



SECTION 08 87 13
WINDOW FILM

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PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Safety and Security Window Film:
 - 1. Impact protection film attachment systems. (IPA) (IPP)

1.2 RELATED SECTIONS

- A. Section 08 54 13 - Fiberglass Windows.
- B. Section 08 60 00 - Roof Windows and Skylights.
- C. Section 08 83 13 - Mirrored Glass Glazing.
- D. Section 08 44 23 - Structural Sealant Glazed Curtain Wall.

1.3 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM D 624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
 - 2. ASTM D 2240 - Standard Method for Rubber Property - Durometer Hardness.
 - 3. 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.
 - 4. ASTM E 1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.
 - 5. ASTM F 1642 - Standard Method of Test for Glazing and Glazing Systems Subject to Airblast Loadings
 - 6. ASTM F 2912 - Standard Specification for Glazing and Glazing Systems Subject to Airblast Loadings.
- B. GSA-TS01 - Standard Test for Glazing and Glazing Systems Subject to Airblast Loadings.
- C. ISO 16933, International Standard for Glass in Building: Explosion-resistant security glazing - Test and classification for arena air-blast testing.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

- B. Product Data: Manufacturer's current technical literature on each product to be used, including:
 - 1. Manufacturer's Data Sheets.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods.
- C. Verification Samples: For each film specified, two samples representing actual film color and pattern.

1.5 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 experience.
 - 1. Provide documentation that the adhesive used on the specified films is a Pressure Sensitive Adhesive (PSA).
- 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 a commercial building reference list of 5 properties where the installer has applied window film. This list will include the following information:
 - a. Name of building.
 - b. The name and telephone number of a management contact.
 - c. Type of glass.
 - d. Type of film and/or film attachment system.
 - e. Amount of film and/or film attachment system installed.
 - f. Date of completion.
- 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.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Follow Manufacturer's instructions for storage and handling.
- B. Store products in manufacturer's unopened packaging until ready for installation.
- C. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.

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 recommended limits.

1.8 WARRANTY

- A. At project closeout, provide to Owner or Owners Representative an executed current copy of the manufacturer's standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. 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:[request info \(jemannix@mmm.com\)](mailto:request info (jemannix@mmm.com)); Web:www.3m.com/windowfilm
- B. Substitutions: Not permitted.

2.2 3M IMPACT PROTECTION FILM ATTACHMENT SYSTEMS

- A. 3M Impact Protection Profile (IPP): Weatherable, flexible-mechanical style film attachment made of extruded rubber profile with two strips of double coated foam tape: one strip for bonding to applied film and the other strip for bonding to the window frame.
 - 1. 3M Impact Protection Profile, BP-950.
 - a. Total width: 1.3 inches.
 - b. Tape width: 0.625 inches.
 - 2. Material Properties:
 - a. Full Adhesion: 1 - 2 days (25 degrees C, 50% RH)
 - b. Ultimate Tensile Strength (ASTM D412): > 20,500 psi
 - c. Ultimate Elongation (ASTM D412): 400%
 - d. Break Strength, Die B (ASTM D624): > 71 ppi
 - e. Durometer Hardness, Shore A: (ASTM D2240): 70 pts
 - 3. Uniformity: Product shall have uniform consistency and appearance.
 - 4. Impact Resistance and Pressure Cycling:
 - a. As part of a filmed glass system, film attachment shall demonstrate ability to withstand Small Missile A impact, with subsequent pressure cycling (per ASTMs E 1996 and E 1886) at +/- 50 psf design pressure.
 - 5. Blast Hazard Mitigation:
 - a. GSA level "2" rating (minimal hazard) with minimum blast load of 4 psi overpressure and 28 psi*msec blast impulse.
 - b. GSA level "3B" rating (low hazard) with minimum blast load of 10 psi overpressure and 89 psi*msec blast impulse.
 - c. ASTM F1642 rating of "Low Hazard" with minimum blast load of 4 psi overpressure and 28 psi*msec blast impulse.

PART 3 EXECUTION

3.1 EXAMINATION

- A. 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.
 - a. 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.
- B. Impact Protection Profile Examination:
 - 1. If application of window film is/was the responsibility of another installer, notification in writing shall be made of deviations from manufacturer's recommended installation tolerances and conditions.

2. Windows and frames shall be examined to ensure that they are fit to receive the Impact Protection Profile in a manner such that the two profile adhesive strips will be perpendicularly opposed to each other and that they will not contact glazing stops or frame gaskets without stretching the profile.
3. Filmed glass surfaces receiving new attachment should first be examined to verify that they are free from defects and imperfections, and that the film edges extend sufficiently to the frame edges.
4. Do not proceed with installation until film and frame 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.
5. Upon the customer's request, an adhesion test to the frame surface may be conducted by applying a 4 - 6 inch long strip on the frame surface, using the sufficient pressure to achieve good adhesive wet-out. Allow the Impact Protection Profile to cure for 1-2 days and test adhesion by removing the test strip. If cohesive failure is observed (adhesive residue left behind on the frame surface), adhesion is acceptable; if adhesive failure is observed (clean peel from the frame), adhesion is unacceptable and product is either not recommended, or an adhesion promoter, such as 3M Primer 94, shall be used.

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.
- C. Refer to Manufacturer's installation instructions for methods of preparation for Impact Protection Adhesive or Impact Protection Profile film attachment systems.

3.3 INSTALLATION

- A. 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.
- B. Impact Protection Profile Installation:
 1. The film attachment system shall be applied according to the specifications of the Manufacturer by an Authorized Dealer/Applicator trained to install 3M Impact Protection Profile. Refer to 3M publication, 70-0709-0323-5, 3M Impact Protection Profile Attachment System Installation Instructions.
 2. Each profile piece shall span continuously to both sides of the window, within 1/8 inch to the frame edge. Splicing the profile between frame edges is prohibited.
 3. Profile shall be aligned and applied by 3M recommended or approved methods and

tools to ensure a quality installation.

4. Corner joints shall be fabricated by 3M recommended and approved methods. No part of the profile adhesive shall make contact with an adjacent profile.
5. Sufficient pressure shall be evenly applied along the entire length of the profile to ensure full adhesion from both adhesive strips. A roller tool is required to minimize entrapment of air in the adhesive.

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