

SPECIFIER'S NOTE: THIS DOCUMENT IS A GUIDE FOR WRITING A SPECIFICATION ON WINDOW FILMS. DETERMINE SUITABILITY OF TEXT AND EDIT FOR PROJECT SPECIFIC REQUIREMENTS. COORDINATE WITH OTHER DOCUMENTS WITHIN THE PROJECT MANUAL.

SECTION 088755

GRAFFITI RESISTANT GLAZING FILMS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes sacrificial film products designed and applied to protect glass surfaces from disfigurement.

1.02 REFERENCES

- A. The following standards are referenced in this Section
 1. ASTM E-84, "Test Method for Surface Burning Characteristics of Building Materials".
 2. ASTM D 882, "Standard Test Method for Tensile Properties of Thin Plastic Sheeting."
 3. ASTM E 903, "Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres"
 4. ASTM D 1044, "Test Method for Resistance of Transparent Plastics to Surface Abrasion."
 5. ASTM D 4830, "Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing. Section 7: Puncture Strength."

1.03 PERFORMANCE REQUIREMENTS

- A. Thermal and Optical Performance Properties: Provide glazing films with the following thermal and optical performance properties (on 1/8 inch clear glass) as determined according to procedures indicated in ASHRAE Handbook of Fundamentals:

1. Solar Energy Rejected:	16%
2. Shading Coefficient:	.97
3. Solar Reflectance:	9%
4. Solar Absorptance:	10%
5. Solar Transmittance:	81%
6. Visible Light Transmittance:	89%
7. U-Value (winter median):	1.02
8. Ultraviolet Transmission:	<5%

Provide films with UV absorbing materials that limit the weighted UV transmission to less than 5 percent when measured in accordance with ASTM E 903.



- B. Scratch Resistance: Provide films that have 5.0 percent maximum haze increase when tested to ASTM D 1044, using 100 revolutions, a CS-10F Taber abraser and 500 g weights.
- C. Surface Burning Characteristics: Provide films that have Flame Spread Index of 0 and Smoke Development Index of 30 or less when tested in accordance to ASTM E 84.
- D. Puncture Strength of 79 lbs under ASTM D4830.
- E. Tensile Properties: When measured in accordance with ASTM D 882
 - a. Minimum Tensile Strength of film: 30,000 psi. (as reported by Polyester Supplier – average).
 - b. Minimum Elongation at Break: 100%.
 - c. Minimum Break Strength: 130 lb/in.

SPECIFIER'S NOTE: FILMS HAVE SCRATCH RESISTANT COATING ON INBOARD SURFACE. FILM IS AVAILABLE IN 4 MIL AND 76MIL THICKNESSES. 4 MIL FILM CAN BE USED IN GRAFFITI RESISTANT APPLICATIONS. WHERE GLASS MAY BE SUBJECT TO VANDALISM, USE 6 MIL FILM. USE PARAGRAPH A-E (Above) AND ASSOCIATED TEST ABOVE FOR 4 MIL THICKNESS FILM. USE PARAGRAPH A-E (Below) AND ASSOCIATED TEST BELOW FOR 6 MIL THICKNESS FILM.

- A. Thermal and Optical Performance Properties: Provide glazing films with the following thermal and optical performance properties (on 1/8 inch clear glass) as determined according to procedures indicated in ASHRAE Handbook of Fundamentals:

1. Solar Energy Rejected:	17%
2. Shading Coefficient:	.95
3. Solar Reflectance:	8%
4. Solar Absorptance:	13%
5. Solar Transmittance:	79%
6. Visible Light Transmittance:	89%
7. U-Value (winter median):	1.02
9. Ultraviolet Transmission:	<1%

Provide films with UV absorbing materials that limit the weighted UV transmission to less than 5 percent when measured in accordance with ASTM E 903.
- B. Scratch Resistance: Provide films that have 5.0 percent maximum haze increase when tested to ASTM D 1044, using 100 revolutions, a CS-10F Taber abraser and 500 g weights.
- C. Surface Burning Characteristics: Provide films that have Flame Spread Index of 0 and Smoke Development Index of 30 or less when tested in accordance to ASTM E 84.
- D. Puncture Strength of 111 lbs under ASTM D4830.

- E. Tensile Properties: When measured in accordance with ASTM D 882
 - a. Minimum Tensile Strength of film: 30,000 psi. (as reported by Polyester Supplier – average).
 - b. Minimum Elongation at Break: 100%.
 - c. Minimum Break Strength: 170 lb/in.

1.04 SUBMITTALS

- A. Product Data (on 1/8 inch clear glass): For each film product indicated.
- B. Samples: 12-inch square samples of each glazing film.
- C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- D. Closeout Submittals: Upon completion of the Work, submit the following:
 - 1. Maintenance (cleaning) and replacement instructions.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Engage a firm experienced in manufacturing systems similar to those indicated for this Project and meeting the standards of the International Standards Organization (ISO), ISO 9001 Quality Assurance in Production and Installation.
- B. Installer Qualifications: Engage an experienced installer certified, licensed, or otherwise qualified by film manufacturer as having the necessary experience, staff, and training to install manufacturer's products according to specified requirements.
- C. Mockups: Apply glazing films in locations as directed to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution.
 - 1. Obtain approval of field samples before continuing with remainder of installation.
 - 2. Maintain field samples during remainder of installation in an undisturbed condition as a standard for judging the completed Work.
 - 3. Approved field samples may become part of the completed Work.
- D. Preinstallation Conference: Before installing glazing films, conduct conference at Project site. Conduct preinstallation conference in conjunction with installation of mockup.
 - 1. Meet with Owner, Architect, glazing film Installer and glazing film manufacturer's representative.
 - 2. Review methods and procedures related to installation, including manufacturer's written instructions.
 - 3. Examine substrate conditions for compliance with requirements.

4. Review temporary protection measures required during and after installation.
5. Document proceedings, including corrective measures or actions required, and furnish copy of record to each participant.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing films according to manufacturer's written instructions and as needed to prevent damage condensation, temperature changes, direct exposure to sun, or other causes.

1.07 PROJECT CONDITIONS

- A. Environmental Limitations: Do not proceed with film installation when ambient and substrate temperature conditions are outside limits permitted by manufacturer and when glass substrates are wet from frost, condensation, or other causes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS/PRODUCTS

- A. Provide one of the products:
 1. CPFilms Inc.; LLumar Magnum Safety and Security Film.

SPECIFIER'S NOTE: IN SUBPARAGRAPH BELOW, SELECT THICKNESS OF FILM.

- B. Product Description: Single-layered product, [4][6] mil thick, applied to interior glass surfaces, consisting of from outboard surface to inboard surface:
 1. Removable release liner.
 2. Pressure sensitive adhesive.
 3. Clear, dyed or metallized layers of polyester film.
 4. Scratch resistant coating.

2.02 GLAZING FILM ACCESSORIES

- A. General: Provide products complying with requirements of glazing film manufacturer for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Adhesive: Pressure sensitive acrylic adhesive system.
- C. Cleaners, Primers, and Sealers: Types recommended by glazing film manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine glass and surrounding adjacent surfaces for conditions affecting installation.

1. Report conditions that may adversely effect installation. In report, include description of any glass that is broken, chipped, cracked, abraded, or damaged in any way.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Immediately before beginning installation of films, clean glass surfaces of substances that could impair glazing film's bond, including mold, mildew, oil, grease, dirt and other foreign materials.
- C. Protect window frames and surrounding conditions from damage during installation.

3.03 INSTALLATION

- A. General: Comply with glazing film manufacturers' written installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
 1. Install film continuously, but not necessarily in one continuous length.
 - a. If seamed, install with no gaps. Horizontal seams are allowed. No vertical seams. Install seams horizontally, plumb and as high as possible.
 2. Do not remove release liner from film until just before each piece of film is cut and ready for installation.
 3. Install film with mounting solution and custom cut to the glass with neat, square corners, and edges to within 1/16 inch of the window frame.
 4. Install film absent bubbles, wrinkles, blisters, edge lifting and blemishes (within the installing technician's control).
- B. After installation, view film from a distance of 10 feet against a bright uniform sky or background. Film shall appear uniform in appearance with no visible streaks, banding, thin spots or pinholes.
 1. If installed film does not meet these criteria, remove and replace with new film.

3.04 CLEANING

- A. Remove excess mounting solution at finished seams, perimeter edges, and adjacent surfaces.
- B. Use cleaning methods recommended by glazing film manufacturer.
- C. Replace films that cannot be cleaned.

END OF SECTION