



SECTION 08800

WINDOW FILM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Anti-graffiti window films for glazing systems and mirrors.

1.2 RELATED SECTIONS

- A. Section 08300 – Mirrors; mirrors for architectural application to receive window film.
- B. Section 08500 - Windows; windows to receive architectural window film.
- C. Section 08600 - Skylights; glass skylights to receive architectural window film.
- D. Section 08800 - Glazing; general glazing applications to receive architectural window film.
- E. Section 08900 - Glazed Curtain Walls; curtain walls to receive architectural window film.

1.3 REFERENCES

- A. American National Standards Institute (ANSI):
 - 1. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Material Used in Buildings.
 - 2. ANSI Z26.1 Safety Glazing Materials
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM D 882 - Tensile Properties of Thin Plastic Sheeting.
 - 2. ASTM D 3330 - Peel-Adhesion at 180 Degree Angle.
 - 3. ASTM E 84-16 - Surface Burning Characteristics of Building Materials.
 - 4. ASTM E 162-16 – Flame Spread
 - 5. ASTM E 662-17 – Smoke Generation
- C. Consumer Product Safety Commission
 - 1. CPSC 16 CFR 1201

1.4 PERFORMANCE REQUIREMENTS

- A. Fire Performance: Surface burning characteristics when tested in accordance ASTM E 84-16:
 - 1. Flame Spread: 25, maximum.
 - 2. Smoke Developed: 450, maximum.
 - 3. Must meet Class A Interior Wall and Ceiling Finish
- B. Abrasion Resistance: Film must have a surface coating that is resistant to abrasion such that, less than a 5% change of transmitted light haze will result. This is in accordance with ANSI Z26.1 using 50 cycles and 300 grams of weight and the CF 10 Calbrase wheel.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. 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.
- C. Selection Samples: For each film specified, submit film samples representing manufacturer's film type for the project.
- D. Verification Samples: For each film specified, two samples representing film color and pattern.
- E. 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.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten years' industry experience.
- B. 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 proof of ability to purchase material through authorized distributor or manufacture.
 - 3. Material is to be precut and made to fit panel with no more than 1/8" tolerance and have .1 - .5 radius corners to alleviate peeling at corners.
 - 4. Precutting must be done via CNC or similar device to ensure clean cutting is done.
 - 5. Part number or cataloging is recommended. Engraved in predetermined corner on surface of film with minimum 1/2 font for viewing and cataloging.
- C. 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.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.
- C. Please recycle materials to reduce carbon footprint.

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. Anti-graffiti films are warranted for a period of 2 years when installed outdoors and installed indoors. Installation must be done to manufacturer's guidelines. Warranty is for material failure, not against vandalism.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer:
Graffiti Shield, Inc.
2940 E. La Palma Ave Suite D
Anaheim, CA 92806
(714) 575-1100
sales@graffiti-shield.com
www.graffiti-shield.com

- B. Acceptable Distributor/Installer:

- C. Requests for substitutions will be considered in accordance with provisions of Section 1.6.

2.2 ANTI-GRAFFITI WINDOW AND SURFACE FILM

- A. Anti-Graffiti Window and Surface Film: Glass Shield 4-Mil Anti-Graffiti Film. Optically clear polyester film with a durable acrylic abrasion resistant coating over one surface and a pressure sensitive adhesive over the other. The film may be laminated to other clear polyester film layers to achieve the desired thickness of the film.
 - 1. Physical / Mechanical Performance Properties:
 - a. Film Color: Clear.
 - b. Thickness: Nominal 4.0 mils (.004 in.).
 - c. Tensile Strength (ASTM D 882): 28,000-30,000 lbs./psi.
 - d. Break Strength (ASTM D 882) (Per Inch Width): 190 lbs.
 - e. Elongation at Break (ASTM D 882): >100 percent.
 - f. Peel Strength: 1,000 g/inch. (ASTM D 3330).
 - g. Abrasion Resistance: Film must have a surface coating that is resistant to abrasion such that, less than a 5% change of transmitted light haze will result. This is in accordance with ANSI Z26.1 using 50 cycles and 300 grams of weight and the CF 10 Calbrase wheel.
 - h. Safety Glazing Materials Performance Characteristics (ANSI Z26.1)
Pass The Following Tests:
 - 1. Light stability test 1
 - 2. Luminous transmission test 2
 - 3. Abrasion test 17
 - 4. Chemical resistance test 19
 - 5. Temperature change test 28
 - i. Impact (ANSI Z97.1 and CPSC CFR 1201)
 - 1. Meet requirements of CPSC, Category I, ANSI Class B
 - j. Surface Burn Radiant Heat Source (ASTM E 162-16)
 - 1. Radiant panel index of 0 (zero)
 - k. Surface Burn Building Materials (ASTM E 84-16)

1. Flame spread index = 0
2. Smoke develop index = 115
- I. Optical Density of Smoke (ASTM E 662-17)
 1. Ds = 0 @ 1.5 min
 2. Ds = 0 @ 4 min
 3. Ds Max < 53 Radiant Source
 4. Ds Max < 84 Pilot Flame
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. Identification: Labeled as to Manufacturer as listed in this Section.
5. Solar Performance Properties: Film applied to 1/4 Inch (6.4 mm) thick clear glass.
 - a. Visible Light Transmission (ASTM E 903): 88 percent.
 - b. Total Solar Reflection (ASTM E 903): Not more than 10 percent.
 - c. Ultraviolet Transmission (ASTM E 903): Less than 1 percent.
 - d. Total Solar Energy Rejection: 17 percent
6. Acid Resistant Top Coat. Must have an acid resistant top coat that does not mar during a vandal attack when acid etching agents are used. Acid agent must wipe off clean and leave no residue in top coat.

PART 3 EXECUTION

3.1 EXAMINATION

- A. 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:
- B. 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.
- C. Commencement of installation constitutes acceptance of conditions.

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.
- B. Tools needed: Spray bottle/tank, slip solution, squeegee/s, snap off blade knife, plastic hard card, lint free towels, SS scraper or nonabrasive scrub pad.
- C. 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 snap off blades as needed.
- D. Remove film and clean glass surface with slip solution (slip solution is composed of ¾ oz. (4 pumps) of slip solution per quart of filtered water) and nonabrasive scrub pad or SS scraper to remove all debris from surface. Clean all edges of frames to clear them of any additional debris.
- E. Remove release liner and spray slip solution on adhesive thoroughly and mist the glass to facilitate proper positioning of film.
- D. Apply film to glass and position correctly, then lightly spray film with slip solution.

- E. Squeegee the top section from middle to the left, then to the right. Next squeegee down center from top to bottom. Then from center to the left with overlapping passes towards the bottom, then from the center to the right with overlapping passes towards the bottom. Spray slip solution to film and repeat squeegee pattern a second time.
- G. Wrap lint free towel around plastic hard card and press any additional water out around all edges. Once done, inspect entire surface for any left over water and remove.
- H. 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.

3.4 CLEANING AND PROTECTION

- A. Remove left over material and debris from Work area. Use necessary means to protect film before, during, and after installation.
- B. Touch-up, repair or replace damaged products before Substantial Completion.
- C. 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