



Light Enhancement Film 3635-100

Note: The only change to Release C of this bulletin is the removal of one bullet under Warranted Durability.

Description

How 3M™ Light Enhancement Film Increases Sign Luminance

A light box or channel letter contains lighting elements that illuminate the front sign face and transmit some light to the viewer. However, much of the illumination is reflected or absorbed by other materials in the light box.

The white sign face materials typically used in cabinets transmit only about 25% to 30% (B) of the light that strikes them (A). The white face material can absorb as much as 15% of the light and reflects the remaining light (C) back into the cabinet. Light from the rear of the light source and light that is reflected back into the cabinet strikes the cabinet sides and back (D). Some of this light is reflected and some of it is absorbed.

Key

- A Available light
- B Transmitted light
- C Lost (reflected) light
- D Lost (absorbed/reflected) light

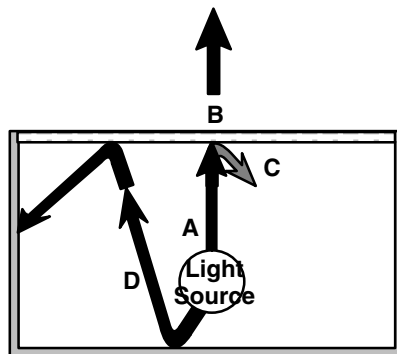


Figure 1. Example of Light Lost in a Cabinet

When efficient reflective material is put on the sides and back of the light box, more light is reflected to the front face for increased illumination. Film 3635-100, which has very low light absorption, is more efficient than most reflective materials including ordinary mirrors. In addition, the diffuse reflective properties of the film help spread light instead of focusing it like a mirror. This feature eliminates hot spots.

Important Note

The light enhancing characteristics of film 3635-100 will be minimized if dark colored rigid plastic faces are used. This is due to the very high rate of light absorption and low rate of reflectivity of such faces. We recommend testing the faces before reducing the number of lighting components.

Advantages

- Matte white diffuse reflective surface (patents applied for)
- Reduces hot spots
- 94% plus reflectivity increases light output for greater sign luminance
- Low light absorption increases efficiency
- Protective top covering for clean fabrication
- 5.5 mil construction for easy handling
- Permanent, pressure sensitive adhesive

Optimal Graphic Constructions

Light enhancement film 3635-100 is most efficient when the total face is 10 to 35% transmissive and a low rate of absorption. The following constructions are examples that fall within this range; other constructions may be possible.

Option 1

- Clear acrylic sheeting,
- 3M™ Diffuser Film 3635-30 OR
- 3M™ Scotchcal™ Translucent Film 3630-20 (as a diffuser film),
- 3M™ Scotchcal™ Translucent Film Series 3630.

Option 2

- White plastic sheeting No. 7328, and
- 3M™ Scotchcal™ Translucent Film Series 3630.

Option 3

- 3M™ Panaflex™ Awning and Sign Facing 930 or 945 GPS, and
- 3M™ Scotchcal™ Translucent Film Series 3630, OR
- 3M™ Panaflex™ Paint on Paper 830 GPS, OR
- 3M Scotchprint® Graphics electrostatic imaging.

Application and Uses

Film 3635-100 is intended for covering all interior opaque surfaces within single-sided, internally illuminated cabinets in the following applications. These applications are warranted by the 3M™ MCS™ Warranty.

- Exterior and interior uses, such as:
 - Signs and light boxes
 - Channel letters
 - POP or trade show displays
 - Posters and informational graphics light boxes
 - Transit shelter advertising boxes
 - Menu boards display boxes
 - Vending or dispensing machines
 - ATM's

Limitations of End 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:

- Use as a graphic marking film for electronic cutting, screen printing or other decoration method.
- Application to substrates with low surface energy coatings or paints with components such as silicone.

Characteristics

This information, which is for 3M™ Light Enhancement Film 3635-100, is subject to change. Refer to the Fax-on-Demand Index to make sure this is the most current Product Bulletin.

Property	Description
Film	5.5 mil, matte white
Thickness film and adhesive	0.0055 to 0.0065 inch (0.140 to 0.165 mm)
film, adhesive and protective top covering	0.0085 to 0.0095 inch (0.216 to 0.241 mm)
Adhesive	Clear, pressure sensitive
Adhesive liner	78 pound white kraft paper
Protective covering	Blue polyethylene
Application surface	Light box interiors
Application substrates	<ul style="list-style-type: none">• Bare aluminum• Galvanized sheet metal• Painted metal• Rigid plastics ¹
Minimum application temperature	40°F (4.5°C) <i>air, film, and substrate</i>
Removability	Permanent, not removable

¹ Film 3635-100 typically adheres to solar-grade polycarbonate substrate. However, some lots of this substrate may inhibit the adhesion of this film. Contact 3M Commercial Graphics Technical Service if you have difficulty with this combination. See Instruction Bulletin 5.7 for additional information.

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

Effective Performance Life

The effective performance life of film 3635-100 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 stated below. The actual performance depends on the:

- Selection and preparation of the substrate
- Application methods
- Cleaning and maintenance methods
- Exposure conditions
- Cabinet design and maintenance
- Lamp selection and intensity

Warranted Durability

Film 3635-100 is warranted for 5 years for its intended purpose in the interior of a lighted cabinet with these conditions:

- The cabinet interior must have a functioning drain system for water elimination.
- The cabinet must be designed to all local codes for electrical, structural and other hazard prevention.

Warranty Exceptions

- Film exposed to abrasive washing conditions, harsh cleaners, or chemicals.
- Film exposed to too high a temperature in application.
- Film exposed to light sources that are placed too close.
- Use as a graphic marking film for electronic cutting, screen printing or other decorating method.
- Application substrates with low surface energy coatings or paints with components such as silicones.

Application

Film 3635-100 can be applied by hand or automated roll lamination. Refer to the Instruction Bulletins listed in the 3M Related Literature section, located at the end of this bulletin, for more complete information.

Before using this film to retrofit existing cabinets or channel letters, clean the components to remove dirt and corrosion.

Temperature

The minimum application temperature for film 3635-100 is 40°F (4.5°C). The air, film, and substrate must be at or above this temperature for a successful application.

Fabrication

All interior surfaces, except the front sign face, should be covered with film 3635-100. Refer to Instruction Bulletin 2.4 for details.


Cutting

The following are common cutting methods for 3M™ Light Enhancement Film 3635-100. See Instruction Bulletin 4.1 for details.

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

Thermoforming

See details in Instruction Bulletin 5.16. Refer to the 3M Related Literature section for further information.

 Caution
<p>Light enhancement film 3635-100 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.</p>

Finishing

- Film 3635-100 tents around rivets, corrugations and sharp angles. This does not inhibit the performance of light reflection efficiency.
- This film performs effectively even if the application is wrinkled, creased or bubbled.
- This film may be patched with another piece of the film if a section of it is cut, gouged or otherwise damaged. Refer to Instruction Bulletin 2.4, *Design of Cabinets for Light Boxes and Channel Letters*.

Maintenance and Cleaning

Film 3635-100 should be cleaned a minimum of once per year, and more frequently in dirty environments, to maintain peak efficiency.

Use a cleaner such as the kind used for high quality painted surfaces. The cleaner must be wet, non-abrasive, without strong solvents or alcohol. It must have a pH value between 3 and 11 (neither strongly acidic nor strongly alkaline) and contain no dyes.

Shelf Life, Shipping, and Storage

- Film 3635-100 has a shelf life of 2 years after receipt from 3M.
- Store the film in a clean dry area, in the original container, out of direct sunlight and at less than 100°F (38°C).
- Keep rolls wrapped after opening the packaging.
- Do not lay sharp or heavy objects on the film or stack unprotected rolls.
- See Instruction Bulletin 6.5, *Storage, Maintenance and Removal of Films and Sheetings*, for details. Refer to the 3M Related Literature section for further information.

Product Data

Values given are typical for film 3635-100 and are not for use in specifications. The data given below are for light enhancement film as purchased from 3M.

UL Recognition

Light enhancement film 3635-100 is UL recognized component for signs or any illuminated product.

Physical Characteristics

Property	English Units	Metric Units
Tensile strength (minimum)	10 pounds/inch at 73°F	44.4 N/25 mm at 23°C
Applied shrinkage	0.010 inch	0.254 mm
Service temperature range	-20° to +175°F	-29° to +80°C
Light reflectance	94.5% typical	

Chemical Resistance Characteristics

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

Warranty and Limited Warranty

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™ Light Enhancement Film 3635-100 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. 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 website at www.3M.com/US/graphicarts, 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: 1-651-732-1016

Subject	Bulletin No.	FOD No.
Product Bulletins		
3M™ Panaflex™ Paint on Paper Series 830 GPS	830	4003
3M™ Panaflex™ Awning and Sign Facing 930	930	4005
3M™ Panaflex™ Awning and Sign Facing 945 GPS	945	4006
3M™ Scotchcal™ Translucent Film Series 3630	3630	3009
3M™ Blockout Film 3635-30	3635	3010
Instruction Bulletins		
Design of markings	2.1	5501
Design of cabinets for light boxes and channel letters	2.4	5504
Scoring and cutting	4.1	6501
Thermoforming	5.16	7016
Storage, handling, maintenance, removal	6.5	8505
Warranties		
Worldwide 3M™ MCS™ Warranty Packet <i>(includes all Commercial Graphics MCS Warranties)</i>		9503
Worldwide 3M™ MCS™ Warranty Overview-Folder		9504



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