



SECTION 08 87 23

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 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. General Services Administration (GSA)
- H. Consumer Products Safety Commission (CPSC)
- I. Code of Federal Regulations (CFR)

1.3 PERFORMANCE REQUIREMENTS

- A. Safety Glazing Impact Performance:
 - 1. Meets ANSI Z97.1 Class A,-Unlimited and 16 CFR 1201 Category II 400 ft-lbs impact resistance
 - 2. Meets ANSI Z97.1 Class B and 16 CFR 1201 Category I 150 ft-lbs impact resistance
 - 3. Meets accelerated weathering requirements in accordance with ANSI Z97.1
- B. Flammability: Meets surface burning characteristics in accordance with ASTM E-84 Class A
 - 1. Flame Spread Index = 15
 - 2. Smoke Development Index = 20
- C. Blast Mitigation Performance: Independent test results when tested in accordance with GSA TS01-2003, ISO 16933, ASTM F1642 and UFC 4-010-01
 - 1. GSA TS-01-2003, GSA Performance Condition with a minimum blast pressure of 4 psi-28 psi-msec when applied with GE SCS2000 Silpruf on 1/4 inch (6 mm) single pane tempered glass: 2.
 - 2. GSA TS-01-2003, GSA Performance Condition with a minimum blast pressure of 4 psi-28 psi-msec when applied with GE SCS2000 Silpruf on 1/4 inch (6 mm) double pane annealed glass: 2.

3. GSA TS-01-2003, GSA Performance Condition with a minimum blast pressure of 4 psi-28 psi-msec when applied with Dow Corning 995 on 1/4 inch (6 mm) single pane annealed glass: 3A.
4. GSA TS-01-2003, GSA Performance Condition with a minimum blast pressure of 4 psi-28 psi-msec when applied as a daylight application on 1/4 inch (6 mm) single pane annealed glass: 3B.
5. GSA TS-01-2003, GSA Performance Condition with a minimum blast pressure of 4 psi-28 psi-msec when applied as a daylight application on 1/4 inch (6 mm) single pane tempered glass: 3B.
6. ISO 16933 Hazard Rating with a minimum blast pressure of 7 psi-36 psi-msec when applied with GE SCS2000 Silpruf on 1/4 inch (6 mm) double pane tempered glass: "Hazard Rating B (EXV33(B))".
7. ISO 16933 Hazard Rating with a minimum blast pressure of 7 psi-36 psi-msec when applied with GE SCS2000 Silpruf on 1/4 inch (6 mm) double pane annealed glass: "Hazard Rating C (EXV33(C))".
8. ISO 16933 Hazard Rating with a minimum blast pressure of 7 psi-36 psi-msec when applied with SikaSil® SG20 on 1/4 inch (6 mm) single pane tempered glass: "Hazard Rating C (EXV33(C))".
9. ISO 16933 Hazard Rating with a minimum blast pressure of 7 psi-36 psi-msec when applied with an aluminum mechanical attachment on 1/4 inch (6 mm) double pane annealed glass: "Hazard Rating C (EXV33(C))".
10. ASTM F 1642 Hazard Level with a minimum blast pressure of 4 psi-28 psi-msec when applied with GE SCS2000 Silpruf on 1/4 inch (6 mm) double pane annealed glass: "No Hazard".
11. ASTM F 1642 Hazard Level with a minimum blast pressure of 7 psi-36 psi-msec when applied with GE SCS2000 Silpruf on 1/4 inch (6 mm) double pane tempered glass: "No Hazard".
12. UFC 4-010-01 Protection Level with a minimum blast pressure of 4 psi-28 psi-msec when applied with GE SCS2000 Silpruf on 1/4 inch (6 mm) double pane annealed glass: "High Level of Protection".
13. UFC 4-010-01 Protection Level with a minimum blast pressure of 7 psi-36 psi-msec when applied with GE SCS2000 Silpruf on 1/4 inch (6 mm) double pane tempered glass: "High Level of Protection".

D. Volatile Organic Compound Content:

1. Compliant with the performance standard established for low-emitting materials under the CDPH, the Collaborative for High Performance Schools (CHPS) and the LEED v4 programs.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00.
- B. Product Data: 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 Certificates: Certify products meet or exceed specified requirements.

F. Manufacturer's warranty information.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Products specified shall be a standard product of a manufacturer regularly engaged in the manufacturing and distribution of such products for a minimum of 10 years.
1. Provide a Quality Management certificate stating the manufacturing facility's location conformance with ISO 9001:2004
 2. Provide an Environmental Management certificate stating the manufacturing facility's location conformance with ISO 14001:2008
- 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.

1.6 DELIVERY, STORAGE, AND HANDLING

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

1.7 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.

1.8 WARRANTY

- A. See Section 01 78 23 - Preventative Maintenance Instructions.
- B. Provide film manufacturer's limited warranty against failure of film, including change of color, peeling, bubbling, rippling, cracking, delamination and demetallization; includes cost of material and labor for removal and reinstallation. Duration of warranty shall be as follows:
1. Twelve Year Limited Warranty for the following safety and security film products:
 - a. Solar Gard Armorcoat 14-mil Clear

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Solar Gard®, which is located at: 4540 View Ridge Ave. ; San Diego, CA 92123; Toll Free Tel: 877-273-4364; Tel: 858-576-0200; Fax: 858-571-3605; Email:info@solargard.com; Web:www.solargard.com
- B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

2.2 SAFETY AND SECURITY FILM

- A. Solar Gard Armorcoat 14-mil clear safety film shall have the following nominal properties:
1. Film Performance Results when applied to 1/4 inch (6 mm) clear glass with pressure

sensitive adhesive (Nominal)

- a. Film Color: Clear
- b. Solar Transmittance: 71 percent
- c. Solar Absorptance : 20 percent
- d. Solar Reflectance: 9 percent
- e. Visible Light Transmittance: 86 percent
- f. Visible Light Reflectance: (Exterior) 12 percent
- g. Visible Light Reflectance: (Interior) 12 percent
- h. Emissivity: .94
- i. U-Factor (Winter): 1.06
- j. Shading Coefficient: .89
- k. Solar Heat Gain Coefficient: .77
- l. Ultraviolet Light Blocked (300-380 nanometers): > 99 percent
- m. Total Solar Energy Rejected: 23 percent

2. Film Performance Results when applied to 1/4 inch (6 mm) clear insulated glass with pressure sensitive adhesive (Nominal)

- a. Film Color: Clear
- b. Solar Transmittance: 56 percent
- c. Solar Absorptance : 31 percent
- d. Solar Reflectance: 13 percent
- e. Visible Light Transmittance: 77 percent
- f. Visible Light Reflectance: (Exterior) 19 percent
- g. Visible Light Reflectance: (Interior) 18 percent
- h. Emissivity: .94
- i. U-Factor (Winter): .48
- j. Shading Coefficient: .78
- k. Solar Heat Gain Coefficient: .68
- l. Ultraviolet Light Blocked (300-380 nanometers): > 99 percent
- m. Total Solar Energy Rejected: 32 percent

3. Physical and Thermal Properties, Nominal

- a. Film Thickness: 14 mil (350 micron)
- b. Peel Strength: >2,500 g/in (985 gm./cm).
- c. Tensile Strength: 30,000 lbs./in² (2,110 kg/cm²)
- d. Break Strength: 420 lbs./in (75 kg/cm)
- e. Combustion Rate: Negligible
- f. Melting Point: 500° F (260° C)
- g. ASTM D 4830 Puncture Test: 230 lbs. (104 kg)

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.
- 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