3M™ Sun Control Window Film

3M™ Thinsulate™ Window Film Climate Control 75 (CC75)

Technical Data

Product Benefits

- High Visible Light Transmission, High Clarity, Competitive Total Solar Energy Rejection
- Low U-Value helps space stay warmer by retaining more heat in cooler months.
- Helps reduce heating costs.
- Helps reduce air conditioning costs.
- Helps prolong the life and vibrancy of fabric, furniture and carpets.
- Helps reduce the risk of injury from flying glass.

Product Performance & Technical Data

3M™ Thinsulate™ CC75								
	Single Pane		Tinted		Double Pane		Double tinted	
Film	1/4" Clear	Thinsulate CC75	1/4" tint	Thinsulate CC75	Dual 1/4" Clear	Thinsulate CC75	Dual 1/4" tint	Thinsulate CC75
Solar Heat Gain Coefficient	0.82	.53	0.63	0.40	0.70	0.51	0.51	0.37
Visible Light Transmitted	89%	74%	53%	44%	79%	66%	47%	40%
Visible Light Reflected Interior	9%	12%	6%	10%	15%	17%	13%	15%
Visible Light Reflected Exterior	8%	15%	6%	8%	15%	21%	8%	10%
U Value ($Btu/h\text{-}ft^2F$)	1.03	0.62	1.03	0.62	0.47	0.35	0.47	0.35
U Value ($W/m^2 K$)	5.8	3.6	5.8	3.6	2.7	2.0	2.7	2.0
UV Block	N/A	99.9%	NA	99.9%	NA	99.9%	NA	99.9%
Total Solar Energy Rejected	19%	47%	37%	60%	30%	49%	49%	63%
Glare Reduction	NA	17%	NA	17%	NA	16%	NA	15%
Heat Loss Reduction	NA	40%	NA	40%	NA	26%	NA	26%
Solar Heat Reduction	NA	35%	NA	37%	NA	27%	NA	27%
Light to solar gain	1.1	1.4	0.8	1.1	1.1	1.3	0.9	1.1

Film properties (nominal)

Thickness	3.5 mil
Emissivity	0.14

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Renewable Energy Division
St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

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Specifications for 3M™ Thinsulate™ Window Film Climate Control 75 (CC75)

1.0 Scope

This specification is for an abrasion resistant Low E window film which when applied to the interior window surface will retard the flow of heat energy through the window. The film shall be called 3M™ Thinsulate™ Window Film Climate Control 75 (CC75).

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 Society for Testing and Materials (ASTM) publication:

- ASTM E-308 Standard Practice Computing Colors of Objects by using the CIE System.
- NFRC 100/200/304 (FORMERLY ASTM E-903) Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres
- ASTM D-1044 Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test)
- ASTM G-90 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 Material

Window 6.3, A Computer Tool for Analyzing Window Thermal Performance, Lawrence Berkeley National Laboratory

3.0 Requirements of the Film

3.1 **Film Material:** The film material shall be an optically clear metallized polyester film. There must be an abrasion resistant coating over the surface of the film for enhanced durability. The metallic coating shall be uniform without noticeable pin holes, streaks, thin spots, scratches, or banding. The variation in total transmission across the width, at any portion along the length, shall conform to NFRC certification requirements. The film shall have a nominal thickness of _____ mils (_____ 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 **Emissivity:** The emissivity of the non-adhesive surface of the film shall be _____ nominal when measured using a Devices & Services Emissometer Model AE at or near room temperature. The Manufacturer shall provide laboratory data of emissivity and calculated window "U" Values for various outdoor temperatures based upon established calculation procedure defined by the 1985 ASHRAE Handbook of Fundamentals, ch. 27, or Lawrence Berkeley Laboratory Window 4.0 Computer Program.

3.3 **U Value:** The U Value of the film applied to 1/4" (6mm) clear glass shall be _____ nominal when measured in accordance with test procedures described in 3.2 for Emissivity.

3.4 **Transmission - Visible:** When applied to 1/4" (6mm) clear glass, the luminous transmittance shall be _____ nominal when measured with an integrating sphere spectrophotometer as referenced by NFRC 100/200/304 (Formerly ASTM E-903) and calculated per ASTM E-308 using Standard Source "C" for average daylight.

3.5 **Reflection - Visible:** When applied to 1/4" (6mm) clear glass, the total luminous reflection from the glass surface shall be _____ nominal when measured with an integrating sphere spectrophotometer as referenced by NFRC 100/200/304 (Formerly ASTM E-903) and calculated per ASTM E-308 using Standard CIE Source "C" for average daylight

3.6 **Transmission - Ultraviolet Light:** When applied to 1/4" (6mm) clear glass, the total transmission of solar ultraviolet radiation of air mass = 2 over the spectral range of 3000 to 3800 angstroms shall not exceed _____ when measured with an integrating sphere spectrophotometer as referenced by NFRC 100/200/304 (FORMERLY ASTM E-903).

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3.7 **Shading Coefficient:** When applied to 1/4" (6mm) clear glass, the shading coefficient shall be _____ nominal when solar energy transmittance and reflection are measured per NFRC 100/200/304 (Formerly ASTM E-903) and the shading coefficient is computed in accordance with the established procedures defined by The ASHRAE Handbook of Fundamentals.

3.8 **Adhesive System:** The film shall be supplied with an optically clear pressure sensitive weatherable acrylic adhesive applied uniformly over the surface opposite the abrasion resistant coating:

a. Viewing the film from a distance of ten feet (3 m)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.

3.9 **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 Smoke Development Values per ASTM E-84.

3.10 **Abrasion Resistance:** The Manufacturer shall provide independent test data showing that the film has a surface coating that is resistant to abrasion such that, less than 5% increase of transmitted scattered light and haze will result in accordance with ASTM D-1044 using 100 cycles, 500 grams weight, and the CS10F Calibrase Wheel.

4.0 Requirements of the Authorized Dealer/Applicator (ADA)

4.1 The ADA shall provide documentation that the ADA is certified by the Manufacturer to install 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 I.D. 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 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

5.3 The ADA Point of Contact: Sunray Window Films, which is located at: 2174 Lost Nation Road; Willoughby, OH 44094-7534; Toll Free Tel: 800-295-8468; Tel: 440-975-0800; Fax: 440-398-0202; Email: sales@sunrayfilms.com; Web: www.sunrayfilms.com

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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 bladed with industrial razors to ensure the removal of any foreign contaminants.
b. Toweling 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" to 1/16" of the window sealing device.
c. Clear, clean water will be used to remove the water soluble overcoat that protects the pressure sensitive adhesive. Water and film slip solution shall be used on the window glass to facilitate the proper positioning of the film.
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 left over 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

8.1 The application shall be warranted by the film manufacturer (3M) for a period of fifteen (15) years in that the film will maintain solar reflective properties without cracking, crazing, delaminating, bubbling or peeling. In the event that the product is found to be defective under warranty, the seller will replace such quantity of the film proved to be defective, and will additionally provide the removal and reapplication labor free of charge.

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.

Section	Title	
1.0	Film	3M™ Thinsulate™ Window Film Climate Control 75 (CC75)
3.1	Thickness (mils)	3.5
	(inches)	0.0035
3.3	U value	0.62
3.4	Visible Light Transmission	75%
3.5	Visible Light Reflection - Exterior	15%
	Visible Light Reflection - Interior	13%
3.6	Ultraviolet Rejection	99.9%
3.7	Shading Coefficient Coefficient - 90 degrees (normal incidence)	0.60

Note: All values on ¼" clear glass

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