

3M Safety & Security Window Film





Anti Graffiti 4 (AG-4)

Technical Data

Product Features & Benefits

- Optically clear, 4-mil (0.10 mm) thick film to protect glass from scratches, abrasion and acid etching
- Will not form chemical bond to glass, enabling easy film removal should replacement be required due to vandalism
- Glass fragment retention properties to provide basic shatter resistance
- Reduces injury risk from flying glass.
- Protects from the harmful effects of UV light and reduces fading of interior furnishings
- Class A rated interior use for Flame Spread Index and Smoke Development values per ASTM E-84.

Product Performance & Technical Data

Anti Graffiti 4 (AG-4)								
	Single Pane		Tinted		Double Pane		Double tinted	
Film	1/4" Clear	AG-4	1/4" tint	AG-4	Dual 1/4" Clear	AG-4	Dual 1/4" tint	AG-4
Solar Heat Gain Coefficient	0.82	0.82	0.63	0.59	0.70	0.68	0.51	0.46
Visible Light Transmitted	89%	87%	53%	47%	79%	77%	47%	45%
Visible Light Reflected Interior	9%	8%	9%	6%	15%	15%	13%	14%
Visible Light Reflected Exterior	8%	8%	13%	6%	15%	15%	8%	14%
U Value	1.03	1.03	1.03	1.03	0.47	0.47	0.47	0.47
UV Block	38%	99%	NA	99%	NA	99%	NA	99%
Total Solar Energy Rejected	19%	19%	37%	41%	30%	32%	49%	54%
Glare Reduction	NA	2%	NA	11%	NA	3%	NA	5%
Heat Loss Reduction	NA	0%	NA	0%	NA	0%	NA	0%
Solar Heat Reduction	NA	0%	NA	6%	NA	3%	NA	9%

Film Properties* (nominal)

Product	Film Thickness	Single or Multi-ply	Tensile Strength	Break Strength	Elongation at Break	Peel Strength	Puncture Strength	Abrasion Resistance
AG-4	0.004"	Single	34,900 psi	136 lbs/in	>100 %	1,000 g/in	93 lbs	< 5% increase in haze

*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

St. Paul, MN 55144-1000

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Specifications

3M Anti-Graffiti Film AG4

1.0 Scope

This specification is for an optically clear abrasion resistant window film which, when applied to glass, will help protect the surface from vandalism. This film is intended to be a sacrificial layer to help protect against damage from graffiti, glass etching, and other commonly used methods to mark glass. The film does not chemically bond to glass and is easily removed when replacement is required. The film shall be called **3M Anti-Graffiti Film AG4**.

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)

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 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 and contain a durable abrasion resistant coating over one surface, and a UV stabilized pressure sensitive adhesive on the other. The film shall have a nominal thickness of 4 mils (0.004 inches). 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): 34,900 psi
- b) Break Strength (ASTM D882): 34,000 psi (136 lbs per inch width)
- c) Percent Elongation at Break (ASTM D882): >100%
- d) Percent Elongation at Yield (ASTM D882): greater than 100%
- e) Puncture Strength (ASTM D4830): 93 lbs
- f) Abrasion Resistance (ASTM D1044): < 5% increase in haze
- g) Peel Strength: 1,000 gr/in

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Specifications

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

- a) Visible Light Transmission: 86%
- b) Visible Reflection: not more than 10%
- c) Ultraviolet Transmission: less than 1% (300 – 380 nm)
- d) Solar Heat Gain Coefficient: 0.81

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 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. 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.

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.

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 The Manufacturer will, upon request and pre-approval, provide 100% financing for the complete installation of the window film to the end-user customer in either an installment purchase or lease purchase format to be decided upon by customer.

5.3 Materials shall be manufactured by:

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

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