





3M™ Safety & Security Window Film

Safety S70 Exterior

Product Features & Benefits

- Dual purpose Exterior / Interior film
- Outstanding exterior weatherability
- Optically clear, 7 mil (180 μm) thick film
- Suitable for enhanced protection upon spontaneous glass breakage of tempered glass
- Provides shatter resistance to help protect against broken glass hazards caused by seismic activity, and other moderate force impact events
- Suggested uses: to help secure exterior facing glass such as balcony glass, balustrades, skylights, outer pane of multiple glazed units, curtain walls, oversized glass panes
- Use with 3M Impact Protection Attachment Systems to enhance glass retention

Product Performance & Technical Data

| Safety S70 Exterior |  | |  | |  | |  | |
|----------------------------------|---|---------------------|---|---------------------|---|---------------------|---|---------------------|
| | Single Pane | | Tinted | | Double Pane | | Double tinted | |
| Film | 1/4" Clear | Safety S70 Exterior | 1/4" tint | Safety S70 Exterior | Dual 1/4" clear | Safety S70 Exterior | Dual 1/4" tint | Safety S70 Exterior |
| Solar Heat Gain Coefficient | 0.82 | 0.79 | 0.63 | 0.62 | 0.70 | 0.68 | 0.51 | 0.50 |
| Visible Light Transmitted | 89% | 88% | 53% | 53% | 79% | 79% | 47% | 47% |
| Visible Light Reflected Interior | 9% | 8% | 6% | 6% | 15% | 15% | 13% | 13% |
| Visible Light Reflected Exterior | 8% | 8% | 6% | 6% | 15% | 15% | 9% | 8% |
| U Value | 1.03 | 1.02 | 1.03 | 1.02 | 0.47 | 0.47 | 0.47 | 0.47 |
| UV Block | 38% | 99.9% | NA | 99.9% | NA | 99.9% | NA | 99.9% |
| Total Solar Energy Rejected | 19% | 21% | 37% | 38% | 30% | 32% | 49% | 51% |
| Glare Reduction | NA | 0% | NA | 0% | NA | 0% | NA | 1% |
| Heat Loss Reduction | NA | 1% | NA | 0% | NA | 0% | NA | 0% |
| Solar Heat Reduction | NA | 2% | NA | 2% | NA | 3% | NA | 2% |

Film Properties* (nominal)

| Product | Film Thickness | Single or Multi-ply | Tensile Strength | Break Strength | Elongation at Break | Peel Strength | Abrasion Resistance |
|---------------------|--------------------|---------------------|------------------|----------------|---------------------|---------------|---------------------|
| Safety S70 Exterior | 7 mil (180 micron) | Single | 22,000 psi | 140 lbs/in | > 70 % | > 5 lbs/in | 5% haze increase |

*not for specification purposes

Important:

The information provided in this report is believed to be reliable; however, due to the wide variety of intervening factors, 3M does not warrant that the results will necessarily be obtained. All details concerning product specifications and terms of sale are available from 3M.



Renewable Energy Division

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Specifications - Safety and Security Window Film

Specifications for 3M Safety S70 Exterior

1.0 Scope

This specification is for an optically clear glass shatter resistant window film that will help hold broken glass together. The film exhibits excellent longevity and durability when applied on the exterior surface of a window, but may also be used as an interior film. The film blocks over 99% of the ultra-violet that would normally radiate through a window. The film is useful for glass shatter protection and general glass fragment retention against moderate force impact situations, such as spontaneous glass breakage and seismic events. Certain applications may require the film be used in conjunction with a film attachment system. The film shall be called **3M Safety and Security Window Film, S70 Exterior**.

2.0 Applicable Documents

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

The 1985 American Society for Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals.

The American National Standards Institute (ANSI).

ANSI Z97.1 Specification for Safety Glazing Material used in Buildings

The American Society for Testing and Materials (ASTM):

- ASTM E-308 Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System
- ASTM E-903 Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres
- ASTM D-882 Standard Test Method for Tensile Properties of Thin Plastic Sheeting
- ASTM D-1044 Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test)
- ASTM D-4830 Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing.
- ASTM G-90 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM G 26 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM E-84 Standard Method of Test for Surface Burning Characteristics of Building Materials

The Consumer Products Safety Commission (CPSC) 16 CFR, Part 1201, Safety Standard for Architectural Glazing Material

European Norm, EN-12600

Japan Industrial Standard, JIS A5759

Window 4.1. A Computer Tool for Analyzing Window Thermal Performance, Lawrence Berkeley Laboratory

3.0 Requirements of the Film

3.1 Film Material: The film material shall consist of an optically clear polyester film with a durable abrasion resistant coating over one surface, and a pressure sensitive adhesive on the other. The film shall have a nominal thickness of 7 mils (0.007 inches). The film shall be identified as to Manufacturer of Origin (hereafter to be called Manufacturer).

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3.2 Film Properties (nominal):

- a) Tensile Strength (ASTM D882): 22,000 psi
- b) Break Strength (ASTM D882): (140 lbs per inch width)
- c) Percent Elongation at Break (ASTM D882): 70%
- d) Percent Elongation at Yield (ASTM D882): > 5%
- e) Peel Strength (ASTM D3330, Method A): 5 lbs/in

3.3 Solar Performance Properties: film applied to ¼" thick clear glass, towards light source

- a) Visible Light Transmission: 88%
- b) Visible Reflection (Interior): not more than 8%
- c) Visible Reflection (Exterior): not more than 8%
- c) Ultraviolet Transmission: less than 1% (300 – 380 nm)

3.4 Flammability: The Manufacturer shall provide independent test data showing that the window film shall meet the requirements of a Class A Interior Finish for Building Materials for both Flame Spread Index and Smoked Development Values per ASTM E-84

3.5 Abrasion Resistance: The Manufacturer shall provide independent test data showing that the film shall have a surface coating that is resistant to abrasion such that, a nominal 5% increase of transmitted light haze will result in accordance with ASTM D-1044 using 50 cycles, 500 grams weight, and the CS10F Calbrase Wheel.

3.6 Adhesive System: The film shall be supplied with a high mass pressure sensitive weatherable acrylate adhesive applied uniformly over the surface opposite the abrasion resistant coated surface. The adhesive shall be essentially optically flat and shall meet the following criteria:

- a. Viewing the film from a distance of ten feet at angles up to 45 degrees from either side of the glass, the film itself shall not appear distorted.
- b. It shall not be necessary to seal around the edges of the applied film system with a lacquer or other substance in order to prevent moisture or free water from penetrating under the film system.

3.7 Impact Resistance for Safety Glazing: The film, when applied to either side of the window glass, shall pass a 150 ft-lb impact when tested according to 16 CFR CPSC Part 1201 (Category 1) and ANSI Z97.1 (Class B, Unlimited)

4.0 Requirements of the Authorized Dealer/Applicator (ADA)

4.1 The ADA shall provide documentation that the ADA is certified by the Manufacturer of the window film to install said window film as per the Manufacturer's specifications and in accordance with specific requests as to be determined and agreed to by the customer.

4.2 Authorization of dealership may be verified through the company's 3M ID Number.

4.3 The ADA will provide a commercial building reference list of ten (10) properties where the ADA has installed window film. This list will include the following information:

- * Name of building
- * The name and telephone number of a management contact
- * Type of glass
- * Type of film
- * Amount of film installed
- * Date of completion

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5.0 Requirements of the Manufacturer

5.1 The Manufacturer will insure proper quality control during production, shipping and inventory, clearly identify and label each film core with the product designation and run number.

5.2 Materials shall be manufactured by:

3M Renewable Energy Division
3M Center, Building 235
St. Paul, MN 55144-1000

6.0 Application

6.1 **Examination:** Examine glass surfaces to receive new film and verify that they are free from defects and imperfections, which will affect the final appearance. Correct all such deficiencies before starting film application.

6.2 **Preparation:**

- a. The window and window framing will be cleaned thoroughly with a neutral cleaning solution. The exterior surface of the window glass shall be scraped with stainless steel razor blades with clean, sharp edges to ensure the removal of any foreign contaminants without damages the glass surface.
- b. Drop cloths or other absorbent material shall be placed on the window sill or sash to absorb moisture accumulation generated by the film application.

6.3 **Installation:** The film shall be applied as to the specifications of the Manufacturer by an ADA.

- a. Materials will be delivered to the job site with the manufacturer's labels intact and legible.
- b. To minimize waste, the film will be cut to specification utilizing a vertical dispenser designed for that purpose. Film edges shall be cut neatly and square at a uniform distance of 1/8" (3 mm) to 1/16" (1.6 mm) of the window-sealing device.
- c. Film shall be wet-applied using clean water and slip solution to facilitate positioning of the film onto glass.
- d. To ensure efficient removal of excess water from the underside of the film and to maximize bonding of the pressure sensitive adhesive, polyplastic bladed squeegees will be utilized.
- e. Upon completion, the film may have a dimpled appearance from residual moisture. Said moisture shall, under reasonable weather conditions, dry flat with no moisture dimples within a period of 30 calendar days when viewed under normal viewing conditions.
- f. After installation, any leftover material will be removed and the work area will be returned to original condition. Use all necessary means to protect the film before, during and after the installation.

7.0 Cleaning

The film may be washed using common window cleaning solutions, including ammonia solutions, 30 days after application. Abrasive type cleaning agents and bristle brushes, which could scratch the film, must not be used. Synthetic sponges or soft cloths are recommended.

8.0 Warranty

a) The application shall be warranted by the film manufacturer (3M) for a period of ____ years (Interior) / ____ years (Exterior) in that the film will maintain solar reflective properties without cracking, crazing, delaminating, peeling, or discoloration. In the event that the product is found to be defective under warranty, the film manufacturer (3M) will replace such quantity of the film proved to be defective, and will additionally provide the removal and reapplication labor free of charge.

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