



Light Management Films

3M™ Blockout Films 3635-20b, 3635-22b

3M™ Diffuser Films 3635-30, 3635-70

3M™ Day/Night Films 3635-91

Description

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

Note: Additional light management films currently include 3M™ Light Enhancement Film 3635-100 and 3M™ Dual-Color Film 3635-200. Please refer to their respective product bulletins for details.

Product Replacement Note

3M™ Screen Printing Ink Series 1900 replaces Ink Series 3900.

Applications and Uses

These films are intended for use as specified in each of the Product Line sections in this Bulletin. Any other applications are NOT warranted by 3M or covered by the worldwide 3M™ MCS™ Warranty unless 3M gives its prior written approval for the application.

- **3M™ Blockout Films 3635-20b and 3635-22b**
To block out light when applied to internally-illuminated signs
- **3M™ Diffuser Films 3635-30 and 3635-70**
To provide light diffusion on internally-illuminated signs; may be thermoformed
- **3M™ Day/Night Film 3635-91**
To produce the appearance of dark graphics during the day, and white or colored graphics at night on internally-illuminated signs

Limitations of Uses

We do not normally warrant other applications, but please contact us to discuss your needs or let us suggest other 3M products.

Specifically, we do not warrant this film for the following:

- Screen printing blockout film 3635-20b (white) and 3635-22b (black) with 3M™ Screen Printing Ink Series 9700UV
- Screen printing on diffuser films 3635-30 or 3635-70, or day/night film 3635-91
- Application of diffuser films 3635-30 or 3635-70 to a first surface unless this film is completely covered by another layer of UV-resistant film
- Graphics for automotive Original Equipment Manufacturers (OEM); 3M Commercial Graphics Division products are not tested against automotive manufacturers' specifications.

Product Line

Blockout Film 3635-20b and 3635-22b

| Property | Description |
|---------------------------------|---|
| Film 3635-20b | <ul style="list-style-type: none"> • Uniformly white on face side with a matte surface • Uniformly black on adhesive side |
| Film 3635-22b | <ul style="list-style-type: none"> • Uniformly black on face side with a matte surface • Uniformly white on adhesive side |
| Adhesive type | Pressure sensitive |
| Adhesive color | Clear |
| Minimum application temperature | 60°F (16°C) |
| Liner | 78 pound, white kraft paper |
| Application surfaces | First or second surface, except not for use on second surface of 3M™ Panaflex™ Awning and Sign Facing 945GPS |
| Application substrates | Panaflex products listed above; flat acrylic, polycarbonate, PETG (glycol-modified polyethylene terephthalate) |
| Compatible inks | Films 3635-20b and 3635-22b 3M™ Screen Printing Ink Series 1900 (opaque inks only) |

3M™ Diffuser Film 3635-30 and 3635-70

| Property | Description |
|---------------------------------|---|
| Film 3635-30 | <ul style="list-style-type: none"> • Provides 30% light transmission • White, uniform in both reflective and transmitted light |
| Film 3635-70 | <ul style="list-style-type: none"> • Provides 60% light transmission • White, uniform in both reflective and transmitted light |
| Adhesive type | Pressure sensitive |
| Adhesive color | Clear |
| Minimum application temperature | 60°F (16°C) |
| Liner | 78 pound, white kraft paper |
| Application surfaces | <ul style="list-style-type: none"> • First surface application if it is completely covered by another layer of UV-resistant film • Second surface applications without adding another film, except not for use on 3M™ Panaflex™ Awning and Sign Facing 945GPS |
| Application substrates | <ul style="list-style-type: none"> • Flat acrylic, polycarbonate, PETG (glycol-modified polyethylene terephthalate) • May be thermoformed under well-controlled conditions. See Instruction Bulletin 5.16. |
| Compatible inks | Cannot be screen printed |

3M™ Day/Night Film 3635-91

| Property | Description |
|---------------------------------|--|
| Film 3635-91 | Smoke gray color |
| Adhesive type | Pressure sensitive |
| Adhesive color | Clear |
| Minimum application temperature | 60°F (16°C) |
| Liner | 78 pound, white kraft paper |
| Application surfaces | First or second surface, except not for use on second surface of Panaflex awning and sign facing 945GPS |
| Application substrates | Panaflex products listed above; flat acrylic, polycarbonate, PETG (glycol-modified polyethylene terephthalate) |
| Compatible inks | Cannot be screen printed |

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

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

- If screen printed, the correct combination of film and ink, ink formulation, and ink drying methods
- Selection and preparation of the substrate
- Application methods
- Cleaning methods
- Exposure conditions

Warranted Durability

| | Vertical Exposure <i>face of graphic is vertical ± 10°</i> | | Non-vertical Exposure <i>face of graphic is more than 10° from vertical</i> | |
|--|---|----------------------------|--|----------------------------|
| | U.S. ¹ years | S.W. ² years | U.S. ¹ years | S.W. ² years |
| Light Management Films | | | | |
| First surface, unprinted | | | | |
| 3635-20b | 5 | 4 | 0 | 0 |
| 3635-22b | 5 | 4 | 0 | 0 |
| 3635-91 | 4 | 3 | 0 | 0 |
| 3635-20b overlaminated with 3640/3642-114GPS | 9 | 6 | 6 | 4 |
| 3635-22b overlaminated with 3640/3642-114GPS | 9 | 6 | 6 | 4 |
| 3635-91 overlaminated with 3640/3642-114GPS | 7 | 5 | 4 | 3 |
| Second surface, unprinted | | | | |
| 3635-30 ³ | 5 | 5 | 0 | 0 |
| 3635-70 ³ | 5 | 5 | 0 | 0 |
| First surface covered completely by another layer of UV-resistant film or second surface, thermoformed | | | | |
| 3635-30 ³ | 4 | 2 | 0 | 0 |
| 3635-70 ³ | 3 | 2 | 0 | 0 |
| First surface, printed with screen printing ink series 3900 | | | | |
| 3635-20b or -22b with overprint clear 3920 | 5 | 4 | 4 | 3 |
| 3635-20b or -22b overlaminated with 3640/3642-114GPS | 9 | 6 | 6 | 4 |

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 If the diffuser film is completely covered by a UV-resistant Scotchcal translucent film, the warranty for a first surface application on flexible substrates is the same as the translucent film.

Fabrication

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

Application Tape

The type of application tape to use depends on the type of graphic produced and the ink or overprint clear that was applied last.

- Use prespacing tape SCPS-2 or SCPS-53X if the graphic has large amounts of the liner exposed.
- Use premasking tape SCPM-3 or SCPM-44X if very little of the liner is exposed.

| Ink ¹ | Prespacing Tape | Premasking Tape |
|--|-----------------|-----------------|
| Unprinted films 3635-20b, 3635-22b, 3635-30, 3635-70, 3635-91 | SCPS-2 | SCPM-3 |
| Ink series 1900 | SCPS-2 | SCPM-3 |

¹ Films 3635-30, -70, and -91 cannot be screen printed.

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

Chemical and Physical Properties

The values given are typical for undecorated (as purchased) film. For a custom specification, contact your 3M sales representative.

Physical Properties

| Property | Film 3635-20b, -22b | | Film 3635-30, -70 | | Film 3635-91 | |
|-------------------------------|-----------------------|-------------------|--|-------------------|-----------------------|-------------------|
| | English Units | Metric Units | English Units | Metric Units | English Units | Metric Units |
| Thickness (film and adhesive) | 0.004 to 0.005 inch | 0.10 to 0.13 mm | 0.003 to 0.004 inch | 0.08 to 0.10 mm | 0.003 to 0.004 inch | 0.08 to 0.10 mm |
| Tensile strength (minimum) | 5 pounds/inch at 73°F | 0.9 kg/cm at 23°C | 5 pounds/inch at 73°F | 0.9 kg/cm at 23°C | 5 pounds/inch at 73°F | 0.9 kg/cm at 23°C |
| Service temperature range | -65° to +225°F | -60° to +107°C | -20° to +175°F | -29° to +80°C | -20° to +175°F | -29° to +80°C |
| Applied shrinkage | 0.015 inch | 0.4 mm | 0.015 inch | 0.4 mm | 0.015 inch | 0.4 mm |
| Light transmission | less than 0.001% | | Nominal 30% for 3635-30 Nominal 60% for 3635-70 | | Nominal at 47% | |

Adhesion

The adhesion to acrylic panels and to the first surface of the following products is 3 pounds/inch (0.5 kg/cm) for all film series 3635.

- Panaflex awning and sign facing 945GPS
- Panaflex *enhanced image* sign facing 645EI

Chemical Resistance Characteristics

- Resists mild alkalis, mild acids, and salt.
- Excellent resistance to water.

Shelf Life, Shipping, and Storage

- Unprocessed films have a shelf life of 2 years after receipt from 3M. Processed film has a shelf life of 1 year. However, the total shelf life of a graphic before and after processing cannot exceed 2 years.
- Store the film in a clean, dry area in the original container.
- Store the film out of the direct sunlight and at less than 100°F (38°C).
- Ship the finished graphic lying flat or roll the graphic. Roll the graphic, film side out, onto a core that is 6 inches (15 cm) or larger in diameter. These methods help prevent the film and premasking from wrinkling or popping off the liner.

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.

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: 3M™ Blockout Films 3635-20b, 3635-22b, 3M™ Diffuser Films 3635-30, 3635-70, 3M™ Day/Night Films 3635-91 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 bulletin, 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.

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



Commercial Graphics Division
3M Center, Building 220-6W-06
PO Box 33220
St. Paul, MN 55133-3220 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: 3010
www.scotchprint.com

3M Canada
P.O. Box 5757
London, Ontario
Canada N6A 4T1
1-800-265-1840
Fax 519-452-6245

3M México, S.A. de C.V.
Av. Santa Fe No. 55
Col. Santa Fe, Del. Alvaro Obregón
México, D.F. 01210
52-55-52-70-04-00
Fax 52-55-52-70-22-77

3M Puerto Rico, Inc.
Puerto Rico Industrial Park
P.O. Box 100
Carolina, PR 00986-0100
787-620-3000
Fax 787-750-3035

| Subject | Bulletin No. | FOD No. |
|--|--------------|---------|
| Product Bulletins | | |
| 3M™ Panaflex™ Enhanced Image Sign Facing 645EI | 645 | 4001 |
| 3M™ Panaflex™ Awning and Sign Facing 945GPS | 945 | 4006 |
| 3M™ Screen Printing Ink Series 1900 and Overprint Clear VI0402 | 1900 | 2501 |
| Instruction Bulletins | | |
| Design of graphics | 2.1 | 5501 |
| Screen printing with ink series 1900 | 3.11 | 6011 |
| 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 |
| Application, wet method for translucent screen printed, thermal mass transfer and cut graphics | 5.7 | 7007 |
| Thermoforming | 5.16 | 7016 |
| Storage, handling, maintenance, removal | 6.5 | 8505 |
| Warranties | | |
| Worldwide 3M™ MCS™ Warranty Packet (includes all Commercial Graphics MCS Warranties) | | 9503 |
| Worldwide 3M™ MCS™ Warranty Overview-Folder | | 9504 |
| 3M Scotchprint® Graphics Warranty (includes overview) | | 9505 |
| 3M™ MCS™ Graphics Warranty for Fleet Vehicle Applications (includes overview) | | 9506 |

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