remove the graphic. Refer to Method E in Instruction Bulletin 6.5. Follow the removal instructions carefully. Substrates with coatings such as anti-reflection and scratch resistance may be damaged during removal.

Removal Temperatures

Substrate	Temperature
Glass	60° to 100°F (16° to 38°C)
Acrylic, polycarbonate	70° to 100°F (21° to 38°C)

Shelf Life, Storage, and Shipping

- Unprocessed film has a shelf life of 2 years from the date of receipt from 3M. Processed film must be used within 1 year, even if the combined shelf life as processed and unprocessed film is less than 2 years.
- Store the graphics in a clean, dry area, out of direct sunlight, and at a temperature less than 100°F (38°C).
- Be sure the ink and screen print clear are dry before packaging the finished graphic.
- Ship the finished graphic lying flat or in a roll. To roll the graphic, wrap it film side out on a minimum 6 inch (152 mm) diameter core. These methods help prevent the liner and premask from wrinkling or 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:

- 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

These properties are for film 8171 only.

Property	Value
Tensile strength (minimum)	4.2 pounds/inch (0.74 kg/cm)
Service temperature range	-30° to 150°F (-34° to 65°C)

Flammability

Film 8171 has been tested for flame spread per ASTM E84-91a, "Surface Burning Characteristics of Building Materials," and the results show that the material meets the requirements of National Fire Protection Association Class A as defined in NFPA 101, "Life Safety Code. "

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: Film 8171 is warranted to be free of defects in materials and manufacture and to perform as 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 effective performance life. See the worldwide 3M™ MCS™ Warranty for detailed warranty information.

This is the exclusive remedy; in no case shall 3M be liable for any direct, indirect, or consequential damages, including any labor or non-3M material charges.

3M Related Literature

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	2501
3M™ Screen Printing Ink Series 9700UV	9700	2507
3M™ Scotchcal™ Optically Clear Overlamine 8914 ES	8914	3542
Instruction Bulletins		
Design of graphics	2.1	5501
Screen printing with ink series 1900		
- 4-color	3.11	6011
- line color	3.12	6012
Screen printing with ink series 9700UV		
- line color	3.4	6004
- 4-color	3.13	6013

Subject	Bulletin No.	FOD No.
Scoring and cutting	4.1	6501
Using 3M application tapes;premasking and prespacing for films and sheetings	4.3	6503
Application, substrate selection, preparation and substrate-specific application techniques	5.1	7001
Application, special applications and vehicles	5.4	7004
Storage, handling, maintenance, removal	6.5	8505

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Patent Acknowledgement

Scotchcal perforated window graphic film 8171 is licensed from Contra Vision Group under U.S. Patent No. 4,673,609 (and 15 corresponding patents worldwide in the following countries: Australia, Austria, Bahrain, Belgium, Canada, Cyprus, France, Germany, Hong Kong, Italy, Liechtenstein, Malaysia, Netherlands, Singapore, Spain, Sweden, Switzerland, and U.K.).

Bulletin Change Summary

Added reminder that perforated window graphics films must be applied using a dry application method.



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