



SECTION 08872

ARCHITECTURAL WINDOW FILM

For best results, display hidden notes to specifier by clicking TOOLS / OPTIONS / VIEW / HIDDEN TEXT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Interior Window Film.
- B. Decorative Window Film.
- C. Privacy Window Film.

1.2 RELATED SECTIONS

- A. Section 08500 - Windows: Windows to receive architectural window film.
- B. Section 08600 - Skylights: Glass Skylights to receive architectural window film.
- C. Section 08800 - Glazing: General Glazing applications to receive architectural window film.
- D. Section 08900 - Glazed Curtain Walls: Curtain Walls to receive architectural window film.

1.3 REFERENCES

- A. ASHRAE - American Society for Heating, Refrigeration, and Air Conditioning Engineers; Handbook of Fundamentals, 1997 Edition.
- B. ASTM E 84 - Standard Method of Test for Surface Burning Characteristics of Building Materials.
- C. ASTM E 308 - Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System.
- D. ASTM E 903 - Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres.
- E. ASTM G 26 - Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight.

1.4 PERFORMANCE REQUIREMENTS

- A. Fire Performance: Surface burning characteristics when tested in accordance ASTM E 84:
 - 1. Flame Spread: 25, maximum.

2. Smoke Developed: 450, maximum.

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 finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- D. Verification Samples: For each finish product specified, two samples representing actual product, color, and patterns.

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 (10) years experience.
- B. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five (5) 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 ____ (#) 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.
 - e. Amount of film installed.
 - f. Date of completion.
 3. Provide a Glass Stress Analysis of the existing glass and proposed glass/film combination as recommended by the film manufacturer.
- 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.

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. 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 Films; 3M Center Bldg. 0223-02-S-24, St. Paul, MN 55144-1000. ASD. 3M Window Film Contact: Michael Hassenauer. Tel: (651) 737-1053. Fax: (651) 736-0611. Email: mjhassenauer@mmm.com. Web: <http://www.3m.com/windowfilm>.
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 COMBINATION PATTERNED FILM

- A. Fasara - Illumina Decorative / Privacy Glazing Film:
 - 1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 - 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 49 percent.
 - 3. Visible Light Rejected (ASTM E 903): Not less than 19 percent.
 - 4. Solar Heat Reduction: Not less than 14 percent.
 - 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.62.
 - 6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.

2.3 DOT PATTERNED FILM

- A. Fasara - Aura 9 Decorative / Privacy Glazing Film:
 - 1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 - 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 83 percent.
 - 3. Visible Light Rejected (ASTM E 903): Not less than 8 percent.
 - 4. Solar Heat Reduction: Not less than 7 percent.
 - 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.94.
 - 6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.
- B. Fasara - Luna 6 Decorative / Privacy Glazing Film:

1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 44 percent.
 3. Visible Light Rejected (ASTM E 903): Not less than 21 percent.
 4. Solar Heat Reduction: Not less than 15 percent.
 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.67.
- C. Fasara - Luna 9 Decorative / Privacy Glazing Film:
1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 39 percent.
 3. Visible Light Rejected (ASTM E 903): Not less than 23 percent.
 4. Solar Heat Reduction: Not less than 16 percent.
 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.63.
 6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.
- D. Fasara - Luna Cell Decorative / Privacy Glazing Film:
1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 31 percent.
 3. Visible Light Rejected (ASTM E 903): Not less than 24 percent.
 4. Solar Heat Reduction: Not less than 17 percent.
 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.59.
 6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.
- E. Fasara - Luna Pico Decorative / Privacy Glazing Film:
1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 32 percent.
 3. Visible Light Rejected (ASTM E 903): Not less than 24 percent.
 4. Solar Heat Reduction: Not less than 17 percent.
 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.60.
 6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.
- F. Fasara - Vista Decorative / Privacy Glazing Film:
1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 69 percent.
 3. Visible Light Rejected (ASTM E 903): Not less than 16 percent.
 4. Solar Heat Reduction: Not less than 13 percent.
 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.80.
 6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.

2.4 LINE PATTERNED FILM

- A. Fasara - Arpa Decorative / Privacy Glazing Film:
1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 46 percent.

3. Visible Light Rejected (ASTM E 903): Not less than 22 percent.
 4. Solar Heat Reduction: Not less than 17 percent.
 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.66.
 6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.
- B. Fasara - Leise Decorative / Privacy Glazing Film:
1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 74 percent.
 3. Visible Light Rejected (ASTM E 903): Not less than 8 percent.
 4. Solar Heat Reduction: Not less than 7 percent.
 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.94.
 6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.
- C. Fasara - Fine Decorative / Privacy Glazing Film:
1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 46 percent.
 3. Visible Light Rejected (ASTM E 903): Not less than 25 percent.
 4. Solar Heat Reduction: Not less than 19 percent.
 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.62.
 6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.
- D. Fasara - Shutie Decorative / Privacy Glazing Film:
1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 52 percent.
 3. Visible Light Rejected (ASTM E 903): Not less than 21 percent.
 4. Solar Heat Reduction: Not less than 17 percent.
 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.69.
 6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.

2.5 SINGLE PATTERNED FILM

- A. Fasara - Altair Decorative / Privacy Glazing Film:
1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 52 percent.
 3. Visible Light Rejected (ASTM E 903): Not less than 16 percent.
 4. Solar Heat Reduction: Not less than 12 percent.
 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.73.
 6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.
- B. Fasara - Chamonix Decorative / Privacy Glazing Film:
1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 47 percent.

3. Visible Light Rejected (ASTM E 903): Not less than 29 percent.
 4. Solar Heat Reduction: Not less than 20 percent.
 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.67.
 6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.
- C. Fasara - Fine Crystal Decorative / Privacy Glazing Film:
1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 83 percent.
 3. Visible Light Rejected (ASTM E 903): Not less than 8 percent.
 4. Solar Heat Reduction: Not less than 7 percent.
 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.93.
 6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.
- D. Fasara - Lausanne Decorative / Privacy Glazing Film:
1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 82 percent.
 3. Visible Light Rejected (ASTM E 903): Not less than 9 percent.
 4. Solar Heat Reduction: Not less than 8 percent.
 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.90.
 6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.
- E. Fasara - Luce Decorative / Privacy Glazing Film:
1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 31 percent.
 3. Visible Light Rejected (ASTM E 903): Not less than 25 percent.
 4. Solar Heat Reduction: Not less than 17 percent.
 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.59.
 6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.
- F. Fasara - Mat Crystal I Decorative / Privacy Glazing Film:
1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 83 percent.
 3. Visible Light Rejected (ASTM E 903): Not less than 8 percent.
 4. Solar Heat Reduction: Not less than 8 percent.
 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.91.
 6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.
- G. Fasara - Milano Decorative / Privacy Glazing Film:
1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 59 percent.
 3. Visible Light Rejected (ASTM E 903): Not less than 17 percent.
 4. Solar Heat Reduction: Not less than 21 percent.

5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.75.
 6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.
- H. Fasara - Opaque White Decorative / Privacy Glazing Film:
1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 6 percent.
 3. Visible Light Rejected (ASTM E 903): Not less than 52 percent.
 4. Solar Heat Reduction: Not less than 41 percent.
 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.29.
 6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.
- I. Fasara - Oslo Decorative / Privacy Glazing Film:
1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 77 percent.
 3. Visible Light Rejected (ASTM E 903): Not less than 9 percent.
 4. Solar Heat Reduction: Not less than 8 percent.
 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.89.
 6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.
- J. Fasara - Rikyu Decorative / Privacy Glazing Film:
1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 47 percent.
 3. Visible Light Rejected (ASTM E 903): Not less than 18 percent.
 4. Solar Heat Reduction: Not less than 13 percent.
 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.69.
 6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.
- K. Fasara - Sagano Decorative / Privacy Glazing Film:
1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 53 percent.
 3. Visible Light Rejected (ASTM E 903): Not less than 16 percent.
 4. Solar Heat Reduction: Not less than 12 percent.
 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.75.
 6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.
- L. Fasara - San Marino Decorative / Privacy Glazing Film:
1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 28 percent.
 3. Visible Light Rejected (ASTM E 903): Not less than 27 percent.
 4. Solar Heat Reduction: Not less than 42 percent.
 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.55.

6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.
- M. Fasara - Vega Decorative / Privacy Glazing Film:
1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 49 percent.
 3. Visible Light Rejected (ASTM E 903): Not less than 16 percent.
 4. Solar Heat Reduction: Not less than 12 percent.
 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.71.
 6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.
- N. Fasara - Yamato Decorative / Privacy Glazing Film:
1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 52 percent.
 3. Visible Light Rejected (ASTM E 903): Not less than 15 percent.
 4. Solar Heat Reduction: Not less than 11 percent.
 5. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): Not less than 0.75.
 6. 3M Window Film Point of Contact - Michael Hassenauer 651-737-1053. Email: mjhassenauer@mmm.com.

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.
- B. 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.
- C. 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.
- D. Apply film to glass and lightly spray film with slip solution.

- E. Squeegee from top to bottom of window. Spray slip solution to film and squeegee a second time.
- F. Bump film edge with lint-free towel wrapped around edge of a 5-way tool.
- G. 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