

SECTION 08 87 23

WINDOW FILMS

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\*\* NOTE TO SPECIFIER \*\* Madico®, Inc.; Commercial and residential solar control and safety films.
This section is based on the products of Madico®, Inc., which is located at:
9251 Belcher Rd. N.
Pinellas Park, FL 33782
Toll Free Tel: 888-887-2022
Tel: 727-327-2544
Email:[request info (contact@madico.com)](http://admin.arcat.com/users.pl?action=UserEmail&company=Madico26reg+Inc&coid=33948&rep=&fax=&message=RE:%20Spec%20Question%20(08870mad):%20%20&mf=)
Web:<http://www.madico.com/window-film>|<http://www.safetyshield.com/products/>
[[Click Here](http://www.arcat.com/arcatcos/cos33/arc33948.html)] for additional information.
Madico, Inc. innovates, manufactures and distributes a broad range of materials-based solutions including window films, coatings and laminates for numerous industries across the globe from automotive and architecture to healthcare and aerospace. Since 1903, Madico has pioneered products with an unrivaled commitment to quality.
An award-winning organization, Madico is a company that puts customers first by embracing a flexible, collaborative manufacturing style that nurtures new customers and strengthens experienced ones. The company's business segments include specialty film, window film and diversified business.
The Window Films division develops advanced laminates that help automobile, home, and commercial property owners curb energy consumption, combat harmful effects of ultraviolet rays, and increase personal safety.

1. GENERAL
	1. SECTION INCLUDES
		1. Madico Safety and Security: Transparent film applied to glass to provide shatter resistance, increase safety during an accidental impact meeting safety glazing standard.
			1. Madico: Solar control safety and security
				1. NG 45 8 mil PS SR
	2. RELATED SECTIONS

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

* + 1. Section 08 40 00 - Entrances, Storefronts, and Curtain Walls.
		2. Section 08 50 00 - Windows.
		3. Section 08 60 00 - Roof Windows and Skylights.
		4. Section 08 83 13 - Mirrored Glass Glazing.
	1. REFERENCES

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

* + 1. American National Standards Institute (ANSI):
			1. ANSI/NFRC 100 - 2014 - Procedure for Determining Fenestration Product U-factors.
			2. ANSI/NFRC 200 - 2014 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.
			3. ANSI Z97.1 - Safety Glazing Materials Used In Buildings - Safety Performance Specifications and Methods of Test.
		2. Lawrence Berkeley National Laboratory:
			1. WINDOW 7.4 - Computer program used to model, analyze products made from any combination of glazing layers, gas layers, frames, spacers, and dividers under any environmental conditions and at any tilt.
		3. Consumer Products Safety Council (CPSC):
			1. CPSC Part 1201 - Safety Standard for Architectural Glazing Materials.
		4. International Window Film Association (IWFA):
			1. Architectural Visual Inspection Standard For Applied Window Film As Adopted By The IWFA May 15, 1999.
		5. ASTM International (ASTM):
			1. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
			2. ASTM D1044 - Standard Test Method for Resistance of Transparent Plastics to Surface Abrasion.
			3. ASTM D2582 - Standard Test Method for Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting.
			4. ASTM D3330 - Standard Test Method for Peel Adhesion at 180 Degree Angle.
			5. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
			6. ASTM E903 - Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres.
	1. PERFORMANCE REQUIREMENTS
		1. Safety Glazing Impact resistance (performance to CPSC/ANSI Z97.1):

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

* + - 1. Impact resistance for film applied on 1/8 inch (3 mm) thick glass: 400 foot-pounds (55 kilogram meters) minimum to comply with ANSI Z97.1 Class A and CPSC 16 CFR 1201 Category II as safety glass.
		1. Flammability (performance to ASTM E84):
			1. Flammability: Surface burning characteristics when tested in accordance ASTM E 84:
				1. Flame Spread Index: 25, maximum.
				2. Smoke Developed Index: 450, maximum.
		2. Abrasion resistance (performance to ASTM D1044):
			1. Abrasion Resistance: Film must have a surface coating that is resistant to abrasion such that, less than 5 percent increase of transmitted light haze will result in accordance with ASTM D 1044 using 50 cycles, 500 grams weight, and the CS10F Calibrase Wheel.
	1. SUBMITTALS
		1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
		2. Product Data:
			1. Manufacturer's data sheets on each product to be used.
			2. Preparation instructions and recommendations.
			3. Storage and handling requirements and recommendations.
			4. Typical installation methods.
		3. Verification Samples: 4 inches by 6 inches (102 mm by 152 mm) minimum sample of glazing film.
		4. Shop Drawings: Include details of materials, construction and finish. Include relationship with adjacent construction.
		5. Madico, Inc. SafetyShield Window Film Green / LEED credit data that can contribute LEED credits to a building project's LEED certification.
		6. Sustainability Submittals: Refer to Division 01 for requirements regarding VOC limits, recycled content, regional materials, and required documentation.
	2. QUALITY ASSURANCE
		1. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum ten years successful documented experience.
		2. Installer Qualifications:
			1. Installer: Glazing film shall be applied by installers with a minimum of five years successful experience installing products of the same type and scope as specified.
			2. Provide documentation that the installer is certified by glazing film manufacturer to perform the work specified.
			3. Provide references of three projects where the installer has applied safety and security film or similar nature and size. The list should include:
				1. Name of building.
				2. The name and telephone number of project manager.
				3. Type of glass.
				4. Type of film and attachment system.
				5. Amount of film and attachment system installed.
				6. Date of completion.
		3. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.
		4. USGBC LEED Program:
			1. Product shall contribute to LEED 2009 or LEED V4 credits as applicable, (www.usgbc.org).
			2. Indoor Environmental Quality:
				1. Low-emitting paints.
				2. Daylight and views - daylight.
				3. Daylight and views - views.

\*\* NOTE TO SPECIFIER \*\* Include mock-up if the project size or quality warrant the expense. The following is one example of how a mock-up on might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project. Delete if not required.

* + 1. Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up as acceptable to Architect and provide temporary foundations and support.
			1. Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
			2. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
			3. Retain mock-up during construction as a standard for comparison with completed work.
			4. Do not alter or remove mock-up until work is completed or removal is authorized.
	1. PRE-INSTALLATION CONFERENCE
		1. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.
	2. DELIVERY, STORAGE, AND HANDLING
		1. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
		2. Protect from damage due to weather, excessive temperature, and construction operations.
	3. 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.
		2. Surface temperature: Do not apply glazing film when surface temperature is less than 40 degrees Fahrenheit.
		3. Prior to installation, the glass and frames shall be inspected for surface contamination, damage, or other defects that may adversely affect the performance of the glazing film.
	4. SEQUENCING
		1. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.
	5. WARRANTY
		1. Manufacturer's Warranty: Provide manufacturer's standard limited warranty.
1. PRODUCTS
	1. MANUFACTURERS
		1. Acceptable Manufacturer: Madico®, Inc., which is located at: 9251 Belcher Rd. N.; Pinellas Park, FL 33782; Toll Free Tel: 888-887-2022; Tel: 727-327-2544; Email:[request info (contact@madico.com)](http://admin.arcat.com/users.pl?action=UserEmail&company=Madico26reg+Inc&coid=33948&rep=&fax=&message=RE:%20Spec%20Question%20(08870mad):%20%20&mf=); Web:<http://www.madico.com/window-film>|<http://www.safetyshield.com/products/>
		2. Email: windowfilm@madico.com; Web: www.madico.com.
		3. Substitutions: Not permitted.

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

* 1. SAFETY AND SECURITY WINDOW FILMS

\*\* NOTE TO SPECIFIER \*\* Madico's Solar control Safety & Security Window Films offer the same safety and security as our clear versions with the added benefit of solar control. Save energy and reduce CO2 emissions. Madico's Solar control Safety & Security Window Films can keep out up to 78 percent of the sun's heat, dramatically lowering air conditioning costs. In the winter, the same film helps retain interior heat, reducing heating costs.

* + - 1. Type: Semi-Transparent, polyester, micro-thin film bonded to glass to resist impact, help contain glass shards, remain intact, and resist forced entry break through; NG 45 PS SR 8 mil as manufactured by Madico, Inc.
				1. Physical Properties.

Thickness: 0.0085 inch.

Color: Light Reflective Grey.

Construction: Multi-ply laminate.

Adhesive type: Pressure sensitive acrylic.

Tensile strength: 25,000 PSI tested in accordance with ASTM D882.

Breaking strength: 200 pounds per inch minimum tested in accordance with ASTM D882.

Peel strength: 5 pounds per inch minimum tested in accordance with ASTM D3330.

Surface burning characteristics tested in accordance with ASTM E84: Class A.

Flame spread: 0 to 25 maximum.

Smoke development: 0 to 450 maximum.

* + - * 1. Safety Glazing Performance: comply with ANSI Z97.1 and CPSC 16 CFR 1201 Category II as safety glazing.
				2. Performance attributes for film applied to 1/4 inch (6 mm) thick clear glass tested in accordance with ANSI/NFRC 100 - 2014 and ANSI/NFRC 200 - 2014:

Visible Light:

Transmittance: 43 percent.

Reflected: 14 percent.

Glare reduction: 51 percent.

Ultra violet light transmittance: less than 1 percent.

U-value: 0.95.

Solar energy:

Transmittance: 34 percent.

Reflected: 14 percent.

Absorbed: 52 percent.

Shading Coefficient (SC): 0.57.

Solar Heat Gain Coefficient (SHGC): 0.49.

Emissivity: 0.71.

1. EXECUTION
	1. GLAZING FILM APPLICATION
		1. Field apply glazing film to the following items in accordance with manufacturer's instructions:
			1. Steel framed glazed doors, sidelights, transoms, and windows.
			2. Aluminum framed glazed doors, sidelights, transoms, and windows.
			3. Aluminum curtain wall framing system.
			4. Other curtain wall framing system.
			5. Manufactured wood windows.
			6. Manufactured steel windows.
			7. Manufactured aluminum windows.
			8. Manufactured windows.
		2. Do not apply glazing film when surface temperature is less than 40 degrees F (4 degrees C).
		3. Inspection:
			1. Examine glass and frames. Verify that existing conditions are adequate for proper application and performance of film.
			2. Verify glass is not cracked, chipped, broken, or damaged.
			3. Verify that frames are securely anchored and free of defects.
			4. Do not proceed until unsatisfactory conditions have been addressed.
	2. PREPARATION
		* 1. Comply with manufacturers recommendations for surface preparation.
			2. Clean glass of dust, dirt, paint, oil, grease, mildew, mold, and other contaminants that would inhibit adhesion.
			3. Immediately prior to applying film, thoroughly wash glass with neutral cleaning solution.
			4. Protect adjacent surfaces.
	3. INSTALATION
		1. General Film Installation:
			1. Install in accordance with manufacturers written instructions and approved shop drawings.
			2. Accurately cut film with straight edges to required sizes allowing 1/16 to 1/8 inch (2 to 3 mm) gap at perimeter of glazed panel.
			3. Remove release liner immediately prior to adhering film to glass.
			4. Apply mounting solution to film and glass.
			5. Apply film to glass and removed air bubbles, wrinkles, and other defects using a squeegee. Three to five complete passes are required to completely remove mounting solution from between film and glass.
	4. FIELD QUALITY CONTROL
		1. After installation, view film from a distance of 10 feet (3 meters) against a light colored background. Ensure appearance is uniform without streaks, bands, thin spots, and pinholes in accordance with the IWFA Architectural Visual Inspection Standard for Applied Window Film as Adopted by the IWFA May 15,1999.
		2. If installed film does not meet these requirements removed and replaced with new film.
	5. CLEANING AND PROTECTION
		1. Inspect installation. Verify that it is complete and complies with requirements and manufacturer's instructions to provide specified anti-intrusion requirements. Correct deficiencies.
		2. Clean glass following installation. Remove excess sealants and other glazing materials from adjacent finished surfaces.
		3. Remove labels and protective covers.

END OF SECTION