3M™ Scotchshield™ Safety and Security Window Film

Ultra Night Vision S25

Technical Data

Product Features & Benefits

- Combination safety / solar control window film
- Micro-layered film designed for tear resistance
- Moderately tinted for privacy with low interior reflectivity
- Helps protect from broken glass hazards
- Increase comfort and help reduce air conditioning costs
- Helps extend the life of furnishings by significantly reducing harmful UV rays

Applications

- Bomb Blast Mitigation
- Building Envelope Protection
- Helping to Deter Break & Entry
- Safety Glazing
- Seismic Preparedness
- Spontaneous Glass Breakage

Performance Testing*

Method	Glass Substrate	Film Attachment	Rating	
Safety Glazing / Impact Rating				
16 CFR 1201	¼" annealed	--	Category 2, 400 ft-lbs	
ANSI Z97.1			Class A (Unlimited), 400 ft-lbs	
Blast Mitigation			**Blast Load**	**Rating**
GSA TS01-2003 / ASTM F1642	¼" annealed	IPA	6 psi, 42 psi*msec	GSA Level 2 / ASTM "No Hazard"
	1" double pane (annealed)	IPP	6 psi, 42 psi*msec	GSA Level 2 / ASTM "No Hazard"
	¼" tempered	IPP	4 psi, 28 psi*msec	GSA Level 3B / ASTM "Minimal Hazard"
	1" double pane (tempered)	IPA	8 psi, 60 psi*msec	GSA Level 2 / ASTM "No Hazard"

*** Glazing systems vary. Contact 3M for more information.**

Film Properties (nominal, not for specification purposes)

Film Thickness	8 mils
Film Construction	Micro-layered Laminated
Tensile Strength	27,000 psi
Break Strength	215 lbs/in
Elongation at Break	95%
Yield Strength	15,000 psi
Elongation at Yield	8%
Modulus	600 kpsi
Abrasion Resistance (ASTM D1044)	3% Δ Haze
Peel Strength (ASTM D3330)	4.5 lb/in
Flammability (ASTM E84)	Class A
Graves Area Tear Resistance (ASTM D1004)	1,100 lbs%
Puncture-Propagation-Tear (ASTM D2582)	10 lbf
Puncture Strength (ASTM D4830)	140 lbf

Solar Properties – *film applied to ¼" glass*				
	¼" Clear	**¼" Tint**	**Dual Clear**	**Dual Tint**
VLT	24%	15%	22%	13%
VLR-Int	7%	7%	8%	8%
VLR-Ext	19%	10%	24%	11%
SHGC	0.40	0.38	0.50	0.38
TSER	60%	62%	50%	62%
UV Block	99.9%	99.9%	99.9%	99.9%
Glare ↓	73%	73%	73%	73%
U-Value	1.02	1.02	0.47	0.47
Solar Heat ↓	51%	40%	28%	24%

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Specifications

Specifications for 3M™ Scotchshield™ Safety and Security Window Film, Ultra Night Vision S25

1.0 Scope

This specification is for a combination safety and security window film with sun control: a glass shatter resistant and abrasion resistant window film which, when applied to the interior window surface, will help hold broken glass together, reduce the ultra-violet light transmission, and reduce the solar heat gain of solar energy through the window. This is an easily applied tear-resistant safety and security window film with sun control, exhibiting low internal reflectivity, which is useful for increased measure of protection in a broad range of applications, including basic glass fragment retention, spontaneous glass breakage, seismic preparedness, and safety glazing applications, and bomb blast mitigation. Certain applications may require the film be used in conjunction with a film attachment system. The film shall be called **3M Scotchshield Safety and Security Window Film**, **Ultra Night Vision S25.**

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-2582 Standard Test Method for Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting
- 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
- ASTM D-1004 Standard Method of Test for Resistance of Transparent Plastics to Tearing (Graves Tear Test)
- ASTM E-1886 Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials
- ASTM E-1996 Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes
- ASTM F-1642 Standard Method of Test for Glazing and Glazing Systems Subject to Airblast Loadings, as adapted by the U.S. Government GSA Test Standard Protocols
- ASTM F-2912 Standard Specification for Glazing and Glazing Systems Subjected to Airblast Loadings

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

GSA-TS01-2003 General Services Administration Standard Test for Glazing and Glazing Systems Subject to Airblast Loadings

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

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Specifications
Ultra Night Vision S25 Safety and Security Window Film

3.0 Requirements of the Film

3.1 **Film Material**: The film material shall consist of an optically clear polyester film, consisting of co-extruded microlayers, laminated to a multilayered metalized polyester film for added color and sun control performance. The film has a durable acrylic abrasion resistant coating over one surface, and a UV stabilized pressure sensitive adhesive on the other. The film shall contain no dyed polyester. The film shall have a nominal thickness of 8 mils (0.008 inches). There shall be no evidence of coating voids. The film shall be identified as to Manufacturer of Origin (hereafter to be called Manufacturer).

3.2 **Film Properties (nominal)**:

a) Tensile Strength (ASTM D882): 27,000 psi
b) Break Strength (ASTM D882): 215 lbs / in
c) Percent Elongation at Break (ASTM D882): 95%
d) Percent Elongation at Yield (ASTM D882): 8%
e) Yield Strength (ASTM D882): 15,000 psi
f) Graves Area Tear Resistance (ASTM D1004): 1,100 lbs%
g) Puncture Propagation Tear Resistance (ASTM D2582): 10 lbf
h) Modulus (ASTM D882): 600 kpsi

3.3 **Solar Performance Properties**: film applied to ¼" thick clear glass

a) Visible Light Transmission: 24%
b) Visible Reflection: 7% (interior) / 19% (exterior)
c) Ultraviolet Transmission: less than 1% (300 – 380 nm)
d) Solar Heat Gain Coefficient: 0.40
e) Total Solar Energy Rejected: 60%

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, less than 5% increase of transmitted light haze will result in accordance with ASTM D-1044 using 50 cycles, 500 grams weight, and the CS10F Calibrase 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 pressure sensitive (not water activated) and physically bond (not chemically bond) to the glass. 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 400 ft-lb impact when tested according to 16 CFR CPSC Part 1201 (Category 2) and ANSI Z97.1 (Class A, Unlimited).

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3.8 **Impact Protection:** per ASTMs E1886 / E1996

a. [reserved]

b. The safety film component of the window film construction shall pass impact of Small Missile "A" and withstand subsequent pressure cycling (per ASTMs E 1996 and E 1886) at 80 psf Design Pressure with use of 3M Impact Protection Adhesive attachment system.

3.9 **Bomb Blast Mitigation:**

a. GSA Rating of "2" / ASTM F1642 "No Hazard" with blast pressure of 6 psi and 42 psi*msec blast impulse, on ¼" annealed single pane glass and 3M Impact Protection Adhesive Attachment system

b. GSA Rating of "3B" / ASTM F1642 "Minimal Hazard" with blast pressure of 4 psi and 28 psi*msec blast impulse, on ¼" tempered single pane glass and 3M Impact Protection Profile Attachment system

c. GSA Rating of "2" / ASTM F1642 "No Hazard" with blast pressure of 6 psi and 42 psi*msec blast impulse, on 1" annealed double pane glass and 3M Impact Protection Profile Attachment system

d. GSA Rating of "2" / ASTM F1642 "No Hazard" with blast pressure of 8 psi and 60 psi*msec blast impulse, on 1" tempered double pane glass and 3M Impact Protection Adhesive Attachment system

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

4.4 Upon request, the ADA will provide a Glass Stress Analysis of the existing glass and proposed glass/film combination as recommended by the film Manufacturer.

4.5 Upon request, the ADA will provide an application analysis to determine available energy cost reduction and savings.

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5.0 Requirements of the Manufacturer

5.1 The Manufacturer will ensure 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 inside 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 shall be used.
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 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.
b) 8.2 The film manufacturer (3M) also warrants against glass failure due to thermal shock fracture of the glass window unit (maximum value $500 per window) provided the film is applied to recommended types of glass and the failure occurs within sixty (60) months from the start of application. Any glass failure must be reviewed by the film manufacturer (3M) prior to replacement.

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