SECTION 081100: STEEL DOORS AND FRAMES

PART 1: GENERAL

1.1 SECTION INCLUDES

A. Flush Steel Doors

B. Steel frames

1.2 REFERENCES

A. ANSI/NFPA 80 - Standard for Fire Doors and Windows.

B. ANSI/DHI A 115.IG - Installation Guide for Doors and Hardware.

C. ANSI/BHMA A 156 - Specifications for Hardware Preparations in Standard Steel Doors and Frames.

D. ANSI/BHMA A156.7 - Hinge Template Dimensions.

E. ANSI A 250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcing.

F. ANSI/SDI A 250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames.

G. ANSI A 250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.

H. ANSI A 250.11 - Recommended Erection Instructions for Steel Frames.

I. ASTM A 366/A 366M - Standard Specification for Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality.

J. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

K. ASTM A 924 - Specification for General Requirements for Steel Sheet, Metallic Coated by the Hot Dip Process.

L. ASTM A 1008/1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.

M. ASTM E 90 - Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.

N. ASTM E 152 - Standard Methods of Fire Tests of Door Assemblies.

O. ASTM E 413 - Classification for Rating Sound Insulation.

P. SDI-111 - Recommended Standard Details for Steel Doors & Frames.

Q. NAAMM/HHMA-820 TN01 - Grouting Hollow Metal Frames

R. NAAMM/HHMA-820 TN03 - Guidelines for Glazing of Hollow Metal Transom, Sidelight and Windows

S. NAAMM/HMMA-840 - Guide Specification for Installation and Storage of Hollow Metal Doors and Frames.

T. ANSI/UL 10C - Standard for Safety for Positive Pressure Fire Tests of Door Assemblies.

U. NFPA 252 - Standard Method of Fire Tests of Door Assemblies.

V. Federal Emergency Management Agency (FEMA) 361 Guidelines

W. ANSI/UL 10B - Fire Tests of Door Assemblies.

X. ANSI/UL 10C - Positive Pressure Fire Tests of Door Assemblies.

Y. ANSI/UL 1784 - Air Leakage Tests of Door Assemblies

Z. UL - Building Materials Directory; Underwriters Laboratories Inc.

AA. WH - Certification Listings; Warnock Hersey International Inc.

BB. Miami - Dade County test protocols PA 201, PA 202 and PA 203.

CC. Florida Building Code test protocols TAS 201, TAS 202 and TAS 203.

1.3 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's standard details and catalog data indicating compliance with referenced standards, and manufacturer's installation instructions.

C. Certificates:
1. Manufacturer's certification that products comply with referenced standards.
2. Evidence of manufacturer's membership in the Steel Door Institute.

D. Shop Drawings: Door, frame, and hardware schedule in accordance with SDI 111D. Show types, quantities, dimensions, specified performance, and design criteria, materials and similar data for each opening required.
1. Indicate frame configuration, anchor types and spacing, location of cutouts for hardware, reinforcement, to ensure doors and frames are properly prepared and coordinated to receive hardware.
2. Indicate door elevations, internal reinforcement, closure method, and cutouts for glass lights and louvers.

E. Samples: 18 by 24 inches (150 by 150 mm) cut away sample door with provisions for lockset, hinge and corner section of frame.

1.4 QUALITY ASSURANCE

A. Supplier: A direct account of the manufacturer who has on permanent staff, an Architectural Hardware Consultant (AHC), a Certified Door Consultant (CDC) or an Architectural Openings Consultant (AOC), who will be available to consult with the Architect and Contractor regarding matters affecting the door and frame openings.

B. Fire Rated Doors and Frames: Underwriters' Laboratories and Warnock Hersey, labeled fire doors and frames:
   1. Label fire doors and frames in accordance with Underwriters Laboratories standard UL10C, UL1784, and Positive Pressure Fire Tests of Door Assemblies.
   2. Construct and install doors and frames to comply with current issue of ANSI/NFPA 80.
   3. Manufacture Underwriters' Laboratories labeled doors and frames under the UL factory inspection program and in strict compliance to UL procedures, and provide the degree of fire protection, heat transmission and panic loading capability indicated by the opening class.
   4. Manufacture Intertek Testing Services / Warnock Hersey labeled doors and frames under the ITS/WH factory inspection program and in strict compliance to ITS/WH procedures, and provide the degree of fire protection capability indicated by the opening class.
   5. Affix a physical label or approved marking to each fire door or fire door frame, at an authorized facility as evidence of compliance with procedures of the labeling agency. Label embossment is not permitted.
   6. Conform to applicable codes for fire ratings. It is the intent of this specification that hardware and its application comply or exceed the standards for labeled openings. In case of conflict between types required for fire protection, furnish type required by NFPA and UL.
   7. Fire door assemblies in exit enclosures and exit passageways; maximum transmitted temperature end point rating of not more than 250 degrees F (121 degrees C) above ambient at the end of 30 minutes of the standard fire test exposure.

C. Manufacturer Qualifications: Member of the Steel Door Institute.

D. Installer: Minimum five years documented experience installing products specified this Section.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Handle, store and protect products in accordance with the manufacturers printed instructions and ANSI/SDI A250.10 and NAAMM/HMMA 840.

B. Store doors vertically in a dry area, under a proper vented cover. Place on 4 inch (102 mm) high wood sills to prevent rust or damage. Provide 1/4-inch (6 mm) space between doors to promote air circulation.

C. Store frames in an upright position with heads uppermost under cover. Place on 4 inch (102 mm) high wood sills to prevent rust and damage. Store assembled frames five units maximum in a stack with 2 inch (51 mm) space between frames to promote air circulation.

D. Do not use non-vented plastic or canvas shelters to prevent rust or damage.

E. Should wrappers become wet, remove immediately.

1.6 COORDINATION

A. Coordinate Work with other directly affected sections involving manufacture or fabrication of internal cutouts and reinforcement for door hardware, electric devices and recessed items.

B. Coordinate Work with frame opening construction, door and hardware installation.

C. Sequence installation to accommodate required door hardware.

D. Verify field dimensions for factory assembled frames prior to fabrication.

PART 2: PRODUCTS

2.1 MANUFACTURERS

A. Ceco Door Products; an ASSA ABLOY Group Company

B. Pioneer Industries, Inc

C. Steelcraft; an Ingersoll-Rand Company

NOTE: Provide all steel doors and frames from a single manufacturer.

2.2 DOORS

A. General: Construct exterior/interior doors to the following designs and gages:
   1. Interior Doors: Cold-rolled steel, ASTM A 1008/A 1008M:
      a. Thickness:1 ¾”
         1) 18 gage (1 mm).
   2. Include galvannealed components and internal reinforcements.
   3. Prime Finish Doors: Clean, phosphatize and factory prime painted doors indicated on Door Schedule as HM.
   4. Hardware Reinforcements:
      a. Hinge reinforcements for full mortise hinges: minimum 7 gage (4.7 mm).
      b. Lock reinforcements: minimum 16 gage (1.3 mm).
      c. Closer reinforcements: minimum 14 gage (1.7 mm) steel, 20-inch (508 mm) long.
      d. Galvannealed doors: include galvannealed hardware reinforcements.
      e. Projection welded hinge and lock reinforcements to the edge of the door.
      f. Provided adequate reinforcements for other hardware as required.

B. Full Flush Doors:
   1. Acceptable Product: Steelcraft L Series.
      a. Performance:
         1) Physical performance: 5 million cycles per ANSI A250.4.
         2) Sound attenuation (gasketed):
            a) Honeycomb core, 35 STC.

b) Polystyrene core, 25 STC.
3) Thermal performance (gasketed), ASTM C1363.
a) Honeycomb core, 0.653 U-factor.
b) Polystyrene core, 0.48 U-factor.
c) Polyurethane core, 0.498 U-factor.
4) Thermal performance (gasketed), ASTM C236.
a) Honeycomb core, 0.363 U-factor.
b) Polystyrene core, 0.263 U-factor.
c) Polyurethane core, 0.09 U-factor.

2. Door Thickness: 1-3/4 inches (45 mm).
3. Door faces reinforced and sound deadened as follows:
   a. Honeycomb Core: Reinforced, stiffened, sound deadened and insulated with impregnated Kraft honeycomb core completely filling the inside of the doors and laminated to inside faces of both panels using contact adhesive applied to both panels and honeycomb core.
4. Bevel hinge and lock door edges 1/8 inch (3 mm) in 2 inches (50 mm). Square edges on hinge and/or lock stiles are not acceptable.
5. Reinforce top and bottom of doors with galvannealed 14 gage (1.7 mm), welded to both panels.
6. Fire Rating: Supply door units bearing Labels for fire ratings indicated in Door Schedule for the locations indicated.

2.3 DOOR FRAMES

A. General: Construct exterior/interior metal door frames to the following designs and gages.
   1. Interior Frames in Masonry: Zinc-Iron Alloy-Coated galvannealed steel, ASTM A 653, Class A60, galvannealed steel.
      a. Thickness:2”
         1) 16 gage (1.3 mm).

B. Flush Steel Frames:
   1. Performance:
      a. Physical performance: 5 million cycles per ANSI A250.4
   2. Construction: Three-piece knock-down frames; mitered joints, with locking tab at each head and jamb intersection.
   3. Profile:
      a. 2 inches (51 mm) face dimension with 5/8 inch (16 mm) high stop, and types and throat dimensions indicated on the Door Schedule.
   4. Provide following reinforcement and accessories:
      a. Hinge Preparation for 4-1/2 inches (114 mm) high, standard weight, or heavy weight, full mortise hinges; with plaster guard.
      b. Hinge Preparation for 5 inch (127 mm) high, universal standard weight, or heavy weight, full mortise hinges; with plaster guard.
      c. Strike preparation (single doors) for 4-7/8 inch (123 mm) universal strike; with plaster guard.
      d. Silencers. Prepare frames to receive inserted type door silencers, 3 per strike jamb on single doors, and 2 per head for pair of doors. Stick-on silencers are not permitted.
   5. Fire Rating: Supply frame units bearing Labels for fire ratings indicated in Door

Schedule for the locations indicated.

6. Finish: Factory prime finish.

2.4 ACCESSORIES

A. Anchors: Manufacturer's standard framing anchors, specified in manufacturer's printed installation instructions for project conditions.

B. Astragals for pairs of doors: Manufacturer's standard for labeled and non-labeled openings.

C. Door Bottom:
1. Characteristics: Electrometric, continuous strip, screw-attached to recessed bottom door channel for concealed installation; double-sealing; acceptable for fire-rated doors up to 3 hour rating.

D. Plaster Guards: Same material as door frame, minimum 24 gage (0.6 mm) minimum; provide for all strike boxes.

E. Silencers: Resilient rubber, Inserted type, three per strike jamb for single openings and two per head for paired openings. Stick-on silencers shall not be permitted except on hollow metal framing systems.

2.5 FABRICATION

A. Steel Frames:
1. Three-piece knock-down frames: Head and jamb intersecting corners die-cut, mitered at 45 degrees, with locking tabs for rigid connection when assembled.

2.6 FINISHES

A. Chemical Treatment: Treat steel surfaces to promote paint adhesion.

B. Factory Prime Finish: Meet requirements of ANSI A 250.10.

PART 3: EXECUTION

3.1 EXAMINATION

A. Verify that project conditions are acceptable before beginning installation of frames.
1. Verify that completed openings to receive knock-down wrap-around frames are of correct size and thickness.
2. Verify that completed concrete or masonry openings to receive butt type frames are of correct size.

B. Do not begin installation until conditions have been properly prepared.

C. Correct unacceptable conditions before pre-ceding with installation.

3.2 INSTALLATION

A. Install doors and frames in accordance with manufacturer's printed installation instructions

and with Steel Door Institute's recommended erection instructions for steel frames ANSI A250.11 and NAAMM/HMMA 840.

B. Fire Doors and Frames: Install in accordance with ANSI/NFPA 80.

C. Remove temporary steel spreaders prior to installation of frames.

D. Set frames accurately in position; plumb, align and brace until permanent anchors are set. After wall construction is complete, remove temporary wood spreaders.
   1. Field splice only at approved locations indicated on the shop drawings.
   2. Weld, grind, and finish as required to conceal evidence of splicing on exposed faces.

E. Provide full height 3/8 inch (9.5 mm) to 1-1/2 inch (38 mm) thick strip of polystyrene foam blocking at frames requiring grouting where continuous hinges are specified. Apply the strip to the back of the frame, where the hinge is to be installed, to facilitate field drilling or tapping.

F. Glaze and seal exterior transom, sidelight and window frames in accordance with HMMA-820 TN03.

G. Apply hardware in accordance with hardware manufacturers' instructions and Section 08710 of these Specifications. Install hardware with only factory-provided fasteners. Install silencers. Adjust door installation to provide uniform clearance at head and jambs, to achieve maximum operational effectiveness and appearance.

3.3 ADJUST AND CLEAN

A. Adjust doors for proper operation, free from binding or other defects.

B. Clean and restore soiled surfaces. Remove scraps and debris and leave site in a clean condition.

C. Prime Coat Touch-Up: Immediately after erection, sand smooth rusted or damaged areas of prime coat, and apply touch-up of compatible air-drying primer.

3.4 PROTECTION

A. Protect installed products and finished surfaces from damage during construction.

END OF SECTION 081100

SECTION 08120- STILE AND RAIL DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Monumental aluminum stile and rail doors.

B. Aluminum Storefront Systems

1.2 RELATED SECTIONS

A. Section 07920- Joint Sealant.

B. Section 08710- Door Hardware.

C. Section 08720- Weatherstripping & Seals.

1.3 REFERENCES

A. ASTM B 209 - Aluminum and Aluminum-Alloy Sheet and Plate.

B. ASTM B 221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

C. ASTM D 6670-01 - Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/Products.

D. ASTM E 84 - Surface Burning Characteristics of Building Materials.

E. ASTM E 283 - Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

F. ASTM E 330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

G. ASTM E 331 - Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.

H. ASTM E 1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Storm Shutters Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide door assemblies that have been designed and fabricated to comply with specified performance requirements, as demonstrated by testing manufacturer’s corresponding standard systems.

B. Air Infiltration: For a single door, test specimen shall be tested in accordance with ASTM E 283 at a pressure differential of 6.24 psf. The maximum air leakage rate of the door shall not exceed 0.01 cfm per square foot of door area.

C. Air Infiltration: Storefront System shall be tested in accordance with ASTM E 283 at a pressure differential of 1.57 psf. The maximum air leakage rate shall not exceed 0.3 cfm/ ft² of fenestration area.

D. Thermal Resistance: Storefront System performance, 0.45 Maximum U-Value.

E. Thermal Resistance: Door Performance, 0.80 Maximum U-Value.

F. Uniform Structural Load: For a single door, test specimen shall be tested in accordance with ASTM E 330. Plus or minus 67.5 pounds per square foot.

G. Water Resistance: For a single door, test specimen shall be tested in accordance with ASTM E 331 at a pressure differential of 3.75 psf. No leakage.

H. Large Missile Impact: Single impact. Pass.

I. Indoor air quality testing per ASTM D 6670-01: GREENGUARD Environmental Institute Certified including GREENGUARD for Children and Schools Certification.

1.5 SUBMITTALS

A. Comply with Section 01330- Submittal Procedures.

B. Product Data: Submit manufacturer's product data, including description of materials, components, fabrication, finishes, and installation.

C. Shop Drawings: Submit manufacturer's shop drawings, including elevations, sections, and details, indicating dimensions, tolerances, materials, fabrication, doors, panels, framing, hardware schedule, glazing, and finish.

D. Samples:
1. Doors: Submit manufacturer's sample of doors showing stiles, rails, framing, hardware, glazing, and finish.
2. Color: Owner to select from manufacturer’s full range.

E. Manufacturer's Project References: Submit list of successfully completed projects including project name and location, name of architect, and type and quantity of doors manufactured.

F. Maintenance Manual: Submit manufacturer's maintenance and cleaning instructions for doors, including maintenance and operating instructions for hardware.

G. Warranty: Submit manufacturer's standard warranty.

1.6 QUALITY ASSURANCE

A. Manufacturer's Qualifications:
1. Continuously engaged in manufacturing of doors of similar type to that specified.
2. Door and frame components from same manufacturer.
3. Evidence of a compliant documented quality management system.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying opening door mark and manufacturer.

B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions.

C. Handling: Protect materials and finish from damage during handling and installation.

1.8 WARRANTY

A. Warrant doors, frames, and factory hardware against failure in materials and workmanship, including excessive deflection, faulty operation, defects in hardware installation, and deterioration of finish or construction in excess of normal weathering.

B. Warranty Period: Ten years starting on date of shipment.

C. Hardware Attachment Warranty: Door Manufacture shall install all hardware (except closers) and warrant attachment for a period or ten years.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Basis of Design: **SL-15 wide stile monumental aluminum stile and rail doors by Special-Lite, Inc.,** PO Box 6, Decatur, Michigan 49045. Toll Free (800) 821-6531. Phone (269) 423-7068. Fax (800) 423-7610. Web Site www.special-lite.com. E-Mail info@special-lite.com. Subject to compliance with the requirements, provide the above named product or a comparable product by one of the following:
a. Kawneer
b. Old Castle Architectural Products
c. Special-Lite Inc.

2.2 MONUMENTAL STILE AND RAIL DOORS

A. Door Opening Size: As indicated on the Drawings.

B. Door Thickness: 1-3/4 inches.

C. Stiles and Rails:
1. Material: Aluminum extrusions made from prime-equivalent billet that is produced from 100% reprocessed 6063-T5 alloy recovered from industrial processes, 0.125-inch minimum wall thickness, 1-piece.
2. Stile Width: 4-1/2 inches.
3. Rail Width:
a. Top: 6-1/2 inches.
b. Bottom: 10 inches.

D. Corners:
1. True mortise and tenon joints.
2. Full-width 3/8-inch diameter galvanized steel tie rods secured with locking hex nuts.

E. Welding of Joints: Not permitted.

2.3 ALUMINUM-FRAMED STOREFRONT SYSTEMS

A. Basis of Design Product: SL-260FG aluminum-framed storefront system as manufactured by Special-Lite, Inc, PO Box 6, Decatur, MI 49045 (PH: 800-821-6531). Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
1. Kawneer Corporation
2. Old Castle Architectural Products
3. Special-Lite, Inc.

B. Framing:
1. Size: 2 inches by 6 inches framing size with 1” glass insulating units.
2. Material: Aluminum extrusions made from prime-equivalent billet that is produced from 100% reprocessed 6063-T6 alloy recovered from industrial processes.
3. Jambs, Mullions, Sills, Horizontal Intermediates, and Headers: 0.125-inch wall thickness.
4. Lock Jambs, Hinge Jambs, and Door Headers: 0.125-inch wall thickness.

2.4 MATERIALS

A. Aluminum Members:
1. Aluminum extrusions made from prime-equivalent billet that is produced from 100% reprocessed 6063-T5 alloy recovered from industrial processes: ASTM B 221.
2. Sheet and Plate: ASTM B 209.
3. Wall Thickness: 0.125 inch.
4. Alloy and Temper: As required by manufacturer for strength, corrosion resistance, application of required finish, and control of color.

B. Fasteners:
1. Material: Aluminum, 18-8 stainless steel, or other noncorrosive metal.
2. Compatibility: Compatible with items to be fastened.
3. Exposed Fasteners: Oval Phillips head screws with finish matching items to be fastened.

C. Framing System: Refer to Section 08410 Aluminum Framed Storefront.

2.5 FABRICATION

A. Sizes and Profiles: Required sizes for door and frame units and profile requirements shall be as indicated on the Drawings.

B. Coordination of Fabrication: Field measure before fabrication and show recorded measurements on shop drawings.

C. Assembly:
1. Complete cutting, fitting, forming, drilling, and grinding of metal before assembly.
2. Remove burrs from cut edges.

D. Welding: Welding of doors or frames is not acceptable.

E. Fit:
1. Maintain continuity of line and accurate relation of planes and angles.
2. Secure attachments and support at mechanical joints with hairline fit at contacting members.

2.6 HARDWARE

A. Premachine doors in accordance with templates from specified hardware manufacturers and hardware schedule.

B. Factory install hardware.

C. Integral Adjustable Dual Brush Door Bottom, SL-301 supplied and installed by Door Manufacturer.

D. Hardware Schedule: As specified in Section 08710 and as indicated on the Drawings.
1. Hinges: See Spec section 08710
2. Locking Hardware: See Spec section 08710
3. Flush Bolts and Surface Bolts: See Spec section 08710
4. Door Pulls: See Spec section 08710.
5. Push Bars: See Spec section 08710.
6. Concealed adjustable bottom brush. Install door manufacturer’s multidirectional adjustable bottom with double nylon brush weatherstripping. Door bottom must be concealed and adjust to accommodate irregular tapered floor conditions.

E. Finish: Clear.

2.7 GLAZING

A. Factory Safety Glazing with a permanent SGCC Certification Label: 1-inch glass insulating units

B. Design glazing system for replacement of glass. Manufacturer’s standard flush glazing system of recessed channels and captive glazing gaskets or applied stops as indicated on the Drawings.

C. Allow for thermal expansion on exterior units.

D. Performance Requirements:
   i. Maximum U-Value: 0.8
   ii. Maximum SHGC: 0.4

2.8 ALUMINUM FINISHES

A. Anodized Finish: Class I finish, 0.7 mils thick.

1. Clear 215 R1, AA-M10C12C22A41.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas to receive doors. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Ensure openings to receive frames are plumb, level, square, and in tolerance.

3.3 INSTALLATION

A. Install doors in accordance with manufacturer's instructions.

B. Install doors plumb, level, square, true to line, and without warp or rack.

C. Anchor frames securely in place.

D. Separate aluminum from other metal surfaces with bituminous coatings or other means approved by Architect.

E. Set thresholds in bed of mastic and backseal.

F. Install exterior doors to be weathertight in closed position.

G. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.

H. Remove and replace damaged components that cannot be successfully repaired as determined by Architect.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for installation of doors.

3.5 ADJUSTING

A. Adjust doors, hinges, and locksets for smooth operation without binding.

3.6 CLEANING

A. Clean doors promptly after installation in accordance with manufacturer's instructions.

B. Do not use harsh cleaning materials or methods that would damage finish.

3.7 PROTECTION

A. Protect installed doors to ensure that, except for normal weathering, doors will be without damage or deterioration at time of substantial completion.

END OF SECTION 081200

SECTION 083610: STEEL SECTIONAL OVERHEAD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Electrically operated steel sectional overhead doors.
   2. Operating hardware, controls, and supports.

B. Related Sections:
   1. Division 1: Administrative, procedural, and temporary work requirements.
   2. Section 099113 - Painting: Field painting of doors.
   3. Division 26: Connection to power supply and control devices.

1.2 REFERENCES

A. ASTM International (ASTM) A653/A653M-03 - Standard Specification for Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

1.3 SYSTEM DESCRIPTION

A. Design doors to withstand:
   1. Positive and negative design wind loads in accordance with minimum applicable Building Code requirements.
   2. Cycle life of 10,000 cycles.

B. Operation: Electric.Track and Operating Hardware: Standard lift type.

1.4 SUBMITTALS

A. Submittals for Review:
   1. Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.
   2. Product Data: Provide information on component construction, anchorage method, and hardware.

B. Closeout Submittals:
   1. Operation and Maintenance Data.

1.5 WARRANTIES

A. Provide manufacturer’s one year warranty against defects in materials and workmanship.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Contract Documents are based on Model 3285 by C.H.I. Overhead Doors or approved equal.

B. Substitutions: Under provisions of Section 012500.

2.2 MATERIALS

A. Galvanized Steel Sheet:
   1. ASTM A653/A653M, Structural Quality, G60 coating class.

B. Glazing: Clear, insulated, tempered glass.

2.3 COMPONENTS

A. Door Sections:
   1. Type: Micro-grooved sandwich style.
   2. Material: Galvanized steel.
   3. Gage: 20 gage exterior skin with 27 gage interior skin, polyurethane core sections
   4. Thickness: Nominally 2 inches.
   5. Rails: Tongue-and-groove.
   6. End caps: Wrap-around box style, 20 gage galvanized steel, full height of section.
   7. Insulation: CFC-free polystyrene
   8. Vision lites:
      a. Match Existing size and profile, set with silicone sealant and screws.
      b. Pattern: Match Existing
   9. Exhaust ports: Aluminum, with hinged cover.

B. Tracks:
   1. 3 inches wide, roll-formed 13 gage galvanized steel, with galvanized steel mounting brackets.
   2. Lower track sections adjustable for weathertight fit.
   3. Horizontal tracks reinforced with minimum 13 gage galvanized steel angle according to door weight and size.

C. Hinge and Roller Assemblies: Heavy duty hinges and adjustable roller holders of galvanized steel, with floating hardened steel bearing rollers, located at top and bottom of each panel, each side.

D. Spring Counterbalance:
   1. Oil tempered torsion springs mounted on cross-header shaft supported by galvanized steel ball bearing end plates and center carrier brackets as required.
   2. Counterbalance transferred to doors via aircraft quality braided steel lift cables.

E. Bottom Weatherstripping: Vinyl weatherseal, full width of door.

F. Head and Jamb Weatherstripping: Flexible one piece vinyl extrusions.

G. Lock: Inside slide type, adjustable keeper, spring activated.

H. Electric Operator:
1. Power supply: 220 VAC, [single
2. Sufficient power to operate door at average speed of 12 inches per second.
3. Disconnect for chain hoist operation in case of power failure.
4. Control station: 24 VDC; push button station marked OPEN, CLOSE, and STOP.
5. Operator shall have smart wifi/ remote access capability.

I. Safety Device: Photoelectric sensor; detect obstruction and reverse door without requiring door to contact obstruction.

J. Finish:
1. Exterior panel surfaces: Baked-on enamel primer and polyester finish coat, match existing door color.
2. Interior panel surfaces: Baked-on polyester primer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install door assembly in accordance with manufacturer's instructions.

B. Anchor to adjacent construction without distortion or stress.

C. Securely brace door tracks suspended from structure. Secure tracks to structural members only.

D. Fit and align door assembly including hardware, level and plumb, to provide smooth operation.

E. Position head and jamb weatherstripping to contact door sections when closed; secure in position.

F. Make wiring connections between power supply and operator and between operator and controls.

3.2 ADJUSTING

A. Adjust to operate smoothly throughout full operating range.

END OF SECTION 083610

SECTION 085200: WOOD WINDOWS

PART 1: GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Replacement Windows
   2. Glazing.
   3. Accessories.

1.2 SYSTEM DESCRIPTION

A. Performance Requirements: Provide products/systems that have been manufactured, fabricated, and installed to the following performance criteria:
   1. Comply with ANSI/AAMA/NWWDA 101/I.S.2.
   2. Performance Class: CW
   3. Performance Grade: PG-70
   4. U-Factor (NFRC 100): .28
   5. Solar Heat Gain Coefficient (SHGC) (NFRC 200) : .43
   6. Outdoor-Indoor Transmission Class (OITC) (ASTM E90) : 22
   7. Sound Transmission Class (STC) (ASTM E90) : 26

1.3 SUBMITTALS

A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 01 Submittal Procedures Section.

B. Product Data: Submit manufacturer's product data and installation guides.

C. Shop Drawings: Provide drawings indicating direction of operable parts, typical jamb, head and sill conditions, and special mullion reinforcement details.

D. Color Samples: Submit selection and verification samples, including the following:
   1. Hardware: Submit Sample indicating typical finish on hardware.
   2. Cladding: Submit color samples of exterior cladding.

E. Quality Assurance/Control Submittals: Submit the following:
   1. Performance Data: Provide manufacturer's published performance data for specified products.

F. Contract Closeout Submittals: Submit the following:
   1. Warranty documents specified herein.
   2. Owner's Manual: Bound manual clearly identified with project name, location, and completion date. Identify type and size of units installed. Provide recommendations for periodic inspections, care, and maintenance. Identify common causes of damage with instructions for temporary repair.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Utilize an installer having demonstrated experience on projects of similar size and complexity.

B. Certifications:

1. Insulating Glass Units: Provide insulating glass units permanently marked with certification label of Insulating Glass Certification Council (IGCC) indicating compliance with ASTM E2190.

2. Insulating Glass Units: Provide insulating glass units permanently marked with certification label of Insulating Glass Manufacturers Association of Canada (IGMAC) indicating compliance with CAN/CGSB or ASTM E2190.

C. Windborne-Debris Resistance: Provide glazed units capable of resisting impact from windborne debris, based on pass/fail criteria as determined from testing glazed units per ASTM E1886 and ASTM E1996.

1.5 DELIVERY, STORAGE, AND HANDLING

A. General: Comply with Division 01 Product Requirements Section.

B. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

C. Delivery: Deliver materials in manufacturer's original unopened, undamaged containers with identification labels intact.

D. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

E. Store materials and accessories off ground, under cover, and protected from weather and construction activities.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimension of openings by field measurement before fabrication. Record measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

B. Install units in strict accordance with manufacturer's safety and weather recommendations.

1.7 WARRANTY

A. Project Warranty: Refer to Conditions of the Contract for project Warranty provisions.

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard limited warranty document. Manufacturer's limited warranty is in addition to, and not a limitation of, other rights Owner may have under contract documents.

PART 2: PRODUCTS

1.8 MANUFACTURER

A. Provide products from the following manufacturer or equal:
   1. Andersen Windows, Inc.
   2. Marvin
   3. Weathershield
   4. Jeldwen

1.9 MANUFACTURED UNITS

A. Proprietary Product/Systems: Wood windows, including the following:
   1. Andersen® 400 Series Casement/Fixed Windows.

1.10 MATERIALS

A. Frame and Sash: Fabricated from wood species approved in WDMA Industry Standard I.S.2.

B. Vinyl Cladding: Rigid vinyl (PVC) complying with requirements of ASTM D4216, in the following color:
   1. Color: White.

C. Weather-stripping:
   1. Venting Sash: Weather-stripped with the following material:
      a. Tubular flexible vinyl.
      b. Flexible EPDM foam.
   2. Stationary Casement/Awning Sash: Weather-stripped with foamed PVC gaskets or tubular flexible vinyl.

D. Interior Stops:
   1. Unfinished pine.

1.11 GLAZING

A. General: Insulating glass units certified through the Insulating Glass Certification Council as conforming to the requirements of IGCC. Provide dual sealed units consisting of polyisobutylene primary seal and silicone secondary seal. Provide metal spacers with bent or soldered corners.

B. General: Insulating glass units certified through ASTM E2190. Provide dual sealed units consisting of polyisobutylene primary seal and silicone secondary seal. Provide metal spacer with bent or soldered corners.

C. High-Performance™ Low-E4™ Glass Argon Blend Filled Insulating Glass Units:
   1. Glass – Operating Units: Insulating glass units consisting of an outboard lite of clear annealed glass conforming to ASTM C1036, Type 1, Class 1, q3 and an inboard lite of clear, heat strengthened glass conforming to ASTM C1048, Type 1, Class 1, q3, Kind HS.
   2. Glass - Fixed Units: Insulating glass units consisting of an outboard and inboard lite of clear annealed glass conforming to ASTM C1036, Type 1, Class 1, q3.

3. Magnetron sputtering vapor deposition (MSVD) TiO2 coating applied to the No. 1 surface.
4. High-Performance™ Low-E4™ Coating: Magnetron sputtering vapor deposition (MSVD) Low-E coating applied to the No. 2 surface.
5. Filling: Fill space between glass lites with argon gas blend.
6. Protective removable polyolefin film applied to glass surfaces No. 1 and No. 4.

D. High-Performance™ Low-E4™ Sun Glass, Low SHGC, Argon Blend Filled Insulating Glass Units:
1. Glass - Fixed Units: Insulating glass units consisting of an outboard and inboard lite of clear annealed glass conforming to ASTM C1036, Type 1, Class 1, q3.
2. Magnetron sputtering vapor deposition (MSVD) TiO2 coating applied to the No. 1 surface.
3. Filling: Fill space between glass lites with argon gas blend.
4. Protective removable polyolefin film applied to glass surfaces No. 1 and No. 4.

E. Monolithic Impact Glass:
1. Glass: Impact-resistant glass consisting of two (2) lites of clear annealed glass conforming to ASTM C1036, Type 1, Class 1, q3, Kind LA, laminated with 0.090 inch (2.3 mm) polyvinyl butyral interlayer in the following color:
2. Color: Clear.

F. Insulating Impact Resistant Glass:
1. Glass: Insulating glass units consisting of an outboard lite of clear annealed glass conforming to ASTM C1036, Type 1, Class 1, q3 and a laminated inboard lite of cleared annealed glass conforming to ASTM C1036, Type 1, Class 1, q3, Kind LA, laminate with a 0.090 inch (2.29 mm) SentryGlas® Plus interlayer.
2. Magnetron sputtering vapor deposition (MSVD) TiO2 coating applied to the No. 1 surface.
3. High-Performance™ Low-E4™ Coating: Magnetron sputtering vapor deposition (MSVD) Low-E coating applied to the No. 2 surface.
4. Filling: Fill space between glass lites with argon gas blend.
5. Protective removable polyolefin film applied to glass surfaces No. 1 and No. 4.

1.12 HARDWARE

A. Venting Casement Hardware:
1. Hardened steel operator arm stamped with a gear ring. Set arm gear between nylon bushing and nylon spacer. Encase drive shaft and worm gear assemblies in zinc die cast base and removable polycarbonate cover.
    a. Maximum Clear Opening Dimensions in Full Open Position:
        1) Units with Split Arm Operator:
            a) C Series: 14-7/16 inch (367 mm).
        2) Units with Straight Arm Operator:
            a) C Series; 18-5/16 inch (465 mm).
2. Hinges: Stainless steel and heavy gauge steel arms. Stainless steel reinforcing insert in low friction shoe for rectangle units. 2-knuckle stainless steel butt hinges for shaped units. Apply hinges to venting sash indicated on Drawings.
3. Operator Handle and Covers:

a. Folding Handle: Zinc die cast handle with powder coated painted finish and polycarbonate operator cover with integral color in the following style and finish.
   1) Style: Traditional.
   2) Color: Stone.

4. Limited Ventilation Control Adapters: Stainless steel limited ventilation control adapters designed to limit casement opening and projection. Adapters to work with the existing hinge hardware.
5. Operator Stud Cover: Baked enamel finishes matching operator handle finish. Provide operator stud cover where operator handle is removed for controlled access.

1.13 JOINING SYSTEMS

A. Wood Non-Reinforced Joining:
   1. Non-reinforced join with wood spacer.
   2. Gusset Plates: Galvanized metal gusset plates.

B. Aluminum Reinforced Joining.
   1. Reinforcing: Extruded aluminum profile of 6061-T6 aluminum with pre-drilled holes.
   2. End Plate: 0.080 inch (2.03 mm) 6061 T-5 stamped aluminum end plate with yellow chromate conversion coating and 1/2 inch (12.7 mm) stud that engages into aluminum profile.

C. Steel Reinforced Joining:
   1. Reinforcing: Provide 4 inch by 3/16 inch (100 mm by 4.8 mm) thick hot rolled steel plate conforming to ASTM A36 with zinc plating and yellow chromate conversion coat. Pre drill holes for attachment to window frames and end brackets.
   2. End Brackets: Predrilled steel end brackets that attach to each end of steel reinforcement member for attachment to rough opening.

D. LVL Reinforced Joining: 1-way.
   1. Reinforcing: 4-9/16 inch (116 mm).
   2. Reinforcing: 6-9/16 inch (167 mm).
      a. Engineered laminated veneer lumber, 3/4 inch (19 mm) thick, with extruded aluminum end cap.
      b. End Brackets: 18 gages (1.3 mm) galvanized preformed metal gusset plates.
   3. Jamb Clips: Stainless steel jamb clips.

E. LVL Reinforced Joining: 2-way:
   1. Reinforcing: 6-9/16 inch (167 mm).
      a. Engineered laminated veneer lumber 3/4 inch (19 mm) thick with extruded aluminum end cap.
      b. End Brackets: 14 gage (2.3 mm) galvanized end brackets with zinc dichromate finish.
      c. Intersection Brackets: 14 gage (2.3 mm) galvanized brackets with zinc dichromate finish.
   2. Jamb clips: Stainless steel jamb clips.

F. Fasteners: Corrosion resistant screws and bolts as provided by window manufacturer for fastening reinforcement members to wood frame and fastening end brackets to reinforcement members. Other fasteners provided by window installer.

G. Provide silicone sealant recommended by window manufacturer.

H. Provide vinyl trim strips as recommended by window manufacturer for each joining method used.
   1. Color: Match window unit exterior color.

I. Provide Head Flashing: 6 inch (152 mm) long sheet vinyl.
   1. Color: Match window unit exterior color.

J. Jamb clips: Stainless steel.

K. Inside Mull Casing: Provide mull casings in the following species.
   1. Casing Species: Pine.

1.14 ACCESSORIES

A. Insect Screens: Provide venting sash with an insect screen, including attachment hardware.
   1. Frames: 0.024 inch (0.61 mm) rolled aluminum frame with chromate conversion coating. Provide matching corner locks and latch retainers.
      a. Insect Screen Cloth: 18 by 16 aluminum mesh, gunmetal finish.
      b. Frame Finish: High-bake polyester finish in the following color:
         1) Frame Finish: Stone.
      c. Interior Finish: Pine veneer.
   2. Insect Screen Cloth: 25 by 25 micro fine stainless steel wire with a polyester non-reflective coating.

B. Exterior Trim and Casing: Where indicated on Drawings, provide 3/4 inch (19 mm) vinyl sheathed plywood conforming to NIST Voluntary Product Standards PS1 and rigid vinyl channels.
   1. Color: Match window framing.
   2. Andersen® Vinyl Trim Board: 0.043 inch (1.09 mm) thick vinyl with lightly textured surface laminated with adhesive to 3/4 inch (19.1 mm) thick plywood.
      a. Trim Channels: Rigid vinyl extrusions supplied by window manufacturer for use on same product line.
   3. Vinyl Laminated Board: 0.045 inch (1.14 mm) thick vinyl with smooth surface laminated with adhesive to 1/2 inch (13 mm) thick plywood.
      a. Trim Channels: Rigid vinyl extrusions supplied by window manufacturer for use on same product line.
   4. Support Mullion Trim: 2 inch (51 mm) wide wood filler and vinyl trim strip. Color to match window unit exterior color.

C. Extension Jambs: Wood members machined from clear material or veneered finger joined clear material approved in WDMA Industry Standard I.S.4. Pre-drill extension jambs for application.

1.15 FABRICATION

A. Preservative Treatment: Treat wood frame members after machining with a water repellent preservative in accordance with WDMA I.S.4.

B. Vinyl Cladding:
   1. Sash Members: Completely encase sash members with seamless, 0.047 inch (1.19 mm) thick, rigid vinyl extrusions. Heat-weld corners.
   2. Frame Units: Clad frame units with preformed rigid vinyl to provide joint-free cover. Provide integral flanges of 0.040 inch (1.02 mm) vinyl. Bond sheathing to wood frame with vinyl-to-wood adhesive.

C. Glazing: Factory glaze with high quality glazing sealant and snap-in rigid vinyl glazing bead.

D. Factory-apply weather-stripping.

E. Glazing Impact Resistant Units: Factory glaze with high performance glazing sealant as primary seal and removable interior wood stops. Backfill between glass edge and frame with high performance sealant. Apply high performance glazing sealant as secondary seal at glass opening perimeter.
   1. Color of Secondary Sealant: Match window unit.

PART 3: EXECUTION

1.16 MANUFACTURER'S INSTRUCTIONS

A. Comply with the instructions and recommendations of the window manufacturer.

1.17 EXAMINATION

A. Site Verification of Conditions: Verify that site conditions are acceptable for installation of units, including the following:
   1. Concrete surfaces are dry and free of excess mortar, rocks, sand, and other construction debris.
   2. Masonry openings are square and dimensions are correct.
   3. Rough openings are square and dimensions are correct.
   4. Sill plates are level.
   5. Wood frame walls are dry, clean, sound, and well nailed or glued, free of voids and without offsets at joints.
   6. Nail heads are driven flush with surfaces in openings and within 3 inches (75 mm) of rough opening.

B. Do not proceed with installation of units until unacceptable conditions are corrected.

1.18 INSTALLATION

A. General:
   1. Remove unit components, parts, accessories, and installation guides from carton.
   2. Inspect unit components and verify that components are not damaged and that parts are included before disposing of carton.

3. Shop-assemble multiple units before installation in accordance with manufacturer's installation guide.
4. Field-assemble multiple units before installation in accordance with manufacturer's installation guide.

B. Interface With Other Work:
1. Perform installation in accordance with Manufacturer's instructions.
2. Install unit's level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
3. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
4. Install insulation in shim space around unit perimeter to maintain continuity of building insulation. Do not overfill.
5. Hold back exterior siding or other finish materials from edge of unit to allow for expansion and contraction and installation of proper joint sealant with backing materials. Seal perimeter of unit after exterior finish is applied per requirements of Division 07 "Joint Sealants" Section.
6. Finish interior units per requirements specified in related sections. Refer to, and comply with, additional requirements in manufacturer's installation guides.
7. Install optional hardware and unit accessories after cleaning.

C. Site Tolerances:
1. Adjust operation, insect screens, hardware, and accessories for a tight fit at contact points and weather-stripping for smooth operation and weather tight closure.

1.19 CLEANING

A. Clean units using cleaning material and methods specifically recommended by window manufacturer.

B. Remove excess sealants, glazing materials, dirt, and other substances.

C. Avoid damaging protective coatings and finishes.

D. Protect unit surfaces from masonry cleaning solution that could damage insulation glass panels or hardware.

E. Remove debris from work site and properly dispose of debris.

1.20 PROTECTION

A. Protect installed work from damage due to subsequent construction activity on the site.

END OF SECTION

SECTION 087100 – DOOR HARDWARE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This section includes door hardware for the following:
   1. Swinging doors.

B. Door hardware includes, but is not necessarily limited to, the following:
   1. Hinges.
   2. Cylindrical Locksets.
   3. Keying.
   4. Mechanical Locks and Latching Devices.
   5. Lock and Latch Strikes.
   6. Exit Devices.
   7. Surface Door Closers.

1.2 RELATED SECTIONS

A. Section 08120- Stile and Rail Doors

B. Section 08200-FRP Doors and Aluminum Frames

1.3 REFERENCES

A. Comply with the version year adopted by the Authority Having Jurisdiction:
   1. ANSI A117.1 - American National Standard for Accessible and Useable Buildings and Facilities.
   2. ANSI/BHMA A156.1, "Butts and Hinges" (copyrighted by BHMA, ANSI approved).
   3. ANSI/BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches.
   4. ANSI/BHMA A156.3 - American National Standard for Exit Devices.
   5. ANSI/BHMA A156.4 - American National Standard for Door Controls - Closers.
   6. ANSI/BHMA A156.5 - American National Standard for Auxiliary Locks and Associated Products.
   7. ANSI/BHMA A156.6, "Architectural Door Trim" (copyrighted by BHMA, ANSI approved).
   8. ANSI/BHMA A156.7, "Template Hinge Dimensions" (copyrighted by BHMA, ANSI approved).
   9. ANSI/BHMA A156.8, "Door Controls - Overhead Holders" (copyrighted by BHMA, ANSI approved).
   10. ANSI/BHMA A156.13 - American National Standard for Mortise Locks and Latches Series 1000.
   11. ANSI/BHMA A156.15 - Life Safety Closer/Holder/Release Devices.
   12. ANSI/BHMA A156.16 - Auxiliary Hardware.

13. ANSI/BHMA A156.18 - Materials and Finishes.
14. ANSI A156.19 - American National Standard for Power Assist and Low Energy Power Operated Doors.
15. ANSI A156.23 - American National Standard for Electromagnetic Locks
16. ANSI A156.24 - American National Standard for Delayed Egress Locks
17. ANSI A156.25 - American National Standard for Electrified Locking Devices
18. ANSI A156.28 - American National Standard for Keying Systems
19. ANSI A156.29 - American National Standard for Exit Locks and Alarms, Exit Locks with Exit Alarms and Alarms for Exit Devices
20. ANSI A156.31 - American National Standard for Electric Strikes and Frame Mounted Actuators
21. ANSI/UL 10C - Standard for Safety for Positive Pressure Fire Tests of Door Assemblies.

A. PERFORMANCE REQUIREMENTS

B. Accessibility Requirements: Comply with requirements of Local building code, and Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's catalog cuts on each product to be used.

C. Shop Drawings: Indicate locations and mounting heights of each type of hardware, schedules, and connection requirements.

D. Schedule:
1. Submit schedule indicating each type of hardware for each door.
2. List manufacturer's name with each manufacturer's hardware number together with finishes in US standards.
3. Show door number/location, handing, door and frame material, manufacture and catalog numbers, all finishes and keying information. Explain fully all abbreviations.

E. Shop Drawings:
1. Indicate locations and mounting heights of each type of hardware.
2. Supply templates to door and frame manufacturer(s) to enable proper and accurate sizing and locations of cut-outs for hardware.
3. Detail any conditions requiring custom extended lip strikes, or any other special or custom conditions.
4. Wiring diagrams including point to point and riser diagrams, function statements and system descriptions for all electrical hardware

F. Verification Samples: For each finish product specified.
1. Submit one sample of each type of typical hardware required illustrating style, color, and finish.

2. Approved samples may be incorporated into Work.

G. Closeout Submittals:
1. Project Record Documents: Schedule showing actual locations of installed cylinders and their master key code.
2. Parts lists and maintenance instructions including data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
3. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer with a minimum of ten years experience manufacturing door hardware.

B. Supplier Qualifications: A supplier with a minimum of two years demonstrated experience in the sale and distribution of builders' hardware for commercial projects and who has successfully completed at least three projects of similar complexity to the project specified.

C. Hardware Supplier Personnel: Employ Architectural Hardware Consultant (AHC) or equally qualified person to supervise and prepare all schedules, details, and services required for the project.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Package hardware items individually with necessary fasteners and installation templates when necessary; label and identify each package with door opening code to match hardware schedule. Include basic installation instructions with each item or package.

C. Store products in manufacturer's unopened packaging until ready for installation.

D. Protect materials from exposure to moisture. Do not deliver until after wet work is complete and dry.

E. Store materials in a dry, warm, ventilated weathertight location.

F. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail, by hand or overnight package service as directed by the Owner.

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 absolute limits.

1.8 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under the requirements of the Construction Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
   1. Structural failures including excessive deflection, cracking, or breakage.
   2. Faulty operation of the hardware.
   3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
   4. Electrical component defects and failures within the systems operation.

C. Special Warranty Periods. Provide factory warranty against defects in material and workmanship as follows:
   1. Overhead Surface Closers, Grade 1: 25 Year Warranty.
   2. Cylindrical locks, Grade 1: 10 Year Warranty.
   3. Standard and Interchangeable Cylinders: 5 Year Warranty.
   4. Electrical components: 2 Year Warranty.
   5. Exit hardware: 5 Year Warranty.
   6. Door hinges 10 Year Warranty.

1.9 MAINTENANCE MATERIALS

A. Maintenance Tools and Instructions: Provide a complete set of special wrenches, tools, and maintenance instructions applicable to each different or special hardware component for the Owner’s continued adjustment, maintenance, and removal and replacement of door hardware.

B. Continued Service: Beginning at Substantial Completion, and running concurrent with the specified warranty period, provide continuous twelve (12) months full maintenance including repair and replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door opening operation. Provide parts and supplies as used in the manufacture and installation of original products.

1.10 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard

and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door Hardware and Electrical Connections (if applicable): Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

C. Door and Frame Preparation: Related Division 08 Section doors and frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

D. Coordinate work with other directly affected components involving manufacture or fabrication of internal reinforcement for door hardware and recessed items.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 HINGES

A. Basis of Design Product: PemkoHinge Continuous Geared Hinges: Full Surface Hinges: Center Pivot as manufactured by Pemko Manufacturing, PO Box 3780, 4226 Transport Street, Ventura, CA 93003; Telephone: (800) 283-9988, (805) 642-2600; Fax: (805) 642-4109; E-mail: pemkosales@pemko.com; website: www.pemko.com. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
   1. Bommer Industries.
   2. McKinney Products.
   3. Commercial Door Systems.
   4. Markar Architectural Products.
   5. Stanley.

B. Requirements:
   1. Material: Extruded tempered aluminum.
   2. Material Standard: 6063 T6 aluminum alloy.
   3. Finish: Clear anodized.
   4. Type: Full mortise.
   5. Number: Furnish one continuous hinge for each door leaf.
   6. Configuration: Three interlocking extrusions in pinless assembly, installed to full height of door frame.
   7. Hinge Options: Center pivot.

8. Strength: **Standard Duty** (doors up to 240 lbs) unless otherwise noted as **Heavy Duty** (doors up to 540 lbs).
9. Widths: Sufficient to clear trim projection when door swings 180 degrees.
10. ADA/ ANSI compliant.

2.3 CYLINDERS

A. Basis of Design Manufacturer: Cylinders compatible to the Owner's existing system as manufactured by SARGENT Manufacturing Company, 100 Sargent Drive, P.O. Box 9725, New Haven, CT 06536-0915; PH: (800) 727-5477; FX: (888) 863-5054; EM: webmaster@sargentlock.com; Website: www.sargentlock.com. Subject to compliance with requirements, provide the named product or a comparable product subject the Architect's review as a substitution in accordance with the requirements of Division 01. Approval of requests is at the discretion of the Architect.

B. General: Cylinder manufacturer shall have a minimum of ten (10) years experience designing secured master key systems and have on record a published security keying system policy.

C. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as the locksets and exit devices unless otherwise indicated.

D. Cylinders:
   1. Mortise Type: Threaded cylinders with rings and straight- or clover type cam.
   2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
   3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
   4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.

2.4 KEYING

A. Keying System: Each type of lock and cylinders to be factory keyed. Owner to provide to define keying system requirements and as follows:
   1. Provide new master key or grand master key locks to Owner's existing system.
   2. Nickel silver. Stamp keys with "DO NOT DUPLICATE".
   3. Each key and key blank is engraved with a unique serial number at the factory. Serial numbers are never repeated, allowing identification and tracking of each key.

B. Key Quantity. Supply keys in the following minimum quantities:
   1. Master keys: Four (4).
   2. Construction Control Keys: Two (2).
   3. Permanent Control Keys: Ten (10).

C. Construction Keying: Provide construction master keyed cylinders or temporary keyed construction cores where specified. Provide construction master keys in quantity required by project Owner.

D. Key Registration List: Provide keying transcript list to Owner in the proper format for importing into key control software.

2.5 MECHANICAL LOCKS AND LATCHING DEVICES

A. Basis of Design Product:

i. **Standard Duty**: **10 Line Cylindrical Lock** as manufactured by SARGENT Manufacturing Company, 100 Sargent Drive, P.O. Box 9725, New Haven, CT 06536-0915; PH: (800) 727-5477; FX: (888) 863-5054; EM: webmaster@sargentlock.com; Website: www.sargentlock.com. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:

1. Corbin Russwin Hardware- CL3300 Series.
2. Yatch Locks and Hardware- 5400LN Series.
3. Sargent Manufacturing Company.

ii. **Heavy Duty**: **11 Line Lever Lock** as manufactured by SARGENT Manufacturing Company, 100 Sargent Drive, P.O. Box 9725, New Haven, CT 06536-0915; PH: (800) 727-5477; FX: (888) 863-5054; EM: webmaster@sargentlock.com; Website: www.sargentlock.com. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:

1. Corbin Russwin Hardware- CL3300 Series.
2. Yatch Locks and Hardware- 5400LN Series.
3. Sargent Manufacturing Company.

B. Requirements:

1. Lever Type: Locksets to incorporate a free-wheeling lever design with a lifetime warranty against lever sag and spring breakage on all locking functions.
2. Grade 1 (Heavy Duty).
3. ANSI/BHMA A156.2, Series 4000, Grade 1 certified.
4. Lock Chassis: Fabricated of heavy gauge steel, zinc dichromate plated, with through-bolted application.
5. Furnish with solid cast levers, standard 2-3/4” backset, and ½” (3/4” at rated paired openings) throw brass or stainless steel latchbolt.
6. Locks are to be non-handed and fully field reversible.

2.6 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer’s standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three piece antifriction latchbolts, as

recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.

B. Standards. Comply with the following:
1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.5.
4. Dustproof Strikes: BHMA A156.16.

2.7 EXIT DEVICES

A. Basis of Design Product: 80 Series **Heavy Duty** Exit Device as manufactured by SARGENT Manufacturing Company, 100 Sargent Drive, P.O. Box 9725, New Haven, CT 06536-0915; PH: (800) 727-5477; FX: (888) 863-5054; EM: webmaster@sargentlock.com; Website: www.sargentlock.com. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
1. Corbin Russwin Hardware- ED4000/ ED5000 Series
2. Yatch Locks and Hardware- 7000 Series.
3. Sargent Manufacturing Company.

B. Requirements:
1. ANSI/BHMA A156.3, Grade 1 certified.
2. Mounting rails to be formed from smooth stainless steel no less than 0.072" thick, with push rails a minimum 0.062" thickness. Painted or aluminum metal rails are not acceptable.
3. Exit device latch to be investment cast stainless steel, Pullman type, with deadlock feature.

2.8 SURFACE DOOR CLOSERS

A. Basis of Design Product: Benchmark 4040XP Series Closer as manufactured by LCN Closers, 121 W. Railroad Ave., P.O. Box 100, Princeton, IL 61356 (Tel: 877-671-7011). Subject to compliance with the requirements, provide the named product or a comparable product by one of the following:
1. LCN Closers
2. Sargent Manufacturing Company
3. Stanley Precision

B. Requirements:
1. ANSI/BHMA A156.4 Grade 1.
2. UL 10C Positive Pressure.
3. ADA Compliant.

4. Door closer cylinders shall be of high strength cast iron construction to provide low wear operating capabilities of internal parts throughout the life of the installation.
5. Bearing type shall be full compliment.
6. Closers shall be adjustable and be non-handed.
7. Main speed and latch speed regulation valves are to be staked.
8. Closers are to have the option of Delayed Action.
9. Provide closers with regular arm, parallel arm or top jamb mount as required to keep corridors clear and for proper installation. Arms are to be provided extra duty, hold open, stop and spring cush as specified.
10. All closers mounted on exterior openings are to be furnished with LCN's special rust inhibiting process (SRI) or approved equal.
11. Closers are to be provided with a standard or custom powder coat finish.
12. Closers shall not have pressure relief valves.
13. Supply all drop plates, shoe supports, blade stops, templates, etc. to properly Install closers according to manufacturer's recommendations. In replacement Installations closers shall utilize the "Quick Fix Kit" to cover existing holes.
14. Provide adjustable units complying with ANSI A117.1 provisions for door opening force and delayed action closing.
15. Hydraulic Fluid: All mechanical closers shall utilize temperature stable fluid capable of withstanding temperature ranges of 120 degrees F. to -30 degrees F. without requiring seasonal adjustment of closer speed to properly close the door.
16. Closers shall have a minimum 10 year warranty.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify Architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

C. Do not begin installation until substrates have been properly prepared.

D. Verify doors and frames are ready to receive door hardware and dimensions are as indicated on shop drawings.

E. Verify electric power is available to power operated devices and is of correct characteristics (if applicable).

3.2 INSTALLATION

A. Install in accordance with manufacturer's written instructions and according to the specifications.

B. Mounting Heights: Coordinate mounting heights with door and frame manufacturers. Use templates provided by hardware item manufacturer. Verify hardware locations conform to ADA/ ANSI A117.1 requirements and all other governing regulations.

C. Install with fasteners provided by hardware item manufacturer.

D. Storage: Provide a secure lock up for hardware delivered to the project site but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.3 ADJUSTING

A. Adjust and check each operating item of door hardware and each door to ensure smooth, proper operation and function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation as needed and to comply with applicable referenced accessibility requirements.

3.4 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered dry place. Protect exposed hardware installed on all doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean and adjust surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish and provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Owner occupancy.

3.5 DEMONSTRATION

A. Instruct Owner’s maintenance personnel to adjust, operate, and maintain mechanical and any electromechanical door hardware.

END OF SECTION 087100

SECTION **087200**: **WEATHER-STRIPPING & SEALS (THRESHOLDS)**

PART 1 : GENERAL

1.01 SUMMARY

A. Section Includes: Commercial Thresholds

B. Related Sections:

1. Division 8 Section(s): Steel Doors
2. Aluminum frames entrance and storefront

1.02 REFERENCES

A. American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA):

1. ANSI/BHMA A156.18: Materials and Finishes.
2. ANSI/BHMA A156.21 Thresholds.

B. Underwriters Laboratories, Inc. (UL):

1. UL 10B Fire Tests of Door Assemblies.
2. UL 10C Fire Tests of Door Assemblies.
3. UL 410 Slip Resistance for Floor Surface Materials.

C. Federal Government:

1. U.S. Architectural & Transportation Barriers Compliance Board. Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG), 1992.
2. Federal Standard FED-STD-795-1988 (Revised 1989) Uniform Federal Accessibility Standards.
3. Federal Specification P-F-430C Finish, Floor, Water Emulsion (for Use On Light Colored Floors).

D. International Code Council (ICC):

1. UBC 7-2 Fire Test of Door Assemblies (Positive Pressure).
2. International Building Code (IBC) Code 2000 (Positive Pressure).
3. ICC/ANSI A117.1 Accessible and Usable Buildings and Facilities.

E. British Standards (BS):

1. BS 476 Fire Tests on Building Materials and Structures.

F. State Standards:

1. California Title 24, Part 2.

1.03 SYSTEM DESCRIPTION

A. Design Requirements: Provide threshold and seal products which have been manufactured, fabricated and installed to meet the following design criteria:

1. Performance obtained from test procedures ICC/ANSI A117.1.

2. Compliant with UL 410.
3. Compliant with ADA standards.

1.04 SUBMITTALS

A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.

B. Product Data: Submit manufacturer's product data and installation instructions.

C. Shop Drawings: Provide drawings indicating required component locations, interface with adjacent materials, installation, anchorage, fastening and similar information.

D. Samples: Submit one each of manufacturer's standard selection samples.

E. Quality Assurance/Control Submittals: Submit the following:

1. Test Reports: Upon request, submit fire test reports from recognized testing laboratory.
2. Certificates: Submit manufacturer's certificate that products meet or exceed specified requirements.

F. Closeout Submittals: Submit the following:

1. Warranty documents specified herein.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Utilize an installer having demonstrated experience on projects of similar size and complexity.

1.06 DELIVERY, STORAGE & HANDLING

A. General: Comply with Division 1 Product Requirement Section.

B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

D.

PART 2 PART 2: PRODUCTS

2.01 THRESHOLDS

A. Proprietary Products/Systems: Thresholds, including the following:

1. Saddle Thresholds:
   a. Material: Extruded tempered aluminum 6063-T6.
   b. Finish (ANSI/BHMA 156.18): Mill finish aluminum.

PART 3 : EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

A. Comply with the instructions and recommendations of the threshold manufacturer.

3.02 EXAMINATION

A. Site Verification of Conditions:

1. Verify that site conditions are acceptable for installation of thresholds.

a. Examine doors and frames for compliance with requirements for door and frame manufacturer's installation tolerances, labeled fire door assembly construction, wall and floor construction and other conditions affecting performance.

2. Do not proceed with installation of thresholds until unacceptable conditions are corrected.

3.03 INSTALLATION

A. Mounting Location: Comply with drawings and approved shop drawings.

B. Adjust and reinforce attachment substrates as necessary for proper installation and operation.

C. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

D. Rubber Ramps: Install using "Liquid Nails" per manufacturer's installation instructions.

3.04 ADJUSTING

A. Perform adjustments required to ensure that thresholds function in compliance with manufacturer's performance criteria prior to acceptance by Owner.

3.05 CLEANING

A. Remove any protective films and clean components as necessary following manufacturer's recommended procedures.

3.06 PROTECTION

A. Protect installed work from damage due to subsequent construction activity on the site.

END OF SECTION 087200

SECTION 088100 – GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes aluminum framed storefront glazing.

1.2 RELATED SECTIONS

A. Section 08410- Aluminum Framed Storefront.

1.3 DEFINITIONS

A. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:

1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:

a. Design Wind Loads: Determine design wind loads applicable to Project from basic wind speed indicated in miles per hour at 33 feet above grade, according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 6.5, "Method 2-Analytical Procedure," based on mean roof heights above grade indicated on Drawings.
b. Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.

C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:

1. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite 6.0 mm thick and a nominal 1/2-inch- wide interspace.
2. Center-of-Glass Values: Based on using LBL-44789 WINDOW 5.0 computer program for the following methodologies:

a. U-Factors: NFRC 100 expressed as Btu/ sq. ft. x h x deg F.
b. Solar Heat Gain Coefficient: NFRC 200.
c. Solar Optical Properties: NFRC 300.

1.5 SUBMITTALS

A. Product Data: For each Balance type, glass product, and glazing material indicated.

B. Samples:

1. 18-inch- square minimum, of assembled insulating glass unit.
2. Glazing sealant and tapes.

C. Glazing Schedule: Use same designations indicated on Drawings.

D. Preconstruction Adhesion and Compatibility Test Report: From glazing sealant manufacturer.

1.6 QUALITY ASSURANCE

A. Preconstruction Adhesion and Compatibility Testing: Submit to elastomeric glazing sealant manufacturers, for testing according to ASTM C 1087, samples of each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member that will contact or affect elastomeric glazing sealants:

B. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: GANA's "Glazing Manual."
2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."

C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the Insulating Glass Certification Council or Associated Laboratories, Inc.

1.7 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form, made out to Owner and signed by coated-glass manufacturer agreeing to replace coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: 10 years from date of Substantial Completion.

B. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form, made out to Owner and signed by insulating-glass manufacturer agreeing to replace insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
2. Products: Subject to compliance with requirements, provide one of the products specified.
3. Product: Subject to compliance with requirements, provide product specified.
4. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
5. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 GLASS PRODUCTS

A. Insulating-Glass Units, General: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in Part 2 "Insulating-Glass Units" Article.

1. Available Products:
   a. PPG: Solarban 60 Low-E glass with Argon
   b. Viracon: Low-E (VE) Insulating Glass with Argon: VE1-2M
   c. Viracon: Low-E (VE) Insulating Glass with Argon: VE1-85
2. Factory Safety Glazing with a permanent SGCC Certification Label:
3. Overall Unit Thickness and Thickness of Each Lite: 1 inch.

a. Note: Dimensions indicated for insulating-glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
b. Overall thickness to match thickness of existing units to be replaced. Each lite to have a thickness as determined by design wind load with a minimum thickness of 6.0 mm.

4. Sealing System: Dual seal.
5. Spacer Specifications: Manufacturer's standard spacer material and construction complying with the following requirements:

a. Spacer Material: Aluminum with black or dark bronze, color anodic finish Aluminum with powdered metal paint finish in color selected by Architect .
b. Corner Construction: Manufacturer's standard corner construction.

6. Performance Requirements:
a. Visible Light Transmittance: 70% percent minimum.
b. Winter Nighttime U-Factor: 0.27 maximum.
c. Summer U-Factor: 0.25 maximum
d. Solar Heat Gain Coefficient: 0.4 maximum.
e. Low-E Coating: Pyrolytic or sputtered on second or third surface.

2.3 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:

1. Neoprene, ASTM C 864.
2. EPDM, ASTM C 864.
3. Silicone, ASTM C 1115.
4. Thermoplastic polyolefin rubber, ASTM C 1115.
5. Any material indicated above.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal:

1. Neoprene.
2. EPDM.
3. Silicone.
4. Thermoplastic polyolefin rubber.
5. Any material indicated above.

2.4 GLAZING SEALANTS

A. General: Provide products of type indicated, complying with the following requirements:

1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units,

and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range to match color of aluminum sash.

B. Elastomeric Glazing Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

1. Single-Component Neutral- and Basic-Curing Silicone Glazing Sealants :

a. Available Products (**verify compatibility of applied sealants with sealants used in fabrication of insulating glass units**):

1) Dow Corning 795
2) Dow Corning 999-A
3) GE Silicones; SilPruf NB SCS9000.
4) GE Silicones; UltraPruf II SCS2900.
5) Pecora Corporation; 895.
6) Tremco; Spectrem 2.

b. Type and Grade: S (single component) and NS (nonsag).
c. Class: 50.
d. Use Related to Exposure: NT (nontraffic).
e. Uses Related to Glazing Substrates: M, G, A, and, as applicable to glazing substrates indicated, O.
f. Applications: wet glazing

2.5 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:

1. Type 1, for glazing applications in which tape acts as the primary sealant.

2. Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.6 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

PART 3 - EXECUTION

3.1 GLAZING

A. General: Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

1. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
2. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
3. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
4. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
5. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
6. Provide spacers for glass lites where length plus width is larger than 50 inches.
7. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

B. Tape Glazing: Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

1. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
2. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
3. Apply heel bead of elastomeric sealant, where required.
4. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
5. Apply cap bead of elastomeric sealant over exposed edge of tape.

C. Gasket Glazing (Dry): Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

1. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
2. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
3. Install gaskets so they protrude past face of glazing stops.

D. Sealant Glazing (Wet): Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

1. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
2. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.2 CLEANING AND PROTECTION

A. Protect exterior glass from damage. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended by glass manufacturer.

B. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

END OF SECTION 088100