SECTION 08 87 13 - Solar Control Film

WINDOW FILM

Display hidden notes to specifier. (Don't know how? [Click Here](http://www.arcat.com/sd/display_hidden_notes.shtml))

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\*\* NOTE TO SPECIFIER \*\* 3M Window Film; sun control films, safety and security films, anti-graffiti window films, patterned window films.
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This section is based on the products of 3M Window Film, which is located at:
3M Center Bldg. 0235.
St. Paul, MN 55144-1000.
Toll Free: 800-480-1704
Tel: 651-733-2222
Web:[www.3m.com/windowfilm.](http://www.3m.com/windowfilm)
.
As a leader in both adhesive and film technologies, 3M brings together these disciplines to create the finest products available for both commercial and residential use. Our line of films provides an elegant means for solving many of the most challenging aspects of managing the energy use of your business or home.
Our films reduce up to 99.9 percent of the sun's ultraviolet rays and reject up to 79 percent of the solar heat that may otherwise come through a window, and can redirect daylight to increase occupant comfort, and overall energy efficiency. It also helps reduce winter heat loss by reflecting up to 17 percent of indoor heat back into the room. They are also easy on the eyes. On the outside, they give your home or business a more pleasing, unified look. On the inside, our films reduce the level of glare for you and others. 3M(tm) Sun Control and 3M(tm) Ultra Safety & Security Window Films not only save energy, they help protect your furnishings, drapes, carpet, woodwork and artwork from destructive ultraviolet rays that cause fading; help to seal out the water, the primary cause of property damage; and have a toughness that allows these films to withstand day-to-day abuse.

See our SpecWizard:[Click Here](http://www.arcat.com/specwizard/08870mmm/index.htm)

1. GENERAL
	1. SECTION INCLUDES
		1. Sun control window film. (Prestige)(Ceramic)(Night Vision)(All Season)(Traditional Series)(Exterior Series)
	2. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 08 54 13 - Fiberglass Windows.
		2. Section 08 60 00 - Roof Windows and Skylights.
		3. Section 08 83 13 - Mirrored Glass Glazing.
		4. Section 08 44 23 - Structural Sealant Glazed Curtain Wall.
	1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. ASHRAE - American Society for Heating, Refrigeration, and Air Conditioning Engineers; Handbook of Fundamentals.
		2. ASTM International (ASTM):
			1. ASTM D 882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
			2. ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers -- Tension.
			3. ASTM D 624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
			4. ASTM D 1004 - Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting.
			5. ASTM D 1044 - Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test).
			6. ASTM D 2240 - Standard Method for Rubber Property - Durometer Hardness.
			7. ASTM D 2582 - Standard Test Method for Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting.
			8. ASTM D 5895 - Standard Test Methods for Evaluating Drying or Curing During Film Formation of Organic Coatings Using Mechanical Recorders.
			9. ASTM D 4830 - Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing.
			10. ASTM E 84 - Standard Method of Test for Surface Burning Characteristics of Building Materials.
			11. ASTM E 308 - Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System.
			12. ASTM E 903 - Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres.
			13. 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.
			14. ASTM E 1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.
			15. ASTM F1642 - Standard Method of Test for Glazing and Glazing Systems Subject to Airblast Loadings
			16. ASTM F2912 - Standard Specification for Glazing and Glazing Systems Subject to Airblast Loadings.
			17. NFRC 100/200 (Formerly ASTM E903) - Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres.
		3. Window 6.3 - A Computer Tool for Analyzing Window Thermal Performance; Lawrence Berkeley Laboratory.
		4. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
		5. IES LM-83-12: IES Spatial Daylight Autonomy (sDA) and Annual Sunlight Exposure.
		6. Consumer Products Safety Commission 16 CFR, Part 1201 - Safety Standard for Architectural Glazing Materials.
		7. GSA-TS01 - Standard Test for Glazing and Glazing Systems Subject to Airblast Loadings.
		8. ISO 16933, International Standard for Glass in Building: Explosion-resistant security glazing - Test and classification for arena air-blast testing.
		9. Underwriters Laboratories Inc. (UL): UL 972 - Burglary Resisting Glazing Material.
	1. DEFINITIONS
		1. Light to Solar Gain Ratio: The ratio of visible light transmission to Solar Heat Gain Coefficient.
	2. PERFORMANCE REQUIREMENTS
		1. Fire Performance: Surface burning characteristics when tested in accordance ASTM E 84:
			1. Flame Spread: 25, maximum.
			2. Smoke Developed: 450, maximum.
	3. SUBMITTALS
		1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
		2. Product Data: Manufacturer's data sheets on each product to be used, including:
			1. Preparation instructions and recommendations.
			2. Storage and handling requirements and recommendations.
			3. Installation methods.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Verification Samples: For each film specified, two samples representing actual film color and pattern.

\*\* NOTE TO SPECIFIER \*\* Retain the next paragraph only if Sun Control or Safety and Security Film is specified.

* + 1. Performance Submittals: Provide laboratory data of emissivity and calculated window U-Factors for various outdoor temperatures based upon established calculation procedure defined by the ASHRAE Handbook of Fundamentals, Chapter 29, or Lawrence Berkeley Laboratory Window 5.2 Computer Program.
	1. QUALITY ASSURANCE
		1. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten year’s experience.

\*\* NOTE TO SPECIFIER \*\*Pressure Sensitive Adhesives (PSA) physically bond to the glass, allowing for the film to be removed at the end of life. Clear Dry Adhesives (CDA) chemically bond to the glass. These may require the use of toxic chemicals to remove, or the complete replacement of the existing glass, significantly increasing end of life costs.

* + - 1. Provide documentation that the adhesive used on the specified films is a Pressure Sensitive Adhesive (PSA).
		1. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five years demonstrated experience in installing products of the same type and scope as specified.
			1. Provide documentation that the installer is authorized by the Manufacturer to perform Work specified in this section.
			2. Provide a commercial building reference list of 5 properties where the installer has applied window film. This list will include the following information:
				1. Name of building.
				2. The name and telephone number of a management contact.
				3. Type of glass.
				4. Type of film.
				5. Amount of film installed.
				6. Date of completion.

\*\* NOTE TO SPECIFIER \*\* Delete the next paragraph if a Glass Stress Analysis is not required.

* + - 1. Provide a Glass Stress Analysis of the existing glass and proposed glass/film combination as recommended by the film manufacturer.
			2. Provide an EFilm application analysis to determine available energy cost reduction and savings.

\*\* NOTE TO SPECIFIER \*\* Include a mock-up if the project size and/or quality warrant taking such a precaution. The following is one example of how a mock-up on a large project might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project.

* + 1. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
			1. Finish areas designated by Architect.
			2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
			3. Refinish mock-up area as required to produce acceptable work.
	1. DELIVERY, STORAGE, AND HANDLING
		1. Store products in manufacturer's unopened packaging until ready for installation.
		2. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.
	2. PROJECT CONDITIONS
		1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
1. PRODUCTS
	1. MANUFACTURERS
		1. Acceptable Manufacturer: 3M Window Film , which is located at: 3M Center Bldg. 0235-02-S-27; St. Paul, MN 55144-1000; Toll Free Tel: 866-499-8857; Tel: 651-733-2222; Fax: 651-737-3446; Email:3Mrenewableenergy@mmm.com; Web:[www.3m.com/windowfilm](http://www.3m.com/windowfilm)

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* 1. 3M ALL SEASON SUN CONTROL WINDOW FILM
		1. Physical Properties:
			1. Composition: Optically clear metallized polyester with pressure sensitive adhesive on one side and an abrasion resistant coating on the other.
			2. Uniformity: No noticeable pin holes, streaks, thin spots, scratches, banding or other optical defects.
			3. Variation in Total Transmission across the Width: Less than 2 percent over the average at any portion along the length.
			4. Thickness: Nominal 3.5 mils (.089 mm) with no evidence of coating voids.
			5. Identification: Labeled as to Manufacturer as listed in this Section.
		2. Performance, Low E 20 (LE20) - Film applied to 1/4 Inch (6.4 mm) Thick Clear Glass:
			1. Visible Light Transmission (NFRC 100/200/304): 20 percent.
			2. Visible Reflection:
				1. Exterior (NFRC 100/200/304): 53 percent.
				2. Interior (NFRC 100/200/304): 58 percent.
			3. Ultraviolet Rejection (NFRC 100/200/304): 99.9 percent.
			4. Light to Solar Gain ratio: 0.8
			5. Solar Heat Gain Coefficient at 90 Degrees (Normal Incidence) (NFRC 100/200/304): 0.24.
			6. U value (NFRC 100/200/304): 0.77 BTU/hft2.

1. EXECUTION
	1. EXAMINATION
		1. Film Examination:
			1. If preparation of glass surfaces is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.
				1. Glass surfaces receiving new film should first be examined to verify that they are free from defects and imperfections, which will affect the final appearance.
			2. Do not proceed with installation until glass surfaces have been properly prepared and deviations from manufacturer's recommended tolerances are corrected. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result under the project conditions.
			3. Commencement of installation constitutes acceptance of conditions.
	2. PREPARATION
		1. Clean surfaces thoroughly prior to installation.
		2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
		3. Refer to Manufacturer's installation instructions for methods of preparation for Impact Protection Adhesive or Impact Protection Profile film attachment systems.
	3. INSTALLATION
		1. Film Installation, General:
			1. Install in accordance with manufacturer's instructions.
			2. Cut film edges neatly and square at a uniform distance of 1/8 inch (3 mm) to 1/16 inch (1.5 mm) of window sealant. Use new blade tips after 3 to 4 cuts.
			3. Spray the slip solution, composed of one capful of baby shampoo or dishwashing liquid to 1 gallon of water, on window glass and adhesive to facilitate proper positioning of film.
			4. Apply film to glass and lightly spray film with slip solution.
			5. Squeegee from top to bottom of window. Spray slip solution to film and squeegee a second time.
			6. Bump film edge with lint-free towel wrapped around edge of a 5-way tool.
			7. Upon completion of film application, allow 30 days for moisture from film installation to dry thoroughly, and to allow film to dry flat with no moisture dimples when viewed under normal viewing conditions.
			8. If completing an exterior application, check with the manufacturer as to whether edge sealing is required.
	4. CLEANING AND PROTECTION
		1. Remove left over material and debris from Work area. Use necessary means to protect film before, during, and after installation.
		2. Touch-up, repair or replace damaged products before Substantial Completion.
		3. After application of film, wash film using common window cleaning solutions, including ammonia solutions, 30 days after application. Do not use abrasive type cleaning agents and bristle brushes to avoid scratching film. Use synthetic sponges or soft cloths.

END OF SECTION