SECTION 08 87 23

SAFETY AND SECURITY WINDOW FILMS

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\*\* NOTE TO SPECIFIER \*\* Madico®, Inc.; Commercial and residential solar control and safety films.  
This section is based on the products of Madico®, Inc., which is located at:  
9251 Belcher Rd. N.  
Pinellas Park, FL 33782  
Toll Free Tel: 888-887-2022  
Tel: 727-327-2544  
Email:[request info (contact@madico.com)](http://admin.arcat.com/users.pl?action=UserEmail&company=Madico26reg+Inc&coid=33948&rep=&fax=&message=RE:%20Spec%20Question%20(08870mad):%20%20&mf=)  
Web:<http://www.madico.com/window-film>|<http://www.safetyshield.com/products/>  
[[Click Here](http://www.arcat.com/arcatcos/cos33/arc33948.html)] for additional information.  
Madico, Inc. innovates, manufactures and distributes a broad range of materials-based solutions including window films, coatings and laminates for numerous industries across the globe from automotive and architecture to healthcare and aerospace. Since 1903, Madico has pioneered products with an unrivaled commitment to quality.  
An award-winning organization, Madico is a company that puts customers first by embracing a flexible, collaborative manufacturing style that nurtures new customers and strengthens experienced ones. The company's business segments include specialty film, window film and diversified business.  
The Window Films division develops advanced laminates that help automobile, home, and commercial property owners curb energy consumption, combat harmful effects of ultraviolet rays, and increase personal safety.

1. GENERAL
   1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

Madico, Inc. manufactures several types of polyester, transparent glazing films that can be either factory or field applied to glazed doors, sidelights, transoms, windows, and curtain walls to enhance safety and security and to improve solar control. An applied film helps contain flying glass shards if windows are shattered by accidental or intentional impact, or explosive pressure.

There are six installation methods for glass with SafetyShield film. Each method provides a specified level of blast resistance. One method uses an aluminum anchoring angle, FrameGard, applied on either two or four sides of the glass opening, another method utilizes a structural silicone, Wet Glaze, applied on all four sides of the glass opening, another method uses a flexible perimeter anchoring strip, GullWing, and a fourth utilizes an energy absorbing cord restraint system, LifeLine, applied across the opening. FrameGard, Wet Glaze, GullWing and LifeLine are included in this specification guide.

* + 1. SafetyShield Safety and Security Films: Transparent film applied to glass to provide shatter resistance, increase safety during blast occurrence, and increase safety during an accidental impact meeting safety glazing standard.
       1. SafetyShield:
          1. SafetyShield 800 Optivision 25 PS SR
  1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 08 40 00 - Entrances, Storefronts, and Curtain Walls.
    2. Section 08 50 00 - Windows.
    3. Section 08 60 00 - Roof Windows and Skylights.
    4. Section 08 83 13 - Mirrored Glass Glazing.
  1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. American National Standards Institute (ANSI):
       1. ANSI/NFRC 100 - 2014 - Procedure for Determining Fenestration Product U-factors.
       2. ANSI/NFRC 200 - 2014 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.
       3. ANSI Z97.1 - Safety Glazing Materials Used In Buildings - Safety Performance Specifications and Methods of Test.
    2. Lawrence Berkeley National Laboratory:
       1. WINDOW 7.4 - Computer program used to model, analyze products made from any combination of glazing layers, gas layers, frames, spacers, and dividers under any environmental conditions and at any tilt.
    3. Consumer Products Safety Council (CPSC):
       1. CPSC Part 1201 - Safety Standard for Architectural Glazing Materials.
    4. General Services Administration (GSA) Performance Criteria:
       1. GSA TS01 2003 - Standard Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings.
       2. Window Glazing Analysis Response and Design (WINGARD) Version 5.5.1 or Later.
    5. International Window Film Association (IWFA):
       1. Architectural Visual Inspection Standard For Applied Window Film As Adopted By The IWFA May 15, 1999.
    6. International Standards Organization (ISO):
       1. ISO 16933 - Glass in building -- Explosion-resistant security glazing -- Test and classification for arena air-blast loading.
    7. ASTM International (ASTM):
       1. ASTM C1184 - Standard Specification for Structural Silicone Sealants.
       2. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
       3. ASTM D1044 - Standard Test Method for Resistance of Transparent Plastics to Surface Abrasion.
       4. ASTM D2582 - Standard Test Method for Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting.
       5. ASTM D3330 - Standard Test Method for Peel Adhesion at 180 Degree Angle.
       6. ASTM E1886 - 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.
       7. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.
       8. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
       9. ASTM E903 - Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres.
       10. ASTM F 1293 - Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loadings.
  1. PERFORMANCE REQUIREMENTS
     1. Safety Glazing Impact resistance (performance to CPSC/ANSI Z97.1):

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Impact resistance for film applied on 1/8 inch (3 mm) thick glass: 400 foot-pounds (55 kilogram meters) minimum to comply with ANSI Z97.1 Class A and CPSC 16 CFR 1201 Category II as safety glass.
    1. Flammability (performance to ASTM E84):
       1. Flammability: Surface burning characteristics when tested in accordance ASTM E 84:
          1. Flame Spread Index: 25, maximum.
          2. Smoke Developed Index: 450, maximum.
    2. Abrasion resistance (performance to ASTM D1044):
       1. Abrasion Resistance: Film must have a surface coating that is resistant to abrasion such that, less than 5 percent increase of transmitted light haze will result in accordance with ASTM D 1044 using 50 cycles, 500 grams weight, and the CS10F Calibrase Wheel.
    3. Blast resistance (performance to GSA or ISO 16933):

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Blast resistance for daylight applied film on 1/4 inch (6 mm) thick glass that is 48 inches (121.92 cm) wide by (66 inches (167.64 cm) high: GSA Level 3B.
      2. Blast resistance for film applied on 1/4 inch (6 mm) thick glass that is 48 inches (121.92 cm) wide by 66 inches (167.64 cm) high with the use of a structural silicone attachment system (Wet Glaze) on 4 sides: GSA Level 3A.
      3. Blast resistance for film applied on 1/4 inch (6 mm) thick glass that is 48 inches (121.92 cm) wide by 66 inches (167.64 cm) high with the use of GullWing attachment system on 4 sides: GSA Level 3A.
      4. Blast resistance for film applied on 1/4 inch (6 mm) thick glass that is 45 inches (114 cm) wide by 61 inches (155 cm) high with the use of two (2) LifeLine attachment cords: GSA Level 3A.
      5. Blast resistance for film applied on 1/4 inch (6 mm) thick glass that is 48 inches (121.92 cm) wide by 66 inches (167.64 cm) high with the use of a mechanical attachment system (FrameGard) on 2 sides: GSA Level 2.
      6. Blast resistance for film applied on 1/4 inch (6 mm) thick glass that is 48 inches (121.92 cm) wide by 66 inches (167.64 cm) high with the use of a mechanical attachment system (FrameGard) on 4 sides: GSA Level 2.
      7. Blast resistance for film applied on 1/4 inch (6 mm) thick glass that is 48 inches (121.92 cm) wide by 66 inches (167.64 cm) high with the use of FrameGard mechanical attachment system on 4 sides under a blast load of 9.19 psi and an impulse of 64.53 psi-msec: GSA Level 2.
      8. Blast resistance for film applied on 1/4 inch (6 mm) thick glass dual pane windows that are 45 inches (114 cm) wide by 61 inches (155 cm) high with the use of a structural silicone attachment system (Wet Glaze) on 4 sides under a blast load of 7.74 psi and an impulse of 42.1 psi-msec: ISO 16933 EXV33 (B)(No Hazard) GSA Level 2.
      9. Blast resistance for film applied on 1/4 inch (6 mm) thick glass dual pane windows that are 45 inches (114 cm) wide by 61 inches (155 cm) high with the use of FrameGard mechanical attachment system on 4 sides under a blast load of 7.74 psi and an impulse of 42.1 psi-msec: ISO 16933 EXV33 (B)(No Hazard) GSA Level 2.
      10. Blast resistance for film applied on 1/4 inch (6 mm) thick glass dual pane windows that are 45 inches (114 cm) wide by 61 inches (155 cm) high with the use of FrameGard mechanical attachment system on 4 sides under a blast load of 36.5 psi and an impulse of 43.8 psi-msec: ISO 16933 SB3 (B)(No Hazard) GSA Level 2.
    1. Tear Resistance:

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Puncture propagation and tear resistance tested according to ASTM D2582: Greater than 33 Newton in both the machine direction (MD) and transverse direction (TD).

\*\* NOTE TO SPECIFIER \*\* IMPORTANT NOTICE: These products are not approved in the state of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, these products may not be advertised, sold, offered, provided, distributed, or marketed in the state of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. DELETE this section if project is located in the State of Florida. Impact and pressure cycling are performance-based tests for building envelope protection. Manufacturer shall provide 3rd party test reports showing the product complies with the impact and pressure cycling requirements of ASs E1886 / E1996. Glazing systems vary, contact manufacturer for more information. Delete if not required.

* + 1. Windstorm Mitigation (performance to ASTM E 1866 and E1996):
       1. Windstorm mitigation for film applied on 1/4 inch (6 mm) thick annealed glass using structural silicone sealant: Category B 4-1/2 lb. 2 in. x 4 in., plus or minus 100 psf; tested in accordance with ASTM E1886 and ASTM E1996.

\*\*NOTE TO SPECIFIER\*\* Window Glazing Analysis Response and Design (WINGARD) provides an accurate analytical model of window response to the effects of an explosion. The program accepts user input of window system properties and explosion characteristics, and then calculates the performance of the window system when subjected to the defined blast loads.  
Delete if not required.

* + 1. WINGARD Report (independent engineering results for window and film performance to blast mitigation):
       1. The contractor shall submit a test report summary showing that the proposed film system has been certified by an independent Engineering firm utilizing WINGARD 5.5.1 or later. WINGARD shall show a performance condition (2) (3A) (3B) or lower based on the General Services Administration's criteria (i.e., a non- hazard condition) and ASTM F-1642 criteria under a blast load with a minimum peak pressure of 4 psi and a minimum positive phase impulse of 28 psi-msec with the use of a (mechanical attachments system (FrameGard)) (structural silicone attachment system (Wet Glaze)) (flexible perimeter anchoring (GullWing)) on 4 sides when applied to the glazing type and sizes found at the project site. The protective products tested should be representative of those being offered (i.e., daylight installed, edge-to-edge installed, mechanically attached, etc.).
  1. SUBMITTALS
     1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
     2. Product Data:
        1. Manufacturer's data sheets on each product to be used.
        2. Preparation instructions and recommendations.
        3. Storage and handling requirements and recommendations.
        4. Typical installation methods.
     3. Verification Samples: 4 inches by 6 inches (102 mm by 152 mm) minimum sample of glazing film.
     4. Shop Drawings: Include details of materials, construction and finish. Include relationship with adjacent construction.
     5. Madico, Inc. SafetyShield Window Film Green / LEED credit data that can contribute LEED credits to a building project's LEED certification.
     6. Sustainability Submittals: Refer to Division 01 for requirements regarding VOC limits, recycled content, regional materials, and required documentation.
  2. QUALITY ASSURANCE
     1. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum ten years successful documented experience.
     2. Installer Qualifications:
        1. Installer: Glazing film shall be applied by installers with a minimum of five years successful experience installing products of the same type and scope as specified.
        2. Provide documentation that the installer is certified by glazing film manufacturer to perform the work specified.
        3. Provide references of three projects where the installer has applied safety and security film or similar nature and size. The list should include:
           1. Name of building.
           2. The name and telephone number of project manager.
           3. Type of glass.
           4. Type of film and attachment system.
           5. Amount of film and attachment system installed.
           6. Date of completion.
     3. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.
     4. USGBC LEED Program:
        1. Product shall contribute to LEED 2009 or LEED V4 credits as applicable, (www.usgbc.org).
        2. Indoor Environmental Quality:
           1. Low-emitting paints.
           2. Daylight and views - daylight.
           3. Daylight and views - views.

\*\* NOTE TO SPECIFIER \*\* Include mock-up if the project size or quality warrant the expense. The following is one example of how a mock-up on might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project. Delete if not required.

* + 1. Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up as acceptable to Architect and provide temporary foundations and support.
       1. Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
       2. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
       3. Retain mock-up during construction as a standard for comparison with completed work.
       4. Do not alter or remove mock-up until work is completed or removal is authorized.
  1. PRE-INSTALLATION CONFERENCE
     1. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.
  2. DELIVERY, STORAGE, AND HANDLING
     1. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
     2. Protect from damage due to weather, excessive temperature, and construction operations.
  3. PROJECT CONDITIONS
     1. 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.
     2. Surface temperature: Do not apply glazing film when surface temperature is less than 40 degrees Fahrenheit.
     3. Prior to installation, the glass and frames shall be inspected for surface contamination, damage, or other defects that may adversely affect the performance of the glazing film.
  4. SEQUENCING
     1. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.
  5. WARRANTY
     1. Manufacturer's Warranty: Provide manufacturer's standard limited warranty.

1. PRODUCTS
   1. MANUFACTURERS
      1. Acceptable Manufacturer: Madico®, Inc., which is located at: 9251 Belcher Rd. N.; Pinellas Park, FL 33782; Toll Free Tel: 888-887-2022; Tel: 727-327-2544; Email:[request info (contact@madico.com)](http://admin.arcat.com/users.pl?action=UserEmail&company=Madico26reg+Inc&coid=33948&rep=&fax=&message=RE:%20Spec%20Question%20(08870mad):%20%20&mf=); Web:<http://www.madico.com/window-film>|<http://www.safetyshield.com/products/>
      2. Email: windowfilm@madico.com; Web: www.madico.com.
      3. Substitutions: Not permitted.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* 1. SAFETY AND SECURITY WINDOW FILMS

\*\* NOTE TO SPECIFIER \*\* Madico SafetyShield window films help reduce the risk of death, personal injury, property damage and loss caused by natural disaster and crime. Available in a wide range of tint, style and grades, our films are specially designed to deter everything from bomb blasts to natural disasters. And Madico backs every one of our enduring film solutions with a manufacturer's warranty that is second to none. It has been engineered specifically to perform in the most demanding, life threatening situations. It minimizes the risk of death, damage and injury caused by a blast. SafetyShield window film is only installed by our Premier Partners, contact us or locate your local Premier Partner. Delete if not required.

* + 1. SafetyShield:
       1. Type: Transparent, polyester, micro-thin film bonded to glass to resist impact, help contain glass shards, remain intact, and resist impact and explosive pressure and lessen blast damage; SafetyShield 800 Optivision 25 PS SR as manufactured by Madico, Inc.
          1. Physical Properties.

Thickness: (0.009 inch) (0.2286 mm).

Color: Silver reflective to exterior.

Construction: Multi-ply laminate.

Adhesive type: Pressure sensitive acrylic.

Tensile strength: (32,000 PSI) (2,250 kg per sq. cm) tested in accordance with ASTM D882.

Breaking strength: (240 pounds per inch) (4,286 grams per mm) minimum tested in accordance with ASTM D882.

Puncture and tear strength: 33.4 Newton average tested in accordance with ASTM D2582.

Peel strength: (5 pounds per inch) (89 grams per mm) minimum tested in accordance with ASTM D3330.

Surface burning characteristics tested in accordance with ASTM E84: Class A.

Flame spread: 0 to 25 maximum.

Smoke development: 0 to 450 maximum.

* + - * 1. Safety Glazing Performance: comply with ANSI Z97.1 and CPSC 16 CFR 1201 Category II as safety glazing.
        2. Performance attributes for film applied to 1/4 inch (6 mm) thick clear glass tested in accordance with ANSI/NFRC 100 - 2014 and ANSI/NFRC 200 - 2014:

Visible Light:

Transmittance: 27 percent.

Reflected: 27 percent.

Glare reduction: 70 percent.

Ultra violet light transmittance: less than 1 percent.

U-value: 0.97.

Solar energy:

Transmittance: 26 percent.

Reflected: 25 percent.

Absorbed: 50 percent.

Shading Coefficient (SC): 0.46.

Solar Heat Gain Coefficient (SHGC): 0.40.

Emissivity: 0.74.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Safety and Security Film Attachments:
       1. Provide anchoring accessories as recommended by glazing film manufacturer and as required for complete installation meeting specified performance requirements.

\*\* NOTE TO SPECIFIER \*\* The FrameGard Anchoring System has been specifically engineered to keep treated glass within the frame when an incident has occurred. It is a "mechanical" attachment system that clamps the filmed glass to the window frame. This system improves and extends the principle of edge battening by incorporating a specific movement zone (patent applies) which allows the film to move under the applied load without putting excessive force on the fixings and frame. The benefit of FrameGard is that it allows engineers and installers to precisely determine torque settings for each individual installation, creating a truly custom solution. Delete if not required.

* + - 1. Perimeter Anchoring Angle: Extruded aluminum angle with rubber gasket insert: FrameGard Anchoring System as manufactured by Madico, Inc.
         1. Configuration: Extruded aluminum angle with recess in one flange to receive black rubber gasket. Bottom edge of other flange serrated to grip glazing film. Outside corner of anchoring angle to be rounded.
         2. Size: (0.62 by 1.323 inches (16 by 34 mm) with rubber gasket projecting (3/8 inch) (100 mm) above shorter leg.
         3. Attachment: Installed with screws into frame.
         4. Performance: Glazing film extends beyond glass and overlaps onto frame. Rubber gasket insert on one flange presses against glass. Other serrated flange tightly anchors overlapping glazing film. When a blast shatters the glass, rubber gasket absorbs energy and allows glazing film to stretch while anchoring angle clamps film in place. Rounded corner of anchoring angle prevents cutting of glazing film.
         5. Cap piece: Provide L-shaped aluminum cap to snap-lock over anchoring angle and conceal attachment screws.
         6. Finish:

Anchoring angle: Mill finished aluminum.

Cap piece: (Mill finished aluminum) (Clear anodized aluminum) (Bronze anodized aluminum) (Thermoset enamel paint finish with custom color designated by Architect.).

\*\* NOTE TO SPECIFIER \*\* In the event of glass breakage, the Wet Glaze Anchoring System, when combined with SafetyShield window film, is designed to absorb and disburse the energy that the filmed glass is subjected to and transfer the reduced load over the entire glazed opening. By absorbing and distributing the load, the system is designed to retain the filmed glass in the opening and thus reduce the probability of glass fragments and debris from entering the room. The Wet Glaze system is economically viable in retrofit applications and is built around a triangular sealant joint connecting the film to the supporting framing members. To achieve acceptable performance, a very high-performance sealant must be used. We recommend DowSil 995 Silicone Structural Adhesive. Delete if not required.

* + - 1. Structural Silicone Sealant: One-component, self-priming, elastomeric adhesive formulated for impact-resistant protective glazing in high performance window film application complying with ASTM C1184: DowSil 995 Silicone Structural Sealant or other equivalent product approved by glazing manufacturer.

NOTE TO SPECIFIER \*\* The GullWing Anchoring System, when combined with Madico SafetyShield window film, is designed to absorb and disburse the energy that the filmed glass is subjected to and transfer the reduced load over the entire glazed opening. By absorbing and distributing the load, the system is designed to retain the filmed glass in the opening and thus reduce the probability of glass fragments and debris from entering the room. Delete if not required.

* + - 1. Perimeter Anchoring: Flexible, polymer, wing shaped, perimeter anchoring strip: GullWing as manufactured by Madico, Inc.
         1. Material: Composite of hard and flexible polymer layers and provided in rolls.
         2. Configuration: Either 1, 1-1/2, or 2-1/4 inch wide strip with center groove as applicable to facilitate bending lengthwise into wing shape. GullWing is designed such that one-half adheres to glass with glazing film and other half to frame.
         3. Attachment: GullWing can be anchored to glass and frame with double-sided adhesion tape with release paper or a combination of tape and structural silicone sealant.
         4. Performance: GullWing is designed to transfer impact forces from glazing film adhered to the glass to the frame. When a blast shatters the glass, attachment will flex absorbing energy and allowing glazing film to stretch.
         5. Color: As selected by Architect from manufacturer's standard range.
         6. Adhesive priming solution: As recommended by glazing film manufacturer.

NOTE TO SPECIFIER \*\* The LifeLine cord restraint system, when combined with Madico SafetyShield window film, is designed to arrest the inward travel of a filmed glass lite into the interior of the room. The LifeLine system comprises of diecast metal cleats secured to the frame. The cleats are designed to receive a LifeLine safety cord that acts as the arrester line when the pane of glass leaves the window frame. Typical installation is with two separate arrester cords set 300mm apart retained by a total of four LifeLine cleats (two per line). Delete if not required.

* + - 1. Cord restraint system: Diecast metal cleats secure energy absorbing safety cord: LifeLine as manufactured by Madico, Inc.
         1. Material: Diecast metal cleat secured to the frame. Cleats are designed to receive LifeLine safety cord that acts as the arrester line when the pane of glass leaves the window frame.
         2. Attachment: Installed with Buttress Thread Screws.
         3. Performance: LifeLine is designed to arrest the inward travel of a filmed glass lite into the interior of the room. When a blast shatters the glass, the energy absorbing cods slow and catch the filmed lite of glass, often returning it to the direction in which it came.
         4. Color: Silver Diecast Cleats, Energy absorbing cord as selected by Architect from manufacturer's standard range.

1. EXECUTION
   1. GLAZING FILM APPLICATION
      1. Field apply glazing film to the following items in accordance with manufacturer's instructions:
         1. Steel framed glazed doors, sidelights, transoms, and windows.
         2. Aluminum framed glazed doors, sidelights, transoms, and windows.
         3. Aluminum curtain wall framing system.
         4. Other curtain wall framing system.
         5. Manufactured wood windows.
         6. Manufactured steel windows.
         7. Manufactured aluminum windows.
         8. Manufactured windows.
      2. Do not apply glazing film when surface temperature is less than 40 degrees F (4 degrees C).
      3. Inspection:
         1. Examine glass and frames. Verify that existing conditions are adequate for proper application and performance of film.
         2. Verify glass is not cracked, chipped, broken, or damaged.
         3. Verify that frames are securely anchored and free of defects.
         4. Do not proceed until unsatisfactory conditions have been addressed.
   2. PREPARATION
      * 1. Comply with manufacturers recommendations for surface preparation.
        2. Clean glass of dust, dirt, paint, oil, grease, mildew, mold, and other contaminants that would inhibit adhesion.
        3. Immediately prior to applying film, thoroughly wash glass with neutral cleaning solution.
        4. Protect adjacent surfaces.
   3. INSTALATION
      1. General Film Installation:
         1. Install in accordance with manufacturers written instructions and approved shop drawings.
         2. Accurately cut film with straight edges to required sizes allowing 1/16 to 1/8 inch (2 to 3 mm) gap at perimeter of glazed panel.
         3. Remove release liner immediately prior to adhering film to glass.
         4. Apply mounting solution to film and glass.
         5. Apply film to glass and removed air bubbles, wrinkles, and other defects using a squeegee. Three to five complete passes are required to completely remove mounting solution from between film and glass.
2. \*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project;
   * 1. FrameGard - Mechanical Anchoring angle: Install angle around sides of glazed openings where scheduled on Drawings.
        1. Install in accordance with manufacturers written instructions and approved shop drawings for achieving blast resistance GSA Level 2.
        2. Ensure that glazing film extends from glass and overlaps onto frame on sides to receive anchoring angle. Trim overlap as required so that anchoring angle will cover film.
        3. Cut anchoring strip to required lengths using power saw. Neatly cut end and corner cuts.
        4. Place anchoring angle such that rubber gasket on one flange presses against glass and other flange rests on overlapped glazing film. Attach anchoring frame with screws of size, type, and spacing recommended by glazing film manufacturer.
        5. After anchoring angle installation is complete and inspected, install aluminum cap by snap-locking onto anchoring angle.
     2. DowSil 995 Silicone Structural Sealant Installation:
        1. Install in accordance with manufacturers written instructions and approved shop drawings for achieving blast resistance GSA Level 3A.
        2. Apply sealant without voids, install such that the sealant bridges glazing film and frame.
        3. A minimum of 1/2 inch triangular bead overlap on both the frame and film is required.
        4. Ensure a straight and consistent bead width by applying masking tape prior to sealant application.
        5. Sealant shall be dispensed with a caulk gun with nozzle opening diameter matched to the size of bead width desired.
        6. Tool exposed sealant surfaces to provide a clean smooth triangular shape.
        7. Carefully remove any masking tape.
     3. GullWing anchoring: Install GullWing around complete perimeter of glazed openings where scheduled on Drawings.
        1. Install in accordance with manufacturers written instructions and approved shop drawings for achieving blast resistance GSA Level 3A.
        2. Clean surfaces to which GullWing is applied. Ensure surface is dry.
        3. Cut Gullwing to required lengths using shears.
        4. Dow Corning 1200 OS Primer is to be applied to all surfaces to receive GullWing.
        5. Pull off approximately 12 inches of release paper on side of GullWing to be anchored to frame. Position GullWing and apply pressure with roller. Continue to remove release paper in small sections until GullWing is completely attached to frame.
        6. Fold back other side of GullWing from the glass, remove small portion of release paper, Insert nozzle of sealant gun into cavity and run an appropriately sized bead to fill the cavity. Continue to pull the liner off evenly as you are injecting Dow Corning 995 behind the GullWing. Allow GullWing to spring back onto glass. Continue until anchoring is securely attached to both glass and frame.
        7. Install GullWing on all sides of glazed opening. Neatly cut corners such that GullWing interlocks and anchorage is continuous around glazed opening.
     4. LifeLine - Cord restraint system: Install across glazed openings where scheduled on Drawings.
        1. Install in accordance with manufacturers written instructions and approved shop drawings for achieving blast resistance GSA Level 3A.
        2. LifeLine anchors should be attached to the frame using the appropriate fixings depending on the structure of the frame.
        3. Cut energy absorbing cord to required lengths.
        4. Install cord and use heat shrink tube to neaten ends onto cord.
   1. FIELD QUALITY CONTROL
      1. After installation, view film from a distance of 10 feet (3 meters) against a light colored background. Ensure appearance is uniform without streaks, bands, thin spots, and pinholes in accordance with the IWFA Architectural Visual Inspection Standard for Applied Window Film as Adopted by the IWFA May 15,1999.
      2. If installed film does not meet these requirements removed and replaced with new film.
   2. CLEANING AND PROTECTION
      1. Inspect installation. Verify that it is complete and complies with requirements and manufacturer's instructions to provide specified anti-intrusion requirements. Correct deficiencies.
      2. Clean glass following installation. Remove excess sealants and other glazing materials from adjacent finished surfaces.
      3. Remove labels and protective covers.

END OF SECTION