SECTION 08 56 19 – INTERIOR INSULATING STORM WINDOWS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Factory glazed windows complete with perimeter frames, reinforcing, shims, anchors and attachment devices for installation inside existing prime windows.

1. Interior retrofit blast resistant window system.
2. Interior retrofit aluminum hurricane resistant window system.
3. Interior retrofit fixed low-profile historic aluminum window system.
4. Curtain wall retrofit system.
5. Interior Sound Control window system.
6. Operable Single Hung Window system.
7. Operable Horizontal Sliding Window system

1.2 RELATED REQUIREMENTS

A. Section 07 92 00 "Joint Sealants:" Perimeter joint sealants.

1.3 REFERENCES

A. Applied Research Associates (ARA):

1. ARA WINGARD - Window Glazing Analysis Response and Design, version 6.

B. Architectural Aluminum Manufacturers Association (AAMA):

1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
2. AAMA 1801 – Voluntary Specification for Determining the Acoustical Performance of Windows, Doors, Skylight, and Glazed Wall Systems.
3. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix).

C. ASTM International (ASTM):

1. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel.
2. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
3. ASTM C 834 - Standard Specification for Latex Sealants.
4. ASTM C 1036 - Standard Specification for Flat Glass.
5. ASTM C 1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.
6. ASTM C 1172 - Standard Specification for Laminated Architectural Flat Glass.

7. ASTM C 1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Glass.
8. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
9. ASTM E 1332 – Standard Classification for Determination of Outdoor-Indoor Transmission Class.
10. ASTM E 1425 - Standard Practice for Determining the Acoustical Performance of Windows, Doors, Skylight, and Glazed Wall Systems.
11. 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.
12. ASTM E 1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.
13. ASTM E 2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.
14. ASTM F 1642 - Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loadings.
15. ASTM F 3057 - Standard Test Method for Electromagnetic Shielding Effectiveness of Glazings.

D. Consumer Product Safety Commission (CPSC):

1. CPSC 16 CFR Part 1201) - Safety Standard for Architectural Glazing Materials.

E. Lawrence Berkley National Laboratory (LBNL):

1. LBNL THERM 6.3 / WINDOW 6.3 - NFRC Simulation Manual.

F. United States Department of Defense (DoD):

1. DoD Policy, Infrared and radio Frequency Emanation Standard, Intelligence Community Directive 705.2, Certified Tempest Technical authority (CTTa) specifications.

2. UFC 4-010-01.

G. United States General Services Administration (GSA):

1. GSA TS01-2003 - Standard Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings.

2. ISC 2011 – General Services Administration Facility Security Requirements for Explosive Devices Applicable to Facility Security Levels III and IV.

1.4 PREINSTALLATION MEETINGS

A. Conduct pre-installation meeting minimum two weeks before starting installation.

1. Required Attendees: Contractor, installer, [**other affected subcontractors**] [**Architect**] [**Owner**].
2. Agenda: Review work restrictions for occupied building, work area access, materials movement, installation conditions, limitations, and details.

1.5 SEQUENCING

A. Coordinate Work with other contractors affecting or affected by work of this Section. Cooperate with other contractors to ensure efficient progress of the Work.

1.6 ACTION SUBMITTALS

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

B. Product Data: Submit data for each specified product

1. Frame Materials: Show materials, profiles, sizes, construction, and finishes.
2. Glass and Glazing Materials: Show materials, thickness, construction, and performance.

C. Shop Drawings: Submit drawings for each window configuration and mounting condition [**signed and sealed by Professional Engineer**].

1. Show installation details and relation to existing prime window and adjacent wall construction.

2. Show field measurements for existing windows.
3. Indicate clearances and tolerances required to accommodate existing construction.
4. Show window assembly component profiles and sizes.
5. Show mounting hardware types and locations.

6. Show operating hardware types and locations.

D. Design Calculations: Submit design calculations signed and sealed by Professional Engineer indicating specified performance criteria compliance.

1. Include design narrative with table of contents, assumptions listing, and cross references coordinated with design calculations and shop drawings.

E. Selection Samples: Submit samples for color selection.

1. Frame and Sash Materials: Submit [**two**] color chip sets showing manufacturer's [**standard anodized colors**] [**standard paint colors**] [**custom paint color range**].

F. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square representing actual product, color, and patterns.

1. Frame and Sash Materials: Submit [**three**] frame and sash samples minimum 6 inches (150 mm) long showing selected finish.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: Submit [**manufacturer**] [**and**] [**installer**] qualifications.

1. Verify years of experience.:
2. Submit list of similar completed projects. Include project name, location, reference names and phone numbers.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 5years experience manufacturing specified products [**with products included in GSA schedule**].

B. Installer Qualifications: Minimum 2 years experience installing specified products [**certified by manufacturer**].

C. Professional Engineer: Licensed in Project jurisdiction and experienced in designing blast resistant windows and window anchorage to building structure.

D. Mock-Up: Provide mock-up to show fabrication, existing opening preparation, and installation for [**typical window**] [**typical window of each type**].

1. Size: [**Selected by Architect.**] <**Insert size.**>
2. Location: [**Selected by Architect.**] <**Insert location.**>
3. Request Architect review and approval of product and workmanship.
4. Accepted mock-up may remain as part of Work.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging identified with manufacturer and product name.

B. Store materials protected from environment as recommended by manufacturer.

C. Prevent damage to glass and glass coatings.

D. Handle products to avoid damage.

1.10 FIELD CONDITIONS

A. [**Coordinate with Owner to maintain**] [**Maintain**] work area environmental conditions within limits recommended by manufacturer.

1.11 WARRANTY

A. Manufacturer's Warranty: Provide [**five**] year warranty against defective materials.

B. Installer's Warranty: Provide two-year warranty against defective workmanship.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Therm-O-Lite, LLC.

1. 1330 High Street.; South Bend, IN 46601.
2. Telephone: 574-234-4004.
3. Fax: 574-234-4005.
4. Website: http://www.thermolitewindows.com.
5. Email: info@thermolitewindows.com.

B. Substitutions: [**Not permitted.**] [**See Section 01 25 00 "Substitution Procedures."**]

2.2 PERFORMANCE REQUIREMENTS

A. Thermal Performance: LBNL Therm 6.3/Window 6.3 computed center of glass values, in combination with prime window.

1. Single Pane Retrofit Glass:

a. Minimum R-Value: [2.7] [4.0] sf•h•degree F/Btu.
b. Minimum R-Value: [2.7] [4.0] m^2•degree K/W.
c. Maximum U-Value: [0.37] [0.25] Btu/sf•h•degree F.
d. Maximum U-Value: [0.37] [0.25] W/m^2•degree K.
e. Maximum Solar Heat Gain Coefficient: [**0.66**] [**0.57**].

2. Dual Pane Retrofit Glass:

a. Minimum R-Value: [5.0] [6.0] sf•h•degree F/Btu.
b. Minimum R-Value: [5.0] [6.0] m^2•degree K/W.
c. Maximum U-Value: [0.20] [0.16] Btu/sf•h•degree F.
d. Maximum U-Value: [0.20] [0.16] W/m^2•degree K.
e. Maximum Solar Heat Gain Coefficient: [**0.54**] [**0.48**].

B. Air Infiltration Resistance: ASTM E 283; maximum 0.17 cfm/sf (0.5 L/s/sq. m) at 6.24 psf (300 Pa), in combination with prime window. Caulk may be required in some cases depending on condition of existing window.

C. Sound Transmission: Range: 43 STC to 48 STC and 33 OITC to 40 OITC, in combination with prime window. See Sound Control Window section.

2.3 INTERIOR RETROFIT BLAST RESISTANT WINDOW SYSTEM

A. Basis of Design: Therm-O-Lite LLC., Safety Series 2000.

1. Website: http://www.thermolitewindows.com.
2. Email: info@thermolitewindows.com.

B. Performance Requirements: Design windows and anchors to resist 6 psi (41.3 kPa) pressure, 42 psi-msec (289 kPa-msec) impulse, blast load and other specified loads.

1. ASTM F 1642: Minimal hazard response.
2. GSA TS01-2003: Level 2 protection
3. ISC Security Design Criteria, dated September 29, 2010 Rating: minimum 3b performance.
4. Mullion End Rotation: Maximum 2 degrees (L/60) in response to applied blast pressures.
5. Design window components with allowable stresses equal to material yield capacity.
6. Design anchors with minimum 1.5 factor of safety relative to ultimate capacity.
7. Snap-on elements or other architectural extrusions that do not have a positive connection to the main supporting element may not be included in determining the mullion resistance or attachment capacity.
8. Maintain profiles of surrounding interior and exterior construction as indicated in the drawings.

9. Glazing Properties: Default values specified by WINGARD software or as required by Owner.

C. Windows: Aluminum framed, fixed sash with laminated [**Low E**] [**RF shielding**] glass and integral slotted magnetic jamb extrusion with compression release system [**and blinds**]; removable from interior for regular maintenance and cleaning. Glass must have a minimum 10.16mm (.4) inch engagement (bite) into the supporting window sash system.

1. Compression Release System: T-bar, J-channel, T-bar cover,
2. Frame components: Deep track, shallow track and angle jambs.
3. Frame thickness: 11/16 inches. Compression release system at jambs: 1 15/16 inches.
4. Sash siteline: 7/8 inches at sill, sash and T-bar siteline at jambs: 1-1/8 inches.
5. Misc.: Wool pile weather strip.
6. Align frames with existing prime window framing to preserve [**historic**] appearance.

2.4 INTERIOR RETROFIT ALUMINUM HURRICANE RESISTANT WINDOW SYSTEM

A. Basis of Design: Therm-O-Lite LLC.; Storm Series 2000.

1. Website: http://www.thermolitewindows.com.
2. Email: info@thermolitewindows.com.

B. Performance Requirements:

1. Design windows and anchors to resist the following loads and other specified loads.

   a. Missile Impact and Cyclic Pressure Differential: ASTM E 1886 and ASTM E 1996, wind zone [**1**] [**2**] [**3**], missile level [**C**] [**D**].
   b. Static Load: 48 psf (2295 Pa) minimum.

2. Design window components with allowable stresses equal to material yield capacity.
3. Design anchors with minimum 1.5 factor of safety relative to ultimate capacity.

4. Snap-on elements or other architectural extrusions that do not have a positive connection to the main supporting element may not be included in determining the mullion resistance or attachment capacity.
5. Maintain profiles of surrounding interior and exterior construction as indicated in the drawings.

C. Windows: Aluminum framed, fixed sash with laminated [**Low E**] [**RF shielding**] glass and integrated magnetic jamb extrusion with compression release system [**and blinds**]; removable from interior for regular maintenance and cleaning. Glass must have a minimum 10.16mm (.4) inch engagement (bite) into the supporting window sash system.

1. Compression Release System: T-bar and T-bar cover.
2. Frame components: Deep track, shallow track and angle jambs.
3. Frame thickness: 1 inch. Compression release system at jambs: 1 9/16 inches.
4. Sash siteline: 1 inch at sill, t-bar siteline at jambs: 1-1/4 inches.
5. Misc.: Wool pile weather strip.
6. Align frames with existing prime window framing to preserve [**historic**] appearance.

2.5 INTERIOR RETROFIT FIXED, HISTORIC LOW PROFILE ALUMINUM WINDOW SYSTEM

A. Basis of Design: Therm-O-Lite LLC.; Energy Series 2000AL 1/8” & 2000AL 3/16”.

1. Website: http://www.thermolitewindows.com.
2. Email: info@thermolitewindows.com.

B. 2000AL 1/8”: Glass: 1/8” [**heat strengthened**].

C. 2000AL 3/16”: Glass: 3/16” **[heat strengthened**] [**tempered]** [**Low E**].

D. Windows: Aluminum framed, fixed sash with glass and integral slotted magnetic jamb extrusion [**and blinds**]; removable from interior for regular maintenance and cleaning.

1. Deep track, shallow track and angle jambs.
2. Frame thickness: 5/16 inches.
3. Sash sightline: 7/16 inches.
4. Misc.: Wool pile weather strip.
5. Align frames with existing prime window framing to preserve [**historic**] appearance.

2.6 CURTAIN WALL RETROFIT SYSTEM

A. Basis of Design: Therm-O-Lite LLC.; Energy Series RetroWAL Curtain Wall Retrofit System: [**Silver Series**] [**Gold Series**].

1. Website: http://www.thermolitewindows.com.
2. Email: info@thermolitewindows.com.

B. Design Requirements

1. Provide interior curtain wall retrofit system with magnetic sash.

C. Curtain Wall Retrofit System:

1. Silver Series:

a. Outboard lite: Existing glass.
b. Deep track, shallow track and angle jambs.
c. Frame thickness: 3/4 inches.
d. Sash siteline: 7/8 inches.
e. Wool pile weather strip.
f. Interior Glass Type: [**tempered**] [**laminated**] [**Low E**] [**RF shielding**] glass.

2. Gold Series:

a. Outboard lite: Existing glass.
b. Deep track, shallow track and angle jambs.
c. Frame thickness: 1-3/8 inches.
d. Sash siteline: 1-1/8 inches.
e. Wool pile weather strip.
f. Interior Glass Type: Insulating [**Low E**] [**RF shielding**] glass.

2.7 INTERIOR SOUND CONTROL WINDOW SYSTEM

A. Basis of Design: Therm-O-Lite LLC: Sound Control RetroWAL System: [**Silver Series**] [**Gold Series**].

1. Website: http://www.thermolitewindows.com.
2. Email: info@thermolitewindows.com.

B.

C. Performance Requirements: Sound Transmission testing in accordance with: AAMA 1801, ASTM E 1425 and ASTM E 1332.

1. Silver Series:

a. Primary Exterior: 1/4" annealed glass, Secondary Interior: 5/16” laminated glass, (3” glass to glass dim.) shall have a min. Sound Transmission Class **(STC) rating - 43** and a min. Outdoor Indoor Transmission Class **(OITC) rating - 33**.

b. Primary Exterior 1” IGU (1/4” glass, 1/2" air space, 1/4" glass) Secondary Interior: 5/16” laminated glass, (5 1/2” glass to glass dim.) shall have a min. Sound Transmission Class **(STC) rating - 47** and a min. Outdoor Indoor Transmission Class **(OITC) rating - 40**.

2. Gold Series:

a. Primary Exterior: 1/4” annealed glass Secondary Interior: 3/4" IGU – 1/4” laminated glass, 1/4" airspace, 1/4" laminated glass. (3” glass to glass dim.) shall

have a min. Sound Transmission Class **(STC) rating - 48** and a min. Outdoor Indoor Transmission Class **(OITC) rating - 37.**

2.8 OPERABLE SINGLE HUNG WINDOW SYSTEM

A. Basis of Design: Therm-O-Lite LLC Single Hung Window.

1. Website: http://www.thermolitewindows.com.
2. Email: info@thermolitewindows.com.

B. Windows: Aluminum sash – Top lite fixed with magnetic jamb extrusion. Bottom lite operable, with handle on bottom sash. Glass: 1/4" [**tempered**] **[laminated**] [**low e**]. Tilt-in Bottom sash and top sash are removable from interior for regular maintenance and cleaning.

C. Frame: Aluminum Head, sill, jamb and fixed meeting style extrusions. Frame thickness (1-11/16 inches). Sash and frame siteline at sill 1-7/16 inches. Sash and frame siteline at jamb 1-13/16 inches. Sash and meeting style siteline 1-13/16 inches.

D. Hardware: Spiral Balance at each jamb counterbalanced to open at any position and accommodate sash sizes up to 100 lbs.

E. Misc.: Pivot pin screw at each side of bottom lite. Carrier block at each spiral balance. Tilt latch on each side of bottom sash. Steel flat stock at top lite jambs. Wool Pile weather strip.

2.9 OPERABLE HORIZONTAL SLIDING WINDOW SYSTEM

A. Basis of Design: Therm-O-Lite LLC Operable Horizontal Sliding Window.

1. Website: http://www.thermolitewindows.com.
2. Email: info@thermolitewindows.com.

B. Windows: Aluminum sash, Glass: 1/4” **[laminated**] [**tempered**] [**low e**]. Removable from interior for regular maintenance and cleaning.

1. Two Lite Window consists of: (1) Sliding lite w/ handle sashes, and (1) fixed lite.
2. Three Lite Window consists of (2) Sliding lites, w/ handle sashes, at both ends and (1) fixed lite in middle.

C. Frame: (2) aluminum shallow tracks at sill, (2) aluminum deep tracks at head. (1) aluminum shallow track at each jamb. Frame thickness dimension 1-9/16 inches. Frame and sash sightline dimension 1-1/16 inches.

D. Misc.: Rubber bumpers, wool pile weather strip, Ultra High Molecular Weight Polyethylene (UHMW) strip – sliding material.

2.10 FRAME AND SASH MATERIALS

A. Aluminum Extrusions: ASTM B 221; alloy and temper required for specified performance; compatible with specified finishes.

B. Steel Shapes: ASTM A 36/A 36M, size and shape required for application.

C. Operable Sash Hardware: Corrosion resistant, compatible with aluminum frame and sash.

1. Restrict operation with custodial lock requiring special tool as key.

D. Magnetic Seals: Manufacturer's standard to retain sash within perimeter frame.

2.11 GLASS AND GLAZING MATERIALS

A. Flat Glass: Clear, thickness required for specified performance.

1. Annealed Glass: ASTM C 1036.
2. Heat Strengthened Glass: ASTM C 1048, [**fully tempered**] [**CSPC 16 CFR Part 1201 safety glass**].

B. Low E Coated Glass: ASTM C 1376; type required for specified performance.

C. Laminated Glass: ASTM C 1172; flat glass with PVB interlayer; construction required for specified performance.

D. RF Shielding Glass: ASTM F 3057.

1. Horizontal Antennae: Average [**Enter choice here**] dB reduction.
2. Vertical Antennae: Average [**Enter choice here**] dB reduction.

E. Security Glass: Laminated glass clad polycarbonate construction meeting specified performance.

F. Insulating Glass: ASTM E 2190;

1. Dual pane flat glass, [**air**] [**argon**] filled. Construction required for specified performance.
2. Dual pane laminated glass, [**air**] [**argon**] filled. Construction required for specified performance.

G. Glazing Sealant: Dow 995 structural sealant.

H. Glazing Splines: Marine type, continuous.

2.12 FABRICATION

A. Fabricate frames and sashes to sizes and configurations shown on Drawings.

B. Assemble and factory glaze sashes with specified glass.

2.13 FINISHES

A. Anodizing: AAMA 611 Class II; [**clear**] [**black**] [**bronze**] [**champagne**] color.

B. Painting: AAMA 2603; powder coated.

1. Color: [**White.**] [**Black.**] [**Custom, as selected by Architect.**]

2.14 ACCESSORIES

A. Louver Blinds:

1. Louver Blinds: Aluminum slats; [5/8] [1] [2] inch ([15] [25] [50] mm) wide, colors selected from blind manufacturer's standard colors; interior tilt control knob for tilt adjustment [**and interior lift mechanism to raise and lower blinds**].

B. Fasteners:

1. Fasteners: Aluminum, stainless steel, or other non-corrosive material compatible with window components and substrate materials.

C. Anchors:

1. Anchors: Corrosion resistant, concrete, wood, steel, and epoxy anchors, to suit application with no additional structural reinforcement required.

D. Joint Sealants: ASTM C 834; latex for joints between dissimilar materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Field measure existing windows to permit window fabrication to sizes matching existing windows.

3.2 PREPARATION

A. Prepare openings to be in tolerance, plumb, level and provide for secure anchoring.

B. Verify openings are in accordance with approved shop drawings.

C. Clean existing frames and glass.

3.3 INSTALLATION

A. Install windows according to manufacturer's instructions.

B. Set units plumb, square and level without warp or rack of frames.

C. Securely anchor windows to existing windows or surrounding substrate.

3.4 ADJUST AND CLEAN

A. Adjust windows for tight air seals [**and proper operation**].

B. Leave windows clean and free of construction debris.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION