



WINDOW FILMS • PHOTOVOLTAICS • CUSTOM COATINGS

## SECTION 08877

### SAFETY AND SECURITY FILM

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Safety and Security film field applied to existing glass.
- B. Safety and Security film factory applied to glazed surfaces.

##### 1.2 RELATED SECTIONS

- A. Section 08110 - Steel Doors and Frames: New doors with glazing to receive film.
- B. Section 08510 - Steel Windows: New windows to receive film.
- C. Section 08520 - Aluminum Windows: New windows to receive film.
- D. Section 08590 - Window Restoration and Replacement: Existing windows to receive film.
- E. Section 08900 - Glazed Curtain Walls: New glazing to receive film.

##### 1.3 REFERENCES

- A. American Society for Testing Materials (ASTM)
- B. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
- C. Association of Industrial Metallizers, Coaters and Laminators (AIMCAL)
- D. American National Standards Institute (ANSI)
- E. International Standards Organization (ISO)
- F. International Window Film Association (IWFA)
- G. Government Services Administration (GSA)
- H. Consumer Products Safety Commission (CPSC)
- I. Code of Federal Regulations (CFR)

##### 1.4 PERFORMANCE REQUIREMENTS

- A. Storm Testing: The 8 and 10 mil Armorcoat safety films shall be capable of meeting the following tests:
  - 1. Small Missile Impact Test conforming to Miami-Dade Protocol, SBCCI, and the Florida Building Codes.





WINDOW FILMS • PHOTOVOLTAICS • CUSTOM COATINGS

2. Large Missile Impact Test meeting the Florida Building Code, 90 to 100 mph Wind Zone.
  3. Cyclic Pressure Testing conforming to Miami-Dade Protocol, SBCCI, and the Florida Building Codes.
- B. Bomb Blast Simulation: Independent testing of Armorcoat safety films with results from high-explosive tests evaluating the capability of Armorcoat window film in 4 mil to 10 mil thicknesses to reduce the hazards of flying glass shards during an explosion.
- C. Impact Resistance: The Armorcoat safety films shall be capable of meeting the following tests:
1. 4 mil Armorcoat safety films: Passes ANSI Z 97.1 (100 - 150 ft lb).
  2. 7 mil and thicker Armorcoat safety films:
    - a. Passes ANSI Z 97.1 (100 - 150 ft lb).
    - b. Passes CFR 1201, Category II.

#### 1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Manufacturer's data sheets on each product to be used, including:
1. Physical properties and independent testing agency reports showing compliance with specified tests.
  2. Preparation instructions and recommendations.
  3. Storage and handling requirements and recommendations.
  4. Installation methods.
- C. Shop Drawings: Detailing installation of film, anchoring accessories, and sealant.
- D. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- E. Manufacturer's warranty information.

#### 1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Solar film manufacturer shall be the standard product of a manufacturer regularly engaged in the manufacture and distribution of such products in satisfactory use for a minimum of 5 years. Manufacturing facility shall be ISO 9001-2000 registered.
- B. Installer Qualifications: Documented experience in the application of self-adhesive window films with at least 3 applications of similar size and complexity, and approved by the solar film manufacturer.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
1. Apply film to one window designated by Architect.
  2. Do not proceed with remaining work until workmanship and color, is approved by Architect.

#### 1.7 DELIVERY, STORAGE, AND HANDLING





WINDOW FILMS • PHOTOVOLTAICS • CUSTOM COATINGS

- A. Store products indoors in manufacturer's unopened packaging until ready for installation.

## 1.8 PROJECT CONDITIONS

- A. 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 absolute limits.

## 1.9 WARRANTY

- A. See Section 01780 - Closeout Submittals for additional warranty requirements.
- B. Provide film manufacturer's limited warranty against failure of film, including change of color, peeling, bubbling, rippling, cracking, delamination and demetalization; include cost of material and labor for removal and reinstallation. Duration of warranty shall be as follows:
  - 1. Twelve Year Limited Warranty for the following products:
    - a. 4 Mil Solar Bronze 35

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Solar Gard, 4540 Viewridge Ave; San Diego, CA 92123. Toll Free: (877) 273-4364. Tel: (858) 576-0200. Fax: (858) 571-3605. Email: [info@solargard.com](mailto:info@solargard.com)  
Web: [www.solargard.com/us](http://www.solargard.com/us)
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

### 2.2 SAFETY AND SECURITY FILM

- A. Film shall be manufactured from polyethylene terephthalate (polyester) and combined with sputtered metal coatings to achieve the desired performance and aesthetic characteristics. The finished film shall be self adhesive and include a coating to reduce the effects of scratching and abrasions that occur in normal daily activity and also include absorbers and inhibitors for the purpose of reducing ultra violet rays.
- B. 4 Mil Solar Bronze 35 Safety and Security film shall have the following properties when applied to 1/8 inch (3 mm) clear float glass.
  - 1. Film Performance Results, Nominal:
    - a. Solar Transmittance 19 percent
    - b. Solar Absorptance 38 percent
    - c. Solar Reflectance 43 percent
    - d. Visible Light Transmittance 32 percent
    - e. Visible Light Reflectance (Exterior) 29 percent
    - f. Visible Light Reflectance (Interior) 27 percent
    - g. Emissivity .68
    - h. U-Factor (Winter) .95
    - i. Shading Coefficient .34





WINDOW FILMS • PHOTOVOLTAICS • CUSTOM COATINGS

- j. Solar Heat Gain Coefficient .29
- k. Ultraviolet Light Blocked (300-380 nanometers) > 99 percent
- l. Total Solar Energy Rejected 71 percent
- 2. Physical and Thermal Properties, Nominal:
  - a. Film Thickness: 4.0 mils (100 microns).
  - b. Peel Strength: 2,500 g/in (984 g/cm)
  - c. Tensile Strength; 30,000 lbs/sq in (2,110 kg/cm sq).
  - d. Break Strength; 120 lbs/in (22 kg/cm).
  - e. Elongation at Break: >100 percent.
  - f. Combustion Rate: Negligible.
  - g. Melting Point: 260-265 degrees C.
  - h. ASTM D 4830 Puncture Test: 70 lbs (32 (kg)).
- C. 4 Mil Solar Bronze 35 Safety and Security film shall have the following properties when applied to 1/4 inch (6 mm) clear float glass.
  - 1. Film Performance Results, Nominal:
    - a. Solar Transmittance 18 percent
    - b. Solar Absorptance 46 percent
    - c. Solar Reflectance 36 percent
    - d. Visible Light Transmittance 31 percent
    - e. Visible Light Reflectance (Exterior) 28 percent
    - f. Visible Light Reflectance (Interior) 27 percent
    - g. Emissivity .68
    - h. U-Factor (Winter) 1.01
    - i. Shading Coefficient .34
    - j. Solar Heat Gain Coefficient .30
    - k. Ultraviolet Light Blocked (300-380 nanometers) > 99 percent
    - l. Total Solar Energy Rejected 70 percent
  - 2. Physical and Thermal Properties, Nominal:
    - a. Film Thickness: 4.0 mils (100 microns).
    - b. Peel Strength: 2,500 g/in (984 g/cm)
    - c. Tensile Strength; 30,000 lbs/sq in (2,110 kg/cm sq).
    - d. Break Strength; 120 lbs/in (22 kg/cm).
    - e. Elongation at Break: >100 percent.
    - f. Combustion Rate: Negligible.
    - g. Melting Point: 260-265 degrees C.
    - h. ASTM D 4830 Puncture Test: 70 lbs (32 (kg)).
    - i. Meets GSA Level C criteria (3B at 4psi, 28psi/milliseconds).

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### 3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.





WINDOW FILMS • PHOTOVOLTAICS • CUSTOM COATINGS

- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### 3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions. Installation must be accomplished by a recognized professional installer of film for energy control purposes or safety and security purposes. Completed work must meet IWFA visual acceptance standard.
- B. Install without bubbles, ripples, drips, dirt, cuts, tears or gaps between film and frame.
- C. Clean newly installed film and window frames after installation.
- D. Clean up cleaning solutions, run-off cleaning water and adhesive mounting solution.

### 3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Where installed film could be damaged by subsequent construction provide tape warning strips or barricades to prevent contact.

END OF SECTION

