

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Standard hollow metal doors and frames.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include elevations, door edge details, frame profiles, metal thicknesses, preparations for hardware, and other details.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Samples for Verification: For each type of exposed finish required.
- E. Schedule: Prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings.

1.3 QUALITY ASSURANCE

- A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at as close to neutral pressure as possible, NFPA 252.
- B. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Label each individual glazed lite.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Amweld Building Products, LLC.
 2. Benchmark; a division of Therma-Tru Corporation.

3. Ceco Door Products; an Assa Abloy Group company.
4. Curries Company; an Assa Abloy Group company.
5. Deansteel Manufacturing Company, Inc.
6. Firedoor Corporation.
7. Fleming Door Products Ltd.; an Assa Abloy Group company.
8. Habersham Metal Products Company.
9. Karpen Steel Custom doors & Frames.
10. Kewanee Corporation (The).
11. Mesker Door Inc.
12. Pioneer Industries, Inc.
13. Security Metal Products Corp.
14. Steelcraft; an Ingersoll-Rand company.
15. Windsor Republic Doors.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008, CS, Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011, CS, Type B.
- C. Metallic-Coated Steel Sheet: ASTM A 653, Commercial Steel (CS), Type B; with minimum A40 metallic coating.
- D. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z coating designation; mill phosphatized.
 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008 or ASTM A 1011, hot-dip galvanized according to ASTM A 153, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153.
- F. Grout: ASTM C 476, except with a maximum slump of 4 inches as measured according to ASTM C 143.
- G. Mineral-Fiber Insulation: ASTM C 665, Type I.
- H. Glazing: Division 08 Section "Glazing."
- I. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat.

2.3 STANDARD HOLLOW METAL DOORS

- A. General: Comply with ANSI/SDI A250.8.
 1. Design: Flush panel.

2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.
 - a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
 - b. Thermal-Rated (Insulated) Doors: R-value of not less than 12.3 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.
 3. Vertical Edges for Single-Acting Doors: Beveled edge, 1/8 inch in 2 inches.
 4. Top and Bottom Edges: Closed with flush or inverted 0.042-inch-thick, end closures or channels of same material as face sheets.
 5. Tolerances: SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
 - B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Comply with ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
 1. Level 1 and Physical Performance Level C (Standard Duty), Model 1 (Full Flush).
 - a. Width: 1-3/4 inches.
 - C. Interior Doors: Face sheets fabricated from cold-rolled steel sheet unless metallic-coated sheet is indicated. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
 1. Level 1 and Physical Performance Level C (Standard Duty), Model 1 (Full Flush).
 - a. Width: 1-3/4 inches.
 - D. Hardware Reinforcement: ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
 - E. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.
- 2.4 STANDARD HOLLOW METAL FRAMES
- A. General: Comply with ANSI/SDI A250.8.
 - B. Exterior Frames: Fabricated from metallic-coated steel sheet.
 1. Fabricate frames with mitered or coped corners.
 2. Frames for Level 1 Steel Doors: 0.042-inch-thick steel sheet.
 - C. Interior Frames: Fabricated from cold-rolled steel sheet unless metallic-coated sheet is indicated.
 1. Fabricate frames with mitered or coped corners.

2. Frames for Level 1 Steel Doors: 0.042-inch-thick steel sheet.
3. Frames for Wood Doors: 0.042-inch-thick steel sheet.
4. Frames for Borrowed Lights: 0.042-inch-thick steel sheet.

D. Hardware Reinforcement: ANSI/SDI A250.6.

2.5 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
3. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
4. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.6 STOPS AND MOLDINGS

- A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch thick, same material as door face sheet.
- B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch high unless otherwise indicated.
- C. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch thick, same material as frames.

2.7 ACCESSORIES

- A. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

2.8 FABRICATION

- A. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.
- B. Hollow Metal Doors:

1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors. Seal joints in top edges of doors against water penetration.
 2. Glazed Lites: Factory cut openings in doors.
 3. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated.
- C. Hollow Metal Frames: Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
 4. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
 5. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Three anchors per jamb up from 60 inches to 90 inches high.
 - b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Four anchors per jamb from 60 inches to 90 inches high.
 - 2) Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.
 - c. Compression Type: Not less than two anchors in each jamb.
 - d. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
 6. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers.
 - a. Single-Door Frames: Three door silencers.
 - b. Double-Door Frames: Two door silencers.
- D. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
 2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.

4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 electrical Sections.
- E. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
 2. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
 3. Provide loose stops and moldings on inside of hollow metal work.
 4. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

2.9 STEEL FINISHES

- A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
1. Shop Primer: ANSI/SDI A250.10.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Hollow Metal Frames: Comply with ANSI/SDI A250.11.
1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-protection-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install frames with removable glazing stops located on secure side of opening.
 - d. Install door silencers in frames before grouting.
 - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - f. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - g. Field apply bituminous coating to backs of frames that are filled with grout containing antifreezing agents.
 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.

- a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
5. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
6. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- B. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
 1. Non-Fire-Rated Standard Steel Doors:
 - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
 - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
 - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
 - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 3. Smoke-Control Doors: Install doors according to NFPA 105.
- C. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.
 1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.2 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

- B. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- C. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 081113

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-core doors with wood-veneer faces.

1.2 SUBMITTALS

A. Product Data: For each type of door indicated. Include factory-finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.

1. Indicate dimensions and locations of mortises and holes for hardware.
2. Indicate dimensions and locations of cutouts.
3. Indicate requirements for veneer matching.
4. Indicate doors to be factory finished and finish requirements.
5. Indicate fire-protection ratings for fire-rated doors.

C. Samples for Initial Selection: For factory-finished doors.

D. Samples For Verification:

1. Factory finishes applied to actual door materials, 8 inches by 10 inches for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.
2. Corner sections of doors 8 inches by 10 inches, with door faces and edges representing actual materials to be used.

E. Warranty: Sample of special warranty.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.

B. Source Limitation: Obtain flush wood doors from a single manufacturer.

C. Quality Standard: In addition to requirements specified, comply with AWI's "Architectural Woodwork Quality Standards Illustrated."

- D. Forest Certification: Provide doors made with all wood products obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- E. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on test at as close to neutral pressure as possible according to NFPA 252, UBC Standard 7-2, or UL 10B.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.
- C. Mark each door on top and bottom rail with opening number used on shop drawings.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: do not deliver or install doors until spaces are enclosed and weather-tight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
- B. Failures include, but are not limited to the following.
 - 1. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-42-inch section.
 - 2. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Algoma Hardwoods, Inc.
 - 2. Marlite.
 - 3. Marshfield Door Systems, Inc.
 - 4. Mohawk Flush Doors, Inc.; a Masonite company.
 - 5. Oshkosh Architectural Door Company.
 - 6. VT Industries Inc.

2.2 DOOR CONSTRUCTION, GENERAL

- A. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.
- B. WDMA I.S.1-A Performance Grade:
 - 1. Heavy Duty unless otherwise indicated.
- C. Continuous Block-Stave Core Doors:
 - 1. Core, glue block core.
 - 2. Comply with specified requirements for exposed edges.
- D.
 - 1. All Doors: See drawings for locations and additional requirements.
 - a. Wood Veneer Faced Doors: 5 or 7-ply unless otherwise indicated.
 - 2. Flush Interior Solid Core Doors: 1-3/4 inches thick; solid core construction.
 - 3. Flush Interior Hollow Core Doors: 1-3/8 or 1-3/4 inches thick; hollow core construction.

- 2.3
 - 4. Interior Stile and Rail Doors: 1-3/4 inches thick; structural composite lumber core construction.
- E. Glazing Stops: Wood of same species as door facing, mitered corners, prepared for countersunk screws.

2.4 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type PC, particleboard core, plies and faces as indicated above.
- B. Rated Solid Core: Type MC, mineral core, plies and faces as indicated above.
- C. Hollow Core Doors: Phenolic impregnated honeycomb.
- D. Stile and Rail Doors: Structural composite lumber core with solid hardwood edges.

2.5 DOOR FACINGS

- A. Hardboard Facing for Opaque Finish: AHA A135.4, Class 1 - Tempered, S2S (smooth two sides) hardboard, composition face, 1/8 inch thick.
- B. Wood Veneer Doors: Plain sliced select white birch, A Grade, 1/50- inch thick minimum; stain color(s) as indicated; AWI system TR6.

C. Plastic Laminate Veneered Doors: High-pressure decorative laminates complying with NEMA LD 3, Grade HGS; color, patterns, and finishes as indicated.

D. Facing Adhesive: Type I or Type II - water resistant.

2.6 VENEERED-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:

1. Grade: Premium, with Grade A faces.
2. Species: Select white birch.
3. Cut: Rotary cut.
4. Match between Veneer Leaves: Book match.
5. Assembly of Veneer Leaves on Door Faces: Center balance match.
6. Exposed Vertical and Top Edge: Same species as faces.
7. Core: Particleboard, glued wood stave.
8. Construction: Five or seven plies. Stiles and rails are bonded to core, then entire unit
Adhesives: Type I per WDMA TM-6.
9. WDMA I.S.1-A Performance Grade: Heavy duty.

B. Interior Hollow-Core Doors:

1. Grade: Premium, with Grade A faces.
2. Species: Select white birch.
3. Cut: Rotary cut.
4. Match between Veneer Leaves: Book match.
5. Assembly of Veneer Leaves on Door Faces: Center balance match.
6. Exposed Vertical and Top Edge: Same species as faces.
7. Core: Phenolic-impregnated honeycomb.
8. Construction: Five or seven plies. Stiles and rails are bonded to core, then entire unit
Adhesives: Type I per WDMA TM-6.
9. WDMA I.S.1-A Performance Grade: Heavy duty.

C. Stile and Rail Doors:

1. Grade: Premium.
2. Species: Select white birch.
3. Cut: Rotary cut.
4. Match between Veneer Leaves: Book match.
5. Assembly of Veneer Leaves on Door Faces: Center balance match.
6. Exposed Vertical and Top Edge: Same species as faces.
7. Core: Phenolic-impregnated honeycomb.
8. Construction: Structural composite lumber core with solid hardwood edges.
9. WDMA I.S.1-A Performance Grade: Heavy duty.

2.7 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 - 1. Comply with requirements in NFPA 80 for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. comply with final hardware schedules, door frame shop drawings, DHIA115-W series standards, and hardware templates.

2.8 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Finish doors at factory.
- C. Transparent Finish:
 - 1. Grade: Custom.
 - 2. Finish: AWI catalyzed polyurethane.
 - 3. Staining: Match Architect's sample.
 - 4. Effect: Open-grain finish.
 - 5. Sheen: Satin.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Hardware: For installation, see Division 08 Section "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.
 - 1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
- C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 - 1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise

indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.

- a. Comply with NFPA 80 for fire-rated doors.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.2 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes access doors and frames for ceilings.

1.2 SUBMITTALS

- A. Product Data: For each type of access door and frame indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each door face material in specified finish.
- D. Schedule: Types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

1.3 COORDINATION

- A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work, and indicate in the schedule specified in "Submittals" Article.

PART 2 - PRODUCTS

2.1 ACCESS DOORS AND FRAMES FOR CEILINGS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Acudor Products, Inc.
 - 2. Bar-Co, Inc. Div.; Alfab, Inc.
 - 3. Cierra Products
 - 4. J. L. Industries, Inc.
 - 5. Karp Associates, Inc.
 - 6. Larsen's Manufacturing Company.
 - 7. Milcor Inc.

- C. Trimless recessed doors for Gypsum Board Assemblies: Units consisting of frame with concealed edge trim, door, hardware, and complying with the following requirements:
1. Locations: Gypsum board ceiling surfaces.
 2. Door: Minimum 0.0598-inch (16 gage) thick zinc-coated steel sheet, recessed 5/8 inch for application of 5/8 inch gypsum wall board.
 3. Concealed gypsum board edge trim: 0.298-inch (22 gage) zinc-coated steel sheet gypsum board edge trim formed to receive joint compound.
 4. Hinge: Concealed, pivoting-rod type.
 5. Lock: Flush to finished surface, key-operated cylinder lock.

2.2 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view, provide materials with smooth, flat surfaces without blemishes.
- C. Doors and Frames: Continuous welded construction. Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.
- D. Recessed Panel Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling.
- E. Locking Devices: Shall hold doors in flush, smooth plane when closed.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.
- C. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.2 ADJUSTING AND CLEANING

- A. Adjust doors and hardware after installation for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083113

SECTION 083800 - TRAFFIC DOORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Medium to Heavy Traffic Doors.
- B. Hardware and accessories

1.2 RELATED SECTIONS

- A. Section 081300- Metal Doors and Frames.
- B. Section 087100 - Door Hardware.

1.3 REFERENCES

- A. AHA A135.4 - Basic Hardboard; American Hardboard Association.
- B. AWI (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute.
- C. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1 Preparation instructions and recommendations.
 - 2 Storage and handling requirements and recommendations.
 - 3 Installation methods.
 - 4 Operation and maintenance data.

1.5 QUALITY ASSURANCE

- A. Quality Standard: Comply with NWWDA I.S.1-A, "Architectural Wood Flush Doors" or AWI's "Architectural Woodwork Quality Standards Illustrated."
- B. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.

- 1 Test Pressure: As required by code
- 2 Acceptable Fire-Rating Label: Underwriters' Laboratories, Inc. (U.L.) or Warnock Hersey

1.6 DELIVERY, STORAGE, AND HANDLING

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

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits amended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

- A. Manufacturer's standard two-year that products are free of defects in material and workmanship, guaranteeing to replace (exclusive of freight and labor) parts proven defective within two years after date of shipment to purchaser.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Eliason Corporation; P.O. Box 2128, Kalamazoo, MI 49003. ASD. Tel: (800) 828-3655. Fax: (800) 828-3577. Email: doors@eliasoncorp.com, www.eliasoncorp.com, www.restaurantdoors.net, and www.supermarketdoors.net.
- B. Substitutions: Not permitted.

2.2 MATERIALS

- A. Medium to Heavy Traffic Doors: 3/4 inch exterior grade solid wood core; 1 inch total thickness; light to medium duty.
 - 1 Facing: Reinforcing metal plates. (Model SCP-3)
 - a. Full Length Panels: 18 gauge stainless steel both sides; stainless steel top hinge covers.
 - 2 Window Size: 12" round clear acrylic window centered in door
 - 3 Window Molding: Black rubber molding.
 - 4 Glazing: Clear acrylic.

2.3 HARDWARE AND ACCESSORIES

- A. Hinges: Double Action Easy Swing(r) proprietary hinges.
- B. Finish: Zinc coated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Verify jambs plumb and square.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Minimum jamb construction of double studded 2 by 4 wood construction or equivalent.
- C. Reinforce hollow metal jambs at hardware locations.
- D. Steel channel jambs are required for heavy duty traffic doors.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 083800

SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior storefront framing.
2. Storefront framing for punched openings.
3. Exterior manual-swing entrance doors and door frame units.
4. Interior storefront framing.

1.2 PERFORMANCE REQUIREMENTS

A. General Performance: Aluminum-framed systems shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:

1. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
2. Dimensional tolerances of building frame and other adjacent construction.
3. Failure includes the following:
 - a. Deflection exceeding specified limits.
 - b. Thermal stresses transferring to building structure.
 - c. Framing members transferring stresses, including those caused by thermal and structural movements to glazing.
 - d. Noise or vibration created by wind and by thermal and structural movements.
 - e. Loosening or weakening of fasteners, attachments, and other components.
 - f. Failure of operating units.

B. Delegated Design: Design aluminum-framed systems, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

C. Wind Loads: Refer to Structural drawings.

D. Deflection of Framing Members:

1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches, or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.

2. Deflection Parallel to Glazing Plane: Limited to an amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components directly below them to less than 1/8 inch and clearance between members and operable units directly below them to less than 1/16 inch.
- E. Structural-Test Performance: Provide aluminum-framed systems tested according to ASTM E 330 as follows:
1. When tested at positive and negative wind-load design pressures, systems, including anchorage, do not evidence deflection exceeding specified
 2. When tested at 150 percent of positive and negative wind-load-design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
 3. Test duration: As required by design and wind velocity, but not less than 10 seconds.
- F. Story Drift: Provide aluminum-framed systems that accommodate design displacement of adjacent stories indicated.
1. Design displacement: As indicated on Structural drawings.
 2. Test Performance: Meet criteria for passing, based on building occupancy type, when tested according to AAMA 501.4 at design displacement and 1.5 times design displacement.
- G. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of .57 lbf/sq. ft.
- H. Water Penetration Under Static Pressure: Provide aluminum-framed systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.
- I. Water Penetration Under Dynamic Pressure: Provide aluminum-framed systems that do not evidence water leakage through fixed glazing and framing areas when tested according to AAMA 501.1 under dynamic pressure equal to 20 percent of positive wind load design pressure, but not less than 6.24 lbf/sq.ft.
- J. Thermal Movements: Provide aluminum-framed systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. 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.
 2. Test Performance: No buckling, stress on glass, sealant failure, excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.1

3. High Exterior Ambient Air Temperature: That which produces an exterior metallic surface temperature of 180 deg F.
 4. Low Exterior ambient Air Temperature: 0 deg F.
 5. Interior Ambient Air Temperature: 75 deg F.
- K. Condensation Resistance: Provide aluminum-framed systems with fixed glazing and framing areas having CRF of not less than 45 when tested according to AAMA 1503.
- L. Thermal Conductance:: Provide aluminum-framed systems with fixed glazing and framing areas having an average U-factor of not more than 0.57 Btu/sq.ft. x h x deg F. when tested according to AAMA 1503.
- M. Sound Transmission: Provide aluminum-framed systems with fixed glazing and framing areas having a Minimum STC of 35 when tested for laboratory sound transmission loss according to ASTM E90 and determined by ASTM E 413.
- N. Structural Sealant Joints: Designed to produce tensile or shear stress of less than 20 psi.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum-framed systems.
- B. Shop Drawings:
1. Include details of provisions for system expansion and contraction and for drainage of moisture in the system to the exterior.
 2. For entrance doors, include hardware schedule and indicate operating hardware types, functions, quantities, and locations.
- C. Samples for Initial Selection: For units with factory-applied finishes.
- D. Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed systems, made from 123-inch lengths of full-size components and showing details of joinery, anchorage, expansion provisions, glazing, flashing and drainage.
- E. Other Action Submittals:
1. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams.
- F. Qualification Data: For qualified installer and testing agency.
- G. Preconstruction test reports.

- H. Product test reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for aluminum-framed systems, including compliance with performance requirements.
- I. Source quality control reports.
- J. Field quality-control reports.
- K. Maintenance data.
- L. Warranties: Sample of special warranties.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.
- C. Engineering Responsibility: Prepare data for aluminum-framed systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in systems similar to those indicated for this Project.
- D. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance. Do not revise intended aesthetic effects, as judged solely by the Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.
- E. Preconstruction Sealant Testing: For structural-sealant-glazed systems, perform sealant manufacturer's standard tests for compatibility with and adhesion of each material that will come in contact with sealants and each condition required by aluminum-framed systems.
 - 1. Test a minimum of five samples of each metal, glazing, and other material.
 - 2. Prepare samples using techniques and primers required for installed systems.
 - 3. For materials that fail tests, determine corrective measures necessary to prepare each material to ensure compatibility with and adhesion to sealants including, but not limited to, specially formulated primers. After performing these corrective measures on the minimum number of samples required for each material, retest materials.
- F. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

- G. Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacturer.
- H. Structural-Sealant Glazing: Comply with ASTM C 11401, "Guide for Structural Sealant Glazing" for design and installation of structural-sealant-glazed systems.
- I. Structural Sealant Joints: Design reviewed and approved by structural-sealant manufacturer.
- J. Welding Qualifications: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code – Aluminum".
- K. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation. Approval of mockups does not constitute approval of deviations from the Contract documents unless the Architect specifically approves such deviations in writing. Approved mockups may become part of the completed work if undisturbed at the time of Substantial Completion.
- L. Preinstallation Conference: Conduct conference at Project site.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
 - 2. Failures include, but are not limited to:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration caused by thermal movement.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Adhesive or cohesive sealant failures.
 - e. Water leakage through fixed glazing and framing areas.
 - f. Failure of operating components.
- B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in materials or workmanship within specified warranty period. Warranty does not include normal weathering.
 - 1. Warranty Period: 20 years from date of Substantial Completion.

1.6 MAINTENANCE SERVICE

A. Entrance Door Hardware:

1. Maintenance Tolls and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.
2. Initial Maintenance Service: Beginning at substantial completion, provide six months full maintenance by skilled employees of entrance door hardware installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper entrance door hardware operation at rated speed and capacity. Provide parts and supplies the same as those used in the manufacture and installation of original equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Kawneer 451/451T or equivalent product by one of the following:
1. EFCO Corporation.
 2. TRACO.
 3. Vistawall Architectural Products; The Vistawall Group; a Bluescope Steel company.
 4. YKK AP America Inc.

2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
1. Sheet and Plate: ASTM B 209.
 2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
 3. Extruded Structural Pipe and Tubes: ASTM B 429.
 4. Structural Profiles: ASTM B 308/B 308M.
 5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.
- B. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.

3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.3 FRAMING SYSTEMS

- A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.
 1. Construction: Thermally broken.
 2. Glazing System: Retained mechanically with gaskets on four sides.
 3. Glazing Plane: Center.
- B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 2. Reinforce members as required to receive fastener threads.
 3. Use exposed fasteners with countersunk Phillips screw heads finished to match framing system.
- D. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts, complying with ASTM A 123/A 123M or ASTM A 153/A 153M.
- E. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- F. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.
 1. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.4 GLAZING SYSTEMS

- A. Glazing: As specified in Division 08 Section "Glazing."
- B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal.
- C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.
- D. Bond Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.

E. Glazing Sealants: for structural-glazed systems, as recommended by manufacturer for joint type and as follows:

1. Weathered Sealant: ASTM C 920 for type S Grade NS, Class 25, Use NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.
2. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24). Color to be selected by Architect from full range of available colors.

2.5 ENTRANCE DOOR SYSTEMS

A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.

1. Door Construction: Heavy-duty 2-inch overall thickness, with minimum 0.188-inch-thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
2. Door Design: Wide stile series 500.
 - a. Accessible Doors: Smooth surfaced for width of door in area within 10 inches above floor or ground plane.
3. Glazing Stops and Gaskets: Beveled snap-on, extruded-aluminum stops and preformed gaskets.
 - a. Provide non-removable glazing stops on outside of door.

A. Hardware for all manual-swing storefront entrances is as follows:

- 1-Top and bottom offset pivots as manufactured by Kawneer. Finish to match door.
- 1-Door closer Model 1605 as manufactured by Norton. Equip with back-check feature. Paint to match entrance frame finish.
- 1- pull Model CO-9 as manufactured by Kawneer. Finish US32D.
- 1-Threshold Model 69-139 as manufactured by Kawneer for offset pivots. Aluminum mill finish.
- 1-Sealair weathering system as manufactured by Kawneer.
- 1-Door bottom Model 38-560 as manufactured by Kawneer.
- 1-Cardreader Model V6866 as manufactured by Vingcard Systems, Inc.

2.6 1-Model 8400 mortise exit device as manufactured by Adams Rite.

2.7 1-Model 7808 electric strike as manufactured by Adams Rite. Strike to be 12 volt DC, continuous duty and fail secure.

2.8 ACCESSORY MATERIALS

- A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section "Joint Sealants".
- B. Bituminous Paint: cold-applied, asphalt mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30-mil thickness per coat.

2.9 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
 - 4. Physical and thermal isolation of glazing from framing members.
 - 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 6. Provisions for field replacement of glazing from interior for vision glass and exterior for spandrel glazing or metal panels.
 - 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
- F. Entrance Doors: Reinforce doors and frames as required for installing entrance door hardware.
- G. At exterior doors, provide compression weather-stripping at fixed stops and weather sweeps applied to door bottom.

- H. At interior doors, provide silencers to prevent metal-to-metal contact, 3 silencers on strike jamb.
- I. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- J. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.10 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
 - 1. Comply with manufacturer's written instructions.
 - 2. Do not install damaged components.
 - 3. Fit joints to produce hairline joints free of burrs and distortion.
 - 4. Rigidly secure nonmovement joints.
 - 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
 - 6. Seal joints watertight unless otherwise indicated.
- B. Metal Protection:
 - 1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or applying sealant or tape, or by installing nonconductive spacers as recommended by manufacturer for this purpose.
 - 2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
- D. Set continuous sill members and flashing in full sealant bed as specified in Division 07 Section "Joint Sealants" to produce weather tight installation.
- E. Install components plumb and true in alignment with established lines and grades, and without warp or rack.
- F. Install glazing as specified in Division 08 Section "Glazing."

- G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.
 - 1. Exterior Doors: Install to produce weather tight enclosure and tight fit at weather stripping.
 - 2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.2 ERECTION TOLERANCES

- A. Install aluminum-framed systems to comply with the following maximum erection tolerances:
 - 1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet; 1/4 inch over total length.
 - 2. Alignment: Where surfaces abut in line, limit offset from true alignment to 1/16 inch; where surfaces meet at corners, limit offset from true alignment to 1/32 inch.
- B. Limit difference between diagonal measurements to 1/8 inch.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections.
- B. Testing Services: Testing and inspecting of representative areas to determine compliance of installed systems with specified requirements shall take place as follows. Do not proceed with installation of the next area until test results for previously completed areas show compliance with requirements.
 - 1. Water Spray Test: Before installation of interior finishes has begun, a minimum area of 75 feet by 1 story of aluminum-framed systems shall be tested according to AAMA 501.2 and shall not evidence water penetration.
 - 2. Air Infiltration: Areas shall be tested for air leakage of 1.5 times the rate specified for laboratory testing under "Performance Requirements" Article, but not more than 0.09 cfm/sq.ft. of fixed wall area when tested according to ASTM E 783 at a minimum static air pressure difference of 1.57 lbf/sq.ft.
 - 3. Water Penetration: Areas shall be tested according to ASTM E 1105 at a minimum uniform and cyclic static air pressure difference of 0.67 times the static air pressure difference specified for laboratory testing under "Performance Requirements" Article, but not less than 4.18 lbf/sq.ft. and shall not evidence water generation.

- C. Repair or remove work if test results and inspections indicate that it does not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- E. Aluminum-framed assemblies will be considered defective if they do not pass tests and inspections.
- F. Prepare test and inspection reports.

3.4 ADJUSTING

- A. Adjust operating entrance door hardware to function smoothly as recommended by manufacturer.
 - 1. For entrance doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches from the latch, measured to the leading door edge.

END OF SECTION 084113

SECTION 084229 - AUTOMATIC ENTRANCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior and interior, sliding, power-operated automatic entrances.

1.2 PERFORMANCE REQUIREMENTS

A. Windborne-Debris-Impact-Resistance-Test Performance: Provide automatic entrances that pass large missile-impact and cyclic-pressure tests of ASTM E 1996 according to the IBC.

B. Opening-Force Requirements:

1. Power-Operated Doors: Not more than 50 lbf required to manually set door in motion if power fails, and not more than 15 lbf required to open door to minimum required width.
2. Breakaway Device for Power-Operated Doors: Not more than 50 lbf required for a breakaway door or panel to open.

C. Entrapment Force Requirements:

1. Power-Operated Sliding Doors: Not more than 30 lbf required to prevent stopped door from closing.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For automatic entrances. Include plans, elevations, sections, details, hardware mounting heights, and attachments to other work.

1. Wiring Diagrams: For power, signal, and control wiring.
2. Activation and safety devices.
3. Include hardware schedule and indicate hardware types, functions, quantities, and locations.

C. Sample: For each exposed product and for each color and texture specified.

D. Product certificates.

E. Product test reports.

F. Field quality-control reports.

- G. Maintenance data.
- H. Warranties: Sample of special warranties.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation and maintenance of units required for this Project and who employs a certified inspector.
- B. Certified Inspector Qualifications: Certified by AAADM.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Power-Operated Door Standard: BHMA A156.10.
- E. Emergency-Exit Door Requirements: Comply with requirements of authorities having jurisdiction for automatic entrances serving as a required means of egress.
- F. Preinstallation Conference: Conduct conference at Project site.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of automatic entrances that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - 1. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
 - 2. Sheet and Plate: ASTM B 209 (ASTM B 209M).

- B. Steel Reinforcement: With manufacturer's standard corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
 - 1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 - 2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
 - 3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.
- C. Stainless-Steel Bars: ASTM A 276 or ASTM A 666, Type 304.
- D. Stainless-Steel Tubing: ASTM A 554, Grade MT 304.
- E. Glazing: As specified in Division 08 Section "Glazing."
- F. Sealants and Joint Fillers: As specified in Division 07 Section "Joint Sealants."
- G. Nonmetallic, Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout; complying with ASTM C 1107; of consistency suitable for application.
- H. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements, except containing no asbestos; formulated for 30-mil thickness per coat.
- I. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

2.2 SLIDING AUTOMATIC ENTRANCES

- A. General: Provide manufacturer's standard automatic entrances including doors, sidelites, framing, headers, carrier assemblies, roller tracks, door operators, activation and safety devices, and accessories required for a complete installation.
- B. Sliding Automatic Entrance:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Biparting-Sliding Units:
 - 1) Besam Automated Entrance Systems, Inc.; an ASSA ABLOY Group company.
 - 2) DORMA Automatics; Div. of DORMA Group North America.
 - 3) Horton Automatics; Div. of Overhead Door Corporation.
 - 4) Stanley Access Technologies; Div. of The Stanley Works. **(Basis of Design)**
 - 2. Configuration: Biparting-sliding door(s), with transom and sidelite(s).
 - a. Traffic Pattern: Two way.
 - b. Emergency Breakaway Capability: Sliding leaves only.

- c. Mounting: Between jambs.
- 3. Operator Features:
 - a. Power opening and closing.
 - b. Drive System: Chain.
 - c. Adjustable opening and closing speeds.
 - d. Adjustable hold-open time between 0 and 30 seconds.
 - e. Obstruction recycle.
 - f. On-off/hold-open switch to control electric power to operator, key operated.
 - g. Automatic door re-open if stopped while closing.
- 4. Sliding Door Carrier Assemblies and Overhead Roller Tracks: Manufacturer's standard carrier assembly that allows vertical adjustment; consisting of nylon- or delrin-covered, ball-bearing-center steel wheels operating on a continuous roller track, or ball-bearing-center steel wheels operating on a nylon- or delrin-covered, continuous roller track. Support doors from carrier assembly by cantilever and pivot assembly.
 - a. Rollers: Minimum of two ball-bearing roller wheels and two antirise rollers for each active leaf.
- 5. Sliding Door Threshold: Manufacturer's standard threshold members and bottom-guide track system, with stainless-steel, ball-bearing-center roller wheels.
 - a. Configuration: Saddle-type threshold across door opening and surface-mounted guide track system at sidelites.
- 6. Combination Activation and Safety Device: Combination motion/presence sensor.
- 7. Activation Device: Motion sensors mounted on door header to detect pedestrians in activating zone to activate door operator.
- 8. Safety Devices: Presence sensor mounted on each side of door header and one photoelectric beam mounted in sidelite jambs to detect pedestrians in presence zone and to prevent door from closing.
- 9. Sidelite Safety Device: Presence sensor, mounted above each sidelite on side of door opening through which doors travel, to detect obstructions and to prevent door from opening.
- 10. Finish: Finish framing, door(s), sidelite(s), and header with Class I, clear anodic finish.

2.3 ENTRANCE COMPONENTS

- A. Framing and Transom Members: Manufacturer's standard extruded aluminum, minimum 0.125 inch thick and reinforced as required to support imposed loads.
 - 1. Nominal Size: 1-3/4 by 4-1/2 inches.
 - 2. Extruded Glazing Stops and Applied Trim: Minimum 0.062-inch wall thickness.
- B. Stile and Rail Doors: Manufacturer's standard 1-3/4-inch- thick, glazed doors with minimum 0.125-inch- thick, extruded-aluminum tubular stile and rail members. Mechanically fasten

corners with reinforcing brackets that are welded, or incorporate concealed tie-rods that span full length of top and bottom rails.

1. Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and manufacturer's standard preformed gaskets.
 2. Stile Design: Wide stile, more than 4-inch nominal width.
 3. Rail Design: 10-inch nominal height.
 4. Muntin Bars: Horizontal tubular rail member for each door; match stile design and finish.
- C. Sidelite(s) and Transom: Manufacturer's standard 1-3/4-inch- deep sidelite(s) and transom with minimum 0.125-inch- thick, extruded-aluminum tubular stile and rail members matching door design and finish.
1. Glazing Stops and Gaskets: Same materials and design as for stile and rail door.
 2. Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and manufacturer's standard preformed gaskets.
 3. Muntin Bars: Horizontal tubular rail members for each sidelite; match stile design.
- D. Headers: Fabricated from minimum 0.125-inch- thick, extruded aluminum and extending full width of automatic entrance units to conceal door operators and controls. Provide hinged or removable access panels for service and adjustment of door operators and controls. Secure panels to prevent unauthorized access.
1. Mounting: Surface mounted.
 2. Capacity: Capable of supporting doors up to 175 lb per leaf over spans up to 14 feet without intermediate supports.
 - a. Provide sag rods for spans exceeding 14 feet.
- E. Signage: Affixed to both sides of each door as required by BHMA A156.10 and BHMA A156.19 for type of door and its operation.
1. Application Process: Door manufacturer's standard process.

2.4 DOOR OPERATORS AND ACTIVATION AND SAFETY DEVICES

- A. Door Operators: Provide door operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for type of occupancy indicated.
1. Door Operator Performance: Provide door operators that will open and close doors and maintain them in fully closed position when subjected to Project's design wind loads.
 2. Electromechanical Operators: Concealed, self-contained, overhead unit powered by fractional-horsepower, permanent-magnet dc motor; with closing speed controlled mechanically by gear train and dynamically by braking action of electric motor; with solid-state microprocessor controller; UL 325; and with manual operation with power off.

- B. Combination Motion/Presence Sensors: Self-contained units; consisting of both motion and presence sensors in a single metal or plastic housing; adjustable to provide detection field sizes and functions required by BHMA A156.10.
 - 1. Motion Sensor: K-band-frequency, microwave-scanner units; with relay hold time of not less than 2 to 10 seconds.
 - a. Provide capability for switching between bidirectional and unidirectional detection.
 - 2. Presence Sensor: Infrared-scanner units; with relay hold time of not less than 2 to 10 seconds. Sensors shall remain active at all times.
- C. Photoelectric Beams: Pulsed infrared, sender-receiver assembly for recessed mounting. Beams shall not be active when doors are fully closed.
- D. Electrical Interlocks: Unless units are equipped with self-protecting devices or circuits, provide electrical interlocks to prevent activation of operator when door is locked, latched, or bolted.

2.5 HARDWARE

- A. General: Provide units in sizes and types recommended by automatic entrance and hardware manufacturers for entrances and uses indicated. Finish exposed parts to match door finish.
- B. Breakaway Device for Power-Operated Doors: Provide breakaway device that allows door to swing out in direction of egress to full 90 degrees from any operating position. Maximum force to open door shall be 50 lbf according to BHMA A156.10. Interrupt powered operation of door operator while in breakaway mode.
- C. Deadlocks: Manufacturer's standard deadbolt operated by exterior cylinder and interior thumb turn, with minimum 1-inch- long throw bolt; BHMA A156.5, Grade 1.
 - 1. Cylinders: As specified in Division 08 Section "Door Hardware."
 - a. Keying: Integrate into building master key system.
 - 2. Deadbolts: Steel, mortise type, BHMA A156.5, Grade 1.
- D. Thresholds: BHMA A156.21, extruded-aluminum raised thresholds; with beveled edges with a slope of not more than 1:2 and a maximum height of 1/2 inch. Provide cutouts as required for door operating hardware.
- E. Weather Stripping: Manufacturer's standard replaceable components.
 - 1. Sliding Type: AAMA 701, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.
 - 2. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.

3. Weather Sweeps: Manufacturer's standard nylon brush sweep mounted to underside of door bottom.

2.6 FABRICATION

- A. General: Factory fabricate automatic entrance components to designs, sizes, and thicknesses indicated and to comply with indicated standards.
- B. Framing: Provide automatic entrances as prefabricated assemblies. Complete fabrication, assembly, finishing, hardware application, and other work before shipment to Project site.
- C. Doors: Factory fabricated and assembled in profiles indicated. Reinforce as required to support imposed loads and for installing hardware.
- D. Door Operators: Factory fabricated and installed in headers, including adjusting and testing.
- E. Glazing: Fabricate framing with minimum glazing edge clearances for thickness and type of glazing indicated, according to GANA's "Glazing Manual."
- F. Hardware: Factory install hardware to greatest extent possible; remove only as required for final finishing operation and for delivery to and installation at Project site. Cut, drill, and tap for factory-installed hardware before applying finishes.
 1. Provide sliding-type weather stripping, mortised into door, at perimeter of doors.
- G. Activation and Safety Devices:
 1. General: Factory install devices in doors and headers as required by BHMA A156.10 for type of door and direction of travel.
 2. Install photoelectric beams in vertical jambs of sidelites, with dimension above finished floor as follows:
 - a. Top Beam: 48 inches.
 - b. Bottom Beam: 24 inches.

2.7 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight.

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
 2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- B. Entrances: Install automatic entrances plumb and true in alignment with established lines and grades without warp or rack of framing members and doors. Anchor securely in place.
1. Install surface-mounted hardware using concealed fasteners to greatest extent possible.
 2. Set headers, carrier assemblies, tracks, operating brackets, and guides level and true to location with anchorage for permanent support.
 3. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within system to exterior.
 4. Level recesses for recessed thresholds using nonshrink grout.
 5. Provide thresholds at exterior doors.
- C. Door Operators: Connect door operators to electrical power distribution system as specified in Division 26 Sections.
- D. Access-Control Devices: Connect access-control devices to access-control system as specified in Division 28 Sections.
- E. Activation and Safety Devices: Install and adjust devices to provide detection field and functions indicated.
- F. Guide Rails: Install rails according to BHMA A156.10 including Appendix A and manufacturer's written instructions unless otherwise indicated.
- G. Glazing: Install glazing as specified in Division 08 Section "Glazing."
- H. Sealants: Comply with requirements specified in Division 07 Section "Joint Sealants" to provide weather tight installation.
1. Set thresholds, bottom-guide track system, framing members and flashings in full sealant bed.
 2. Seal perimeter of framing members with sealant.
- I. Signage: Apply signage on both sides of each door as required by referenced door standards.
- J. Wiring within Automatic Entrance Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's written limitations on bending radii. Provide and use lacing bars and distribution spools.
- K. Inspection: Engage Installer's certified inspector to test and inspect automatic entrances and prepare test and inspection reports.
1. Certified inspector shall test and inspect each automatic entrance to determine compliance of installed systems with applicable BHMA standards.

2. Field Quality-Control Report: Certified inspector shall submit report in writing to Architect and Contractor within 24 hours after inspection.
 3. Work will be considered defective if it does not pass tests and inspections.
- L. Adjusting: Adjust door operators, controls, and hardware for smooth and safe operation and for weather tight closure; comply with requirements in BHMA A156.10.
1. Readjust door operators and controls after repeated operation of completed installation equivalent to 3 days' use by normal traffic (100 to 300 cycles). Lubricate hardware, operating equipment, and other moving parts.
- M. Demonstration: Engage a certified inspector to train Owner's maintenance personnel to adjust, operate, and maintain automatic entrances.

END OF SECTION 084229

SECTION 084413 - GLAZED ALUMINUM CURTAIN WALLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes conventionally glazed aluminum curtain walls installed as stick assemblies.

1.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Comply with performance requirements specified, as determined by testing of manufacturer's standard glazed aluminum curtain walls representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
 - 1. Glazed aluminum curtain walls shall withstand movements of supporting structure indicated on Drawings including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 - 2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Failure of operating units.
- B. Delegated Design: Design glazed aluminum curtain walls, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- C. Wind Loads: As indicated on Drawings.
- D. Structural-Test Performance: Test according to ASTM E 330 as follows:
 - 1. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
 - 2. Test Durations: 10 seconds.
- E. Deflection of Framing Members: At design wind pressure, as follows:
 - 1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.

2. Deflection Parallel to Glazing Plane: Limited to $[L/360$ of clear span or 1/8 inch, whichever is smaller] [amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch.
- F. Water Penetration under Static Pressure: No evidence of water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).
- G. Energy Performance: Glazed aluminum curtain wall shall have certified and labeled energy performance ratings in accordance with NFRC.
 1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.45 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
 2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.35 as determined according to NFRC 200.
 3. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of 0.30 cfm/sq. ft. of fixed wall area as determined according to ASTM E 283 at a minimum static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).
 4. Condensation Resistance: Provide aluminum-framed systems with fixed glazing and framing areas having CRF of not less than 45 when tested according to AAMA 1503.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For glazed aluminum curtain walls. Include plans, elevations, sections, full-size details, and attachments to other work.
 1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
 2. Include full-size isometric details of each vertical-to-horizontal intersection of glazed aluminum curtain walls, showing the following:
 - a. Joinery, including concealed welds.
 - b. Anchorage.
 - c. Expansion provisions.
 - d. Glazing.
 - e. Flashing and drainage.
- C. Samples: For each type of exposed finish required.
- D. Delegated-Design Submittal: For glazed aluminum curtain walls indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- E. Qualification Data: For qualified Installer.

- F. Energy Performance Certificates: For glazed aluminum curtain walls, accessories, and components, from manufacturer.
 - 1. Basis for Certification: NFRC-certified energy performance values for each glazed aluminum curtain wall.
- G. Product test reports.
- H. Field quality-control reports.
- I. Maintenance data.
- J. Warranties: Sample of special warranties.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.
- C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
- D. Energy Performance Standards: Comply with NFRC for minimum standards of energy performance, materials, components, accessories, and fabrication. Comply with more stringent requirements if indicated.
 - 1. Provide NFRC-certified glazed aluminum curtain walls with an attached label.
- E. Preinstallation Conference: Conduct conference at Project site.

1.5 WARRANTY

- A. Special Assembly Warranty: Standard form in which manufacturer agrees to repair or replace components of glazed aluminum curtain walls that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide or comparable product by one of the following:
1. Kawneer Company, Inc. P600 Wall Series – Outside Glazed, System 1. (**Basis of design**)
 2. Arch Aluminum & Glass Co., Inc.
 3. TRACO.
 4. Tubelite.
 5. Vistawall Architectural Products; The Vistawall Group; a Bluescope Steel company.
 6. Wausau Window and Wall Systems.
 7. YKK AP America Inc.
 8. Approved equal.

2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
 2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
 3. Extruded Structural Pipe and Tubes: ASTM B 429.
 4. Structural Profiles: ASTM B 308/B 308M.
 5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.
- B. Steel Reinforcement: With manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
 3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.3 FRAMING

- A. Framing Members: Manufacturer's standard extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Construction: Thermally broken.
 2. Glazing System: Retained mechanically with gaskets on four sides.
 3. Glazing Plane: Front.
- B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

- C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 - 2. Reinforce members as required to receive fastener threads.
 - 3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.
- D. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
 - 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- E. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- F. Framing Sealants: Manufacturer's standard sealants.

2.4 GLAZING

- A. Glazing: Comply with Division 08 Section "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- C. Glazing Sealants: As recommended by manufacturer.

2.5 ACCESSORY MATERIALS

- A. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.6 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Physical and thermal isolation of glazing from framing members.

4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
5. Provisions for field replacement of glazing from exterior.
6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Fabricate components that, when assembled, have the following characteristics:

1. Internal guttering system or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.
2. Pressure-equalized system or double barrier design with primary air and vapor barrier at interior side of glazed aluminum curtain wall and secondary seal weeped and vented to exterior.

E. Factory-Assembled Frame Units:

1. Rigidly secure nonmovement joints.
2. Seal joints watertight unless otherwise indicated.
3. Install glazing to comply with requirements in Division 08 Section "Glazing."

F. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.7 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Weld components in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.
7. Seal joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.
 2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.
- D. Install components plumb and true in alignment with established lines and grades.
- E. Install glazing as specified in Division 08 Section "Glazing."

3.2 ERECTION TOLERANCES

- A. Erection Tolerances: Install glazed aluminum curtain walls to comply with the following maximum tolerances:
1. Plumb: 1/8 inch in 10 feet.
 2. Level: 1/8 inch in 20 feet.
 3. Alignment:
 - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
 - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
 - c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
 4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/4 inch over total length.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Testing Services: Testing and inspecting of representative areas of glazed aluminum curtain walls shall take place as installation proceeds to determine compliance of installed assemblies with specified requirements.
1. Air Infiltration: Areas shall be tested for air leakage of [1.5 times the rate specified for laboratory testing in "Performance Requirements" Article, but not more than 0.50 cfm/sq. ft., of fixed wall area when tested according to ASTM E 783 at a minimum static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).
 - a. Test Area: One bay wide, but not less than 10 feet, by one story of glazed aluminum curtain wall.
 - b. Perform a minimum of two tests in areas as directed by Architect.

2. Water Penetration: Areas shall be tested according to ASTM E 1105 at a minimum uniform and cyclic static-air-pressure differential of 0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than 6.24 lbf/sq. ft. and shall not evidence water penetration.
 - a. Test Area: One bay wide, but not less than 10 feet, by one story of glazed aluminum curtain wall.
 - b. Perform a minimum of two tests in areas as directed by Architect.
 3. Water Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
 - a. Test Area: A minimum area of 75 feet by one story of glazed aluminum curtain wall.
- C. Glazed aluminum curtain walls will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

END OF SECTION 084413

SECTION 085113 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes operable aluminum-framed windows.

1.2 PERFORMANCE REQUIREMENTS

- A. General: Provide aluminum windows capable of complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified, and that are of minimum test size required by AAMA/WDMA 101/I.S.2/NAFS.
- B. Windows: 3-1/4" frame depth; extruded aluminum with integral structural polyurethane thermal break installed by the window manufacturer in the frame and sash members; equal-leg flange frame; finish applied by the window manufacturer; frames and sash assembled by the window manufacturer.
- C. Glazing: exterior 2-part structural silicone; 1" insulating glass; interior EPDM gasket; aluminum glazing bead; glass description in paragraph 2.04; glazed by the window manufacturer.
- D. Structural Performance: Provide aluminum windows capable of withstanding the effects of the following loads, based on testing units representative of those indicated for Project that pass AAMA/WDMA 101/I.S.2/NAFS, Uniform Load Structural Test:
 - 1. 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, Section 6.5, "Method 2-Analytical Procedure," based on mean roof heights above grade indicated on Drawings.
 - 2. Deflection: Design glass framing system to limit lateral deflections of glass edges to less than 1/175 of glass-edge length or 3/4 inch, whichever is less, at design pressure based on testing performed according to AAMA/WDMA 101/I.S.2/NAFS, Uniform Load Deflection Test or structural computations.
- E. Windborne-Debris Resistance: Provide glazed windows capable of resisting impact from windborne debris, based on the pass/fail criteria as determined from testing glazed windows identical to those specified, according to ASTM E 1886 and testing information in ASTM E 1996 and requirements of authorities having jurisdiction.
- F. Thermal Movements: Provide aluminum windows, including anchorage, that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. 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.

1.3 SUBMITTALS

- A. Product Data: For each type of aluminum window indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other work, operational clearances, and installation details
- C. Samples: For each exposed finish.
- D. Product Schedule: Use same designations indicated on Drawings.
- E. Field quality-control test reports.
- F. Product test reports.
- G. Maintenance data.

1.4 QUALITY ASSURANCE

- A. Installer: A qualified installer, approved by manufacturer to install manufacturer's products.
- B. Glazing Publications: Comply with published recommendations of glass manufacturers and with GANA's "Glazing Manual" unless more stringent requirements are indicated.
- C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
- D. Preinstallation Conference: Conduct conference at Project site.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Failure to meet performance requirements.
 - b. Structural failures including excessive deflection, water leakage, air infiltration, or condensation.
 - c. Faulty operation of movable sash and hardware.
 - d. Deterioration of metals, other materials, and metal finishes beyond normal weathering.

- e. Failure of insulating glass.
- 2. Warranty Period:
 - a. Window: Three years from date of Substantial Completion.
 - b. Glazing: 10 years from date of Substantial Completion.
 - c. Metal Finish: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Traco (**Basis of design**)
 - a. Single slide: NX-640
 - b. Single slide without grille: TR-6800
 - c. Fixed: TR-3800.
 - 2. Approved equivalent.

2.2 SLIDING WINDOW (W3, W4, W6, W7)

- A. Window Type: Window Type: Horizontal sliding.
 - 1. Provide integral aluminum air intake louver where indicated.
 - 2. Reliable AEL-42 louver with insulated blank-off panel (Basis of design).
- B. Comply with AAMA/WDMA 101/I.S.2/NAFS.
- C. Condensation-Resistance Factor (CRF): Provide aluminum windows tested for thermal performance according to AAMA 1503, showing a minimum CRF of 52.
- D. Thermal Transmittance: Provide aluminum windows with a whole-window, U-factor maximum indicated at 15-mph exterior wind velocity and winter condition temperatures when tested according to AAMA 1503, ASTM E 1423, and NFRC 100.
 - 1. U-Factor: 0.60 Btu/sq. ft. x h x deg F (3.4 W/sq. m x K) or less.
- E. Solar Heat-Gain Coefficient (SHGC): Provide aluminum windows with a whole-window SHGC maximum of 0.50, determined according to NFRC 200 procedures.

2.3 FIXED WINDOW (W1, W2, W5, W8)

- A. Window Type: Fixed, in configuration shown.
- B. Comply with AAMA/WDMA 101/I.S.2/NAFS.

- C. Condensation-Resistance Factor (CRF): Provide aluminum windows tested for thermal performance according to AAMA 1503, showing a minimum CRF of 52.
- D. Thermal Transmittance: Provide aluminum windows with a whole-window, U-factor maximum indicated at 15-mph exterior wind velocity and winter condition temperatures when tested according to AAMA 1503, ASTM E 1423, and NFRC 100.
 - 1. U-Factor: 0.60 Btu/sq. ft. x h x deg F (3.4 W/sq. m x K) or less.
- E. Solar Heat-Gain Coefficient (SHGC): Provide aluminum windows with a whole-window SHGC maximum of 0.50, determined according to NFRC 200 procedures.

2.4 GLAZING

- A. Glass and Glazing Materials: Refer to Division 08 Section "Glazing" for glass units and glazing requirements applicable to glazed aluminum window units.
- B. Glass GL-1: Complying with Division 08 Section "Glazing."
- C. Glazing System: Manufacturer's standard factory-glazing system that produces weather tight seal and complies with requirements for windborne-debris resistance.

2.5 INSECT SCREENS

- A. General: Design windows and hardware to accommodate screens in a tight-fitting, removable arrangement, with a minimum of exposed fasteners and latches. Fabricate insect screens to fully integrate with window frame. Locate screens on outside of window and provide for each operable exterior sash or ventilator.
 - 1. Aluminum Tubular Frame Screens: Comply with SMA 1004, "Specifications for Aluminum Tubular Frame Screens for Windows," Architectural C-24 class.
- B. Aluminum Insect Screen Frames: Manufacturer's standard aluminum alloy complying with SMA 1004. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.
 - 1. Aluminum Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet with minimum wall thickness as required for class indicated.
- C. Glass-Fiber Mesh Fabric: 18-by-14 mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration; in the following color. Comply with ASTM D 3656.

2.6 FABRICATION

- A. Fabricate aluminum windows that are reglazable without dismantling sash or ventilator framing.

- B. Weather Stripping: Provide full-perimeter weather stripping for each operable sash and ventilator.
- C. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.
- D. Provide water-shed members above side-hinged ventilators and similar lines of natural water penetration.
- E. Mullions: Provide mullions and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, as indicated. Provide mullions and cover plates capable of withstanding design loads of window units.
- F. Subframes: Provide subframes with anchors for window units as shown, of profile and dimensions indicated but not less than 0.062-inch- thick extruded aluminum. Miter or cope corners, and weld and dress smooth with concealed mechanical joint fasteners. Finish to match window units. Provide subframes capable of withstanding design loads of window units.
- G. Glazing Stops: Provide snap-on glazing stops coordinated with Division 08 Section "Glazing" and glazing system indicated. Provide glazing stops to match sash and ventilator frames.

2.7 ALUMINUM FINISHES

- A. Aluminum Anodic Finish: Class II, clear anodic coating complying with AAMA 611]

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing windows, hardware, accessories, and other components.
- B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- C. Set sill members in bed of sealant or with gaskets, as indicated, for weather tight construction.
- D. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

- F. Adjust operating sashes and ventilators, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weather tight closure. Lubricate hardware and moving parts.
- G. Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- H. Clean factory-glazed glass immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.
- I. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

3.2 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.
 - 1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Testing Services: Testing and inspecting of installed windows shall take place as follows:
 - 1. Testing Methodology: Testing of windows for air infiltration and water resistance shall be performed according to AAMA 502, Test Method [A] [B], by applying same test pressures required to determine compliance with AAMA/WDMA 101/I.S.2/NAFS in Part 1 "Performance Requirements" Article.
 - 2. Testing Extent: Three mockup windows as selected by Architect and a qualified independent testing and inspecting agency. Windows shall be tested immediately after installation.
 - 3. Test Reports: Shall be prepared according to AAMA 502.
- C. Remove and replace noncomplying aluminum window and retest as specified above.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

END OF SECTION 085113

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Commercial door hardware.
 - 2. Cylinders for doors specified in other Sections.
 - 3. Electrified door hardware.
- B. See Division 08 door sections for astragals and door silencers.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Details of electrified door hardware, including wiring diagrams.
- C. Samples: For each exposed finish.
- D. Other Action Submittals:
 - 1. Door Hardware Sets: Prepared by or under the supervision of Architectural Hardware Consultant, detailing fabrication and assembly of door hardware, as well as procedures and diagrams.
 - a. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
 - b. Content: Include the following information:
 - 1) Identification number, location, hand, fire rating, and material of each door and frame.
 - 2) Type, style, function, size, quantity, and finish of each door hardware item.
 - 3) Complete designations of every item required for each door or opening including name and manufacturer.
 - 4) Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.
 - 2. Keying Schedule: Prepared by or under the supervision of Architectural Hardware Consultant, detailing Owner's final keying instructions for locks.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by lock manufacturer.
 - 1. Installer's responsibilities include supplying and installing door hardware and providing a qualified Architectural Hardware Consultant available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
- B. Architectural Hardware Consultant Qualifications: A person who is currently certified by DHI as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.
- C. Source Limitations: Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.
- D. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UBC Standard 7-2.
 - 1. Test Pressure: Test at atmospheric pressure After 5 minutes into the test, neutral pressure level in furnace shall be established at 40 inches (1016 mm) or less above the sill.
- E. Keying Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system.
- F. Preinstallation Conference: Conduct conference at Project site.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.5 COORDINATION

- A. Templates: Distribute door hardware templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: One years from date of Substantial Completion, except as follows:
 - a. Electronic Five years from date of Substantial Completion.
 - b. Exit Devices: Three years from date of Substantial Completion.
 - c. Manual Closers: Ten years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in this Section and door hardware sets indicated in Part 3 "Door Hardware Sets" Article].
 - 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products equivalent in function and comparable in quality to named products.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Sets" Article. Products are identified by using door hardware designations, as follows:
 - 1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Door Hardware Sets" Article.
 - 2. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.

2.2 HINGES, GENERAL

- A. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- B. Hinge Base Metal: Unless otherwise indicated, provide the following:
 - 1. Exterior Hinges: Brass, with stainless-steel pin body and brass protruding heads.
 - 2. Interior Hinges: Steel, with steel pin
 - 3. Hinges for Fire-Rated Assemblies: Steel, with steel pin
- C. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for outswinging exterior doors.

D. Fasteners: Comply with the following:

1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
2. Wood Screws: For wood doors and frames.
3. Threaded-to-the-Head Wood Screws: For fire-rated wood doors.
4. Screws: Phillips flat-head; machine screws drilled and tapped holes for metal doors wood screws for wood doors and frames. Finish screw heads to match surface of hinges.

2.3 HINGES

- A. Butts and Hinges: BHMA A156.1.
- B. Template Hinge Dimensions: BHMA A156.7.
- C. Manufacturers:
 1. Hager Companies (HAG).
 2. McKinney Products Company; an ASSA ABLOY Group company (MCK).
 3. Stanley Commercial Hardware; Div. of The Stanley Works (STH).

2.4 LOCKS AND LATCHES, GENERAL

- A. Accessibility Requirements: Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22 N).
- B. Latches and Locks for Means of Egress Doors: Comply with NFPA 101. Latches shall not require more than 15 lbf (67 N) to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.

2.5 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: Function numbers and descriptions indicated in door hardware sets comply with the following:
 1. Bored Locks: BHMA A156.2.
 2. Mortise Locks: BHMA A156.13.
- B. Bored Locks: BHMA A156.2, Grade 1 unless Grade 2 is indicated]; Series 4000.
 1. Manufacturers:
 - a. Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).
 - b. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company (CR).
 - c. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).

- C. Mortise Locks: Stamped steel case with steel or brass parts; BHMA A156.13, Grade 1 Series 1000.

1. Manufacturers:

- a. Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).
- b. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company (CR).
- c. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).

2.6 SELF-CONTAINED ELECTRONIC LOCKS

1. Onity. By owner.

2.7 DOOR BOLTS

- A. Bolt Throw: Comply with testing requirements for length of bolts required for labeled fire doors.
- B. Dustproof Strikes: BHMA A156.16, Grade 1.
- C. Manual Flush Bolts: BHMA A156.16, Grade 1

1. Manufacturers:

- a. Rockwood Manufacturing Company (RM).
- b. Hager Companies (HAG).
- c. IVES Hardware; an Ingersoll-Rand Company (IVS).

2.8 EXIT DEVICES

- A. Exit Devices: BHMA A156. 1 GRADE 1
- B. Accessibility Requirements: Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22 N).
- C. Exit Devices for Means of Egress Doors: Comply with NFPA 101. Exit devices shall not require more than 15 lbf (67 N) to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.
- D. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

- E. Fire Exit Devices: Devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.
- F. Outside Trim: Lever with cylinder; material and finish to match locksets, unless otherwise indicated.
 - 1. Match design for locksets and latchsets, unless otherwise indicated.
- G. Manufacturers:
 - 1. Von Duprin; an Ingersoll-Rand Company (VD)
 - 2. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).

2.9 LOCK CYLINDERS

- A. Standard Lock Cylinders: BHMA A156.5, Grade 1 unless Grade 2 is indicated.

2.10 LOCK CYLINDERS

- A. Cylinders: Manufacturer's standard tumbler type, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:
 - 1. Number of Pins: Six.
- B. Construction Keying: Comply with the following:
 - 1. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.
- C. Manufacturer: Same manufacturer as for locks and latches.
- D. Manufacturers:
 - 1. Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).
 - 2. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company (CR).
 - 3. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).

2.11 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference into grand master key system.
- B. Keys: Nickel silver; permanently inscribed with a visual key control number **and including the** notation "DO NOT DUPLICATE."
 - 1. Quantity: In addition to one extra key blank for each lock, provide three cylinder change keys and five master; and grand master keys. Also five removal tools.

2.12 KEY CONTROL SYSTEM

- A. Key Control Cabinet: BHMA A156.5, Grade 1 wall-mounted metal cabinet with baked-enamel finish; containing key-holding hooks, labels, 2 sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of 150 percent of the number of locks.
- B. Cross-Index System: Multiple-index system for recording key information. Include three receipt forms for each key-holding hook. Set up by Installer.
 - 1. Manufacturers:
 - a. Lund Equipment Co., Inc. (LUN).
 - b. MMF Industries (MMF).

2.13 OPERATING TRIM

- A. Standard: BHMA A156.6.
- B. Materials: Fabricate from stainless steel, unless otherwise indicated.
- C. Manufacturers:
 - 1. Rockwood Manufacturing Company (RM).
 - 2. Hager Companies (HAG).
 - 3. IVES Hardware; an Ingersoll-Rand Company (IVS).

2.14 CLOSERS

- A. Accessibility Requirements: Comply with the following maximum opening-force requirements:
 - 1. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
 - 2. Sliding or Folding Doors: 5 lbf (22.2 N) applied parallel to door at latch.
 - 3. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
- B. Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
- C. Surface Closers: BHMA A156.4, Grade 1. Provide type of arm required for closer to be located on non-public side of door, unless otherwise indicated.
 - 1. Manufacturers:
 - a. LCN Closers; an Ingersoll-Rand Company (LCN).
 - b. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
 - c. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company (CR).

2.15 PROTECTIVE TRIM UNITS

- A. Size: 2 inches (51 mm) less than door width on push side and 1 inch (25 mm) less than door width on pull side, by height specified in door hardware sets.
- B. Metal Protective Trim Units: BHMA A156.6; beveled top and 2 sides; fabricated from the following material:
 - 1. Material: 0.050-inch- (1.3-mm-) thick stainless steel.
 - 2. Manufacturers:
 - a. Rockwood Manufacturing Company (RM).
 - b. Hager Companies (HAG).
 - c. IVES Hardware; an Ingersoll-Rand Company (IVS).

2.16 STOPS AND HOLDERS

- A. Stops and Bumpers: BHMA A156.16, Grade 1.
 - 1. Provide floor stops for doors unless wall or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic. Where floor or wall stops are not appropriate, provide overhead holders.
- B. Mechanical Door Holders: BHMA A156.1, Grade 1.
- C. Combination Overhead Stops and Holders: BHMA A156.8, Grade 1.
- D. Silencers for Door Frames: BHMA A156.16, Grade 1; neoprene or rubber; fabricated for drilled-in application to frame.
- E. Manufacturers:
 - a. Rockwood Manufacturing Company (RM).
 - b. Hager Companies (HAG).
 - c. IVES Hardware; an Ingersoll-Rand Company (IVS).

2.17 DOOR GASKETING

- A. Standard: BHMA A156.22.
- B. General: Provide continuous weather-strip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated or scheduled. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.
 - 1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
 - 2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
 - 3. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.
- C. Smoke-Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke-control ratings indicated, based on testing according to UL 1784.
 - 1. Provide smoke-labeled gasketing on 20-minute-rated doors and on smoke-labeled doors.
- D. Gasketing Materials: ASTM D 2000 and AAMA 701/702.

E. Manufacturers:

1. National Guard Products (NGP).
2. Pemko Manufacturing Co. (PEM).
3. Hager Companies (HAG).

2.18 THRESHOLDS

A. Standard: BHMA A156.21.

B. Accessibility Requirements: Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high

C. Thresholds for Means of Egress Doors: Comply with NFPA 101. Maximum 1/2 inch (13 mm) high.

D. Manufacturers:

1. National Guard Products (NGP).
2. Pemko Manufacturing Co. (PEM).
3. Hager Companies (HAG).

2.19 FOLDING DOOR HARDWARE

A. General: BHMA A156.14; consisting of complete sets including overhead rails, hangers, supports, bumpers, floor guides, and accessories indicated.

B. Bi-folding Door Hardware: Rated for door panels weighing up to 125 lb (57 kg)

C. Manufacturers:

1. Hager Companies (HAG).
2. Johnson, L. E. Products, Inc. (LEJ).
3. Stanley Commercial Hardware; Div. of The Stanley Works (STH).

2.20 FABRICATION

A. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.

- B. Fasteners: Provide screws according to commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
 - 1. Comply with NFPA 80 for fasteners of door hardware in fire-rated applications.
- C. Finishes: BHMA A156.18, as indicated in door hardware sets.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Steel Doors and Frames: Comply with DHI A115 Series. Drill and tap doors and frames for surface-applied door hardware according to ANSI A250.6.
- B. Wood Doors: Comply with DHI A115-W Series.
- C. Mounting Heights: Mount door hardware units at heights indicated as follows unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Custom Steel Doors and Frames: DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."
 - 3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- D. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- E. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- F. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- G. Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Unless otherwise required by authorities having jurisdiction, adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.

3.2 FIELD QUALITY CONTROL

- A. Independent Architectural Hardware Consultant: Owner will engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.

3.3 DOOR HARDWARE SETS

HARDWARE SET BOH01

DOORS: 1/138, 1/139

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	PASSAGE LOCK	ND10S-SPARTA	US26D
1	EA	CLOSER	RA4041-DEL	ALUM
1	EA	DOOR STOP	409	US32D
1	SET	SEAL	5050B-17	

HARDWARE SET BOH02

DOORS: 1/133, 1/134

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	OFFICE LOCK	ND91PD-SPARTA-CK	US26D
1	EA	DOOR STOP	409	US32D
3	EA	SILENCERS	608	GRAY

HARDWARE SET BOH03

DOORS: 2/010

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	STOREROOM LOCK	ND96PD-SPARTA-CK	US26D
1	EA	CLOSER	PA4041-DEL	ALUM
1	EA	KICK PLATE	10 X 34	US32D
1	EA	DOOR STOP	409	US32D
1	SET	SEAL	5050B-17	
1	EA	AUTO DOOR BOTTOM	222SA-36	

HARDWARE SET BOH04

DOORS: 1/011, 1/101, 1/107, 1/225, 2/709

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	STOREROOM LOCK	ND96PD-SPARTA-CK	US26D
1	EA	DOOR STOP	409	US32D
3	EA	SILENCERS	608	GRAY

HARDWARE SET BOH05

DOORS: 1/122

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	STOREROOM LOCK	ND96PD-SPARTA-CK	US26D
1	EA	O.H. HOLDER	90-H	US26D
3	EA	SILENCERS	608	GRAY

HARDWARE SET BOH06

DOORS: 1/123, 3/010, 5/734

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	PASSAGE LOCK	ND10S-SPARTA	US26D
1	EA	DOOR STOP	409	US32D
3	EA	SILENCERS	608	GRAY

HARDWARE SET BOH07

DOORS: 1/127

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	STOREROOM LOCK	ND96PD-SPARTA-CK	US26D
1	EA	CLOSER	RA4041-DEL	ALUM
1	EA	DOOR STOP	409	US32D
3	EA	SILENCERS	608	GRAY

HARDWARE SET BOH08

DOORS: 1/127A

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	PRIVACY LOCK	ND40S-SPARTA	US26D
1	EA	DOOR STOP	409	US32D
3	EA	SILENCERS	608	GRAY

HARDWARE SET GS-01

DOORS: SUITE/DR

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	ELECTRONIC LOCK	ONITY BY OWNER	
1	EA	CLOSER	RA4041-DEL	ALUM
1	EA	DOOR STOP	409	US32D
1	SET	SEAL	5050B-17	
1	EA	DOOR VIEWER	622	CRM
1	EA	DOOR GUARD	604	US26D

HARDWARE SET GS-02

DOORS: 1/222, 1/240, 1/310, 1/410, 1/510, 1/610

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	ELECTRONIC LOCK	ONITY BY OWNER	
1	EA	CLOSER	RA4041-DEL	ALUM
1	EA	DOOR STOP	409	US32D
1	SET	SEAL	5050B-17	
2	EA	DOOR VIEWER	622	CRM
1	EA	DOOR GUARD	604	US26D

HARDWARE SET GS-03

DOORS: BATH/BR

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	PRIVACY LOCK	ND40S-SPARTA	US26D
1	EA	DOOR STOPS	430	US26D
			MTG ON DOOR TO STK TUB	
3	EA	SILENCERS	608	GRAY

HARDWARE SET GS-04

DOORS: 4/312, 4/313, 4/412, 4/413, 4/512, 4/513, 4/612, 4/613, 4/712, 4/713

EACH TO RECEIVE:

1	SET	SPRING HINGE	1255 4.5 X 4.5	US26D
1	EA	EXIT LOCK	AL25D-NEPTUNE	US26D
1	EA	DEADLOCK	B664P-CK	US26D
1	EA	DOOR STOP	409	US32D
1	SET	SEAL	5050B-17	
1	EA	AUTO DOOR BOTTOM	222SA-36	

HARDWARE SET GS-05

DOORS: BI-FOLD/DR

EACH TO RECEIVE:

1	EA	DUMMY LEVER	AL170-NEPTUNE	US26D
1	EA	BI-FOLD HWD	9570-36	AL

HARDWARE SET GS-06

NOTE: NOT USED.

HARDWARE SET GS-07

DOORS: 2/310, 2/410, 2/510, 2/610, 2/710, 3/240, 3/334, 3/340, 3/434, 3/440, 3/534, 3/540,
3/634, 3/640

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	PRIVACY LOCK	ND40S-SPARTA	US26D
1	EA	DOOR STOP	409	US32D
3	EA	SILENCERS	608	GRAY

HARDWARE SET GS03A

DOORS: 1/016, 1/017

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	CLASSROOM LOCK	LV9070-17A-CK	US26D
1	EA	CLOSER	RA4041-DEL	ALUM
1	EA	KICK PLATE	10 X 34	US32D
1	EA	DOOR STOP	409	US32D
3	EA	SILENCERS	608	GRAY

HARDWARE SET P-01

DOORS: 1/112, 1/140

NOTE: ALL HARDWARE COMPLETE BY THE ALUMINUM SLIDING DOOR SUPPLIER.
FURNISH CYLINDERS AS REQUIRED.

HARDWARE SET P-01A

DOORS: 1/019, 2/002, 2/019, 3/002, 3/019, 4/002, 5/002

NOTE: ALL HARDWARE COMPLETE BY THE ALUMINUM DOOR SUPPLIER. FURNISH
CYLINDERS AS REQUIRED.

HARDWARE SET P-02

DOORS: 2/112, 2/140

NOTE: ALL HARDWARE BY THE ALUMINUM SLIDING DOOR SUPPLIER. ALL
SECURITY REQUIREMENTS BY THE SECURITY SUPPLIER. FURNISH
CYLINDERS AS REQUIRED.

HARDWARE SET P-03

DOORS: 1/102

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	OFFICE LOCK	LV9050-17A-CK	US32D
1	EA	CLOSER	RA4041-DEL	ALUM
1	EA	KICK PLATE	10 X 34	US32D
1	EA	DOOR STOP	409	US32D
3	EA	SILENCERS	608	GRAY

HARDWARE SET P-04

DOORS: 1/124

EACH TO RECEIVE:

4	EA	HINGE	BB1191 4.5 X 4.5 (NRP)	US26D
1	EA	RIM EXIT	98EO	US32D
1	EA	CLOSER	PA4041-3077SC-DEL	ALUM
1	EA	KICK PLATE	10 X 34	US32D
1	EA	THRESHOLD	896S X 36	A
1	SET	SEAL	5050B-17	

HARDWARE SET P-04A

DOORS: 1/004A, 2/004

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	RIM EXIT	98EO	US32D
1	EA	CLOSER	PA4041-3077SC-DEL	ALUM
1	EA	KICK PLATE	10 X 34	US32D
1	EA	THRESHOLD	896S X 36	A
1	SET	SEAL	5050B-17	

HARDWARE SET P-05

DOORS: 1/132, 1/136, 2/136

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	STOREROOM LOCK	ND96PD-SPARTA-CK	US26D
1	EA	CLOSER	RA4041-DEL	ALUM
1	EA	DOOR STOP	409	US32D
3	EA	SILENCERS	608	GRAY

HARDWARE SET P-05A

DOORS: 1/143

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	STOREROOM LOCK	ND96PD-SPARTA-CK	US26D
1	EA	DOOR STOP	409	US32D
3	EA	SILENCERS	608	GRAY

HARDWARE SET P-06 MOD

DOORS: 2/132, 3/144, 3/734, 4/144

EACH TO RECEIVE:

6	EA	HINGE	BB1279 4.5 X 4.5	US26D
2	EA	ROLLER LATCH	591 X ASA	US26D
2	EA	DUMMY LEVER	AL170-NEPTUNE	US26D
2	EA	O.H. HOLDER	90-H	US26D
2	EA	SILENCERS	608	GRAY

HARDWARE SET P-07

DOORS: 1/002, 1/004 1/008, 1/015, 1/018, 1/021, 1/128, 1/130, 1/135, 1/224, 1/228, 1/229,
1/230, 1/231, 1/324, 1/328, 1/329, 1/424, 1/428, 1/429, 1/524, 1/528, 1/529, 1/624,
1/628, 1/629, 1/724, 1/728, 1/729

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	STOREROOM LOCK	LV9480-17A-CK	US32D
1	EA	CLOSER	RA4041-DEL	ALUM
1	EA	DOOR STOP	409	US32D
1	SET	SEAL	5050B-17	
1	EA	AUTO DOOR BOTTOM	222SA-36	

HARDWARE SET P-07A

DOORS: 1/106, 1/146, 1/209, 1/309, 1/409, 1/509, 1/609, 1/709

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	STOREROOM LOCK	ND96PD-SPARTA-CK	US26D
1	EA	O. H. STOP	90-S	US26D
1	EA	CLOSER	RA4041-DEL	ALUM
1	SET	SEAL	5050B-17	
1	EA	AUTO DOOR BOTTO	222SA-36	

HARDWARE SET P-08

DOORS: 1/020, 1/145, 1/215, 1/239, 1/315, 1/339, 1/415, 1/439, 1/515, 1/539, 1/615, 1/639,
1/715, 1/739

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	RIM EXIT DEVICE	98L-BE-F-996L/17	US32D
1	EA	CLOSER	RA4041-DEL	ALUM
1	EA	DOOR STOP	409	US32D
1	SET	SEAL	5050B-17	
1	EA	AUTO DOOR BOTTO	222SA-36	

HARDWARE SET P-09

DOORS: 3/001

NOTE: WALL READER BY OWNER.

EACH TO RECEIVE:

3	EA	HINGE	BB1191 4.5 X 4.5 (NRP)	US26D
1	EA	RIM EXIT DEVICE	98L-NL-996L/17-LESS/STK	US32D
1	EA	RIM CYLINDER	20-022-CK	US26D
1	EA	ELECTRIC STRIKE	6113	US32D
1	EA	O. H. STOP	90-S	US26D
1	EA	CLOSER	PA4041-62A-DEL	ALUM
1	EA	KICK PLATE	10 X 34	US32D
1	EA	THRESHOLD	896S X 36	A
1	SET	SEAL	5050B-17	

HARDWARE SET P-10

DOORS: 1/734

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	ELECTRONIC LOCK	ONITY BY OWNER	
1	EA	CLOSER	RA4041-DEL	ALUM
1	EA	DOOR STOP	409	US32D
1	SET	SEAL	5050B-17	
1	EA	AUTO DOOR BOTTOM	222SA-36	

HARDWARE SET P-11

NOTE: NOT USED.

HARDWARE SET P-12

DOORS: 4/734

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	ELECTRONIC LOCK	ONITY BY OWNER	
1	EA	O. H. STOP	90-S	US26D
1	EA	CLOSER	RA4041-DEL	ALUM
1	SET	SEAL	5050B-17	

HARDWARE SET P-12A

DOORS: 1/126, 2/126

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	ELECTRONIC LOCK	ONITY BY OWNER	
1	EA	CLOSER	PA4041-DEL	ALUM
1	EA	DOOR STOP	409	US32D
1	SET	SEAL	5050B-17	

HARDWARE SET P-12B

DOORS: 1/125

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	ELECTRONIC LOCK	ONITY BY OWNER	
1	EA	CLOSER	PA4041-3077SC-DEL	ALUM
1	SET	SEAL	5050B-17	

HARDWARE SET P-13

NOTE: NOT USED.

HARDWARE SET P-14

DOORS: 1/103, 1/105, 1/144, 2/105, 2/144

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	RIM EXIT DEVICE	98L-NL-F-996L/17-LSEE STK	US32D
1	EA	ELECTRIC STRIKE	6113	US32D
1	EA	CLOSER	PA4041-DEL	ALUM
1	EA	KICK PLATE	10 X 34	US32D
1	EA	DOOR STOP	409	US32D
3	EA	SILENCERS	608	GRAY

HARDWARE SET P-15

NOTE: NOT USED.

HARDWARE SET P-16 MOD

DOORS: 2/108

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	DEADLOCK	B663P-CK	US26D
1	EA	PULL PLATE	BF126 X 70C	US32D
1	EA	PUSH PLATE	70C	US32D
1	EA	CLOSER	RA4041-DEL	ALUM
1	EA	KICK PLATE	10 X 34	US32D
1	EA	DOOR STOP	409	US32D
1	EA	SILENCERS	608	GRAY

HARDWARE SET P-17

NOTE: NOT USED.

HARDWARE SET P-18

DOORS: 1/116, 1/118, 2/005

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	PULL PLATE	BF126 X 70C	US32D
1	EA	PUSH PLATE	70C	US32D
1	EA	CLOSER	RA4041-DEL	ALUM
1	EA	KICK PLATE	10 X 34	US32D
3	EA	SILENCERS	608	GRAY

HARDWARE SET P-19

DOORS: 1/232, 1/233, 1/325, 1/332, 1/333, 1/425, 1/432, 1/433, 1/525, 1/532, 1/533, 1/625,
1/632, 1/633, 1/725, 1/733

EACH TO RECEIVE:

3	EA	HINGE	BB1279 4.5 X 4.5	US26D
1	EA	STOREROOM LOCK	ND96PD-SPARTA-CK	US26D
1	EA	O. H. STOP	90-S	US26D
1	EA	CLOSER	RA4041-DEL	ALUM
1	SET	SEAL	5050B-17	
1	EA	AUTO DOOR BOTTOM	222SA-36	

HARDWARE SET P-20

DOORS: 1/001, 2/001

EACH TO RECEIVE:

6	EA	HINGE	BB1191 4.5 X 4.5 (NRP)	US26D
2	EA	FLUSH BOLT	555-12"	US26D
1	EA	D.P. STRIKE	570	US26D
1	EA	STOREROOM LOCK	LV9480-17A-CK	US32D
2	EA	O.H. HOLDER	90-H	US26D
1	EA	THRSHOLD	425E X 72	A
1	SET	SEAL	5050B-20	
1	EA	DOOR SWEEP	101VA X 36	A
1	EA	ASTRAGAL	1398 X 80"	A

HARDWARE SET P-20A

DOORS: 1/004, 1/005, 1/013

EACH TO RECEIVE:

6	EA	HINGE	BB1279 4.5 X 4.5	US26D
2	EA	FLUSH BOLT	555-12"	US26D
1	EA	D.P. STRIKE	570	US26D
1	EA	STOREROOM LOCK	LV9480-17A-CK	US32D
1	EA	O. H. STOP	90-S	US26D
1	EA	CLOSER	RA4041-DEL	ALUM
2	EA	KICK PLATE	10 X 35	US32D
1	SET	SEAL	5050B-20	
1	EA	ASTRAGAL	1398 X 80"	A
2	EA	AUTO DOOR BOTTOM	222SA-36	

HARDWARE SET P-20B

DOORS: 2/003

EACH TO RECEIVE:

6	EA	HINGE	BB1279 4.5 X 4.5	US26D
2	EA	FLUSH BOLT	555-12"	US26D
1	EA	D.P. STRIKE	570	US26D
1	EA	STOREROOM LOCK	LV9480-17A-CK	US32D
1	EA	O. H. STOP	90-S	US26D
1	EA	CLOSER	RA4041-DEL	ALUM
2	EA	ARMOR PLATE	40 X 29	US32D
1	SET	SEAL	5050B-20	
1	EA	ASTRAGAL	1398 X 80"	A
2	EA	AUTO DOOR BOTTO	226SA-30	

HARDWARE SET P-21

DOORS: 4/001, 1/003

EACH TO RECEIVE:

6	EA	HINGE	BB1279 4.5 X 4.5	US26D
2	EA	FLUSH BOLT	555-12"	US26D
1	EA	D.P. STRIKE	570	US26D
1	EA	STOREROOM LOCK	LV9480-17A-CK	US32D
2	EA	O.H. HOLDER	90-H	US26D
2	EA	ARMOR PLATE	40 X 29	US3
1	SET	SEAL	5050B-20	
2	EA	AUTO DOOR BOTTO	226SA-30	

HARDWARE SET P-21A

DOORS: 1/010

EACH TO RECEIVE:

6	EA	HINGE	BB1279 4.5 X 4.5	US26D
2	EA	FLUSH BOLT	555-12"	US26D
1	EA	D.P. STRIKE	570	US26D
1	EA	STOREROOM LOCK	LV9480-17A-CK	US32D
2	EA	O.H. HOLDER	90-H	US26D
1	EA	ARMOR PLATE	40 X 35	US32D
1	EA	ARMOR PLATE	40 X 23	US32D
1	SET	SEAL	5050B-20	
2	EA	SILENCERS	608	GRAY
1	EA	AUTO DOOR BOTTO	222SA-36	
1	EA	AUTO DOOR BOTTO	222SA-24	

HARDWARE SET P-22

DOORS: 1/108, 3/108

NOTE: DOOR, FRAME AND HARDWARE BY THE DOOR MANUFACTURER.

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary conditions and division 01 Specification Sections apply to this section.

1.2 SUMMARY

- A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
 - 1. Storefront.
 - 2. Curtain wall.
 - 3. Aluminum windows.
 - 4. Interior borrowed lites and interior storefront.

1.3 PERFORMANCE REQUIREMENTS

- 1. Delegated Design: Design glass according to ICC's 2006 International Building Code.

1.4 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
 - 1. Testing will not be required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
 - 2. Use ASTM C1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
 - 3. Test no fewer than eight samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
 - 4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 - 5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.5 SUBMITTALS

- A. Product Data: For each glass product and glazing material indicated.
- B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches (300 mm) square.
 - 1. Insulating glass
 - 2. Coated glass
- C. Glazing Accessory Samples: For gaskets, sealants, and spacers, in 12-inch lengths. Install sealant samples between two strips of material representative in color of the adjoining framing system.
- D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- F. Product Certificates: For glass and glazing products, from manufacturer.
- G. Preconstruction adhesion and compatibility test report.
- H. Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

- A. 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 "Laminated Glazing Reference Manual" and GANA's "Glazing Manual."
- B. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or the manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- D. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- E. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct testing indicated.

- F. Source limitations for Glass: Obtain glass from single source from single manufacturer for each glass type.
- G. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for material and execution.
 - 1. Install glazing in mockups specified in Division 8 Section "Aluminum Framed entrances and Storefronts".
- H. Preinstallation Conference: Conduct conference at project site.

1.7 WARRANTY

- A. Manufacturer's Special Warranty on Coated Glass: Manufacturer's standard form in which coated glass manufacturer agrees to replace coated glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating glass manufacturer agrees to replace insulating glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surface of glass.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

- A. Select materials for paints, coatings, sealants and adhesives that comply with the VOC levels established in Section 01352. Keep track of products and quantities used (in ounces or gallons).
- B. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

- C. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.
- D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
 - 1. For insulating glass units, properties are based on units of thickness indicated for overall unit and for each lite.
 - 2. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq.ft. x h x deg F.
 - 3. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
 - 4. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.2 GLASS PRODUCTS

- A. Tempered Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.
- B. Heat-Treated Float glass: ASTM C 1048; Type 1; Quality-Q3; Class 1 (Clear) unless otherwise indicated
 - 1. Fabrication process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
 - 2. For uncoated glass, comply with requirements for Condition A.
 - 3. For coated vision glass, comply with requirements for Condition C (other coated glass).
- C. Uncoated Clear Float Glass: Class 2, complying with requirements specified.
 - 1. Basis-of-design product: subject to compliance with requirements, provide PPG Solarban 60 or comparable product.
- D. Ceramic –Coated Spandrel Glass: ASTM C 1048, condition B, type 1, Quality-Q3, and complying with other requirements specified.
 - 1. Ceramic coating color: As selected by Architect from manufacturer's full range.

2.3 INSULATING GLASS

- A. Insulating Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other requirements specified.
 - 1. Sealing system: Dual seal, with manufacturer's standard primary and secondary.
 - 2. Spacer: Manufacturer's standard spacer material and construction.
 - 3. Dessicant: Molecular sieve or silica gel, or blend of both.
- B. Glass: comply with applicable requirements in "Glass Products" Article as indicated by designations in "Insulating Glass Types" Article.

2.4 GLAZING GASKETS

- A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:
 - 1. Neoprene complying with ASTM C 864.
 - 2. EPDM complying with ASTM C 864.
 - 3. Silicone complying with ASTM C 1115.
 - 4. Thermoplastic [polyolefin rubber complying with ASTM C 1115.
- B. Soft Compression Gaskets: Molded or extruded, closed-cell, integral-skinned neoprene, EPDM, silicone, or thermoplastic polyolefin rubber gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.
 - 1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.
- C. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock strips, complying with ASTM C 542, black.

2.5 GLAZING SEALANTS

- A. Compatibility: Provide glazing sealants that are compatible with one another and with 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.
- B. Suitability: Comply with sealant and glass manufacturer's written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

- C. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- D. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the work include, but are not limited to, the following:
 - a. Dow Corning Corporation: 790
 - b. GE Advanced materials – Silicones; SilPruf LM SC2700
 - c. May National Associates, Inc.; Bondaflex Sil 290
 - d. Pecora Corporation; 890
 - e. Sika corporation, construction Products division; SikaSil-C990
 - f. Tremco Incorporated; Spectrem 1

2.6 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape, nonstaining and nonmigrating in contact with nonporous surfaces; with or without spaces rod as recommended in writing by tape and glass manufacturers for applications indicated; and complying with ASTM C 1281 and AAMA 80-0 for products listed below:
 - 1. AAMA 804.3 tape, where indicated.
 - 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 - 3. 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, and complying with AAMA 800 for the following types:
 - 1. AAMA 810.0, Type 1, for glazing applications in which tape acts as the primary sealant.
 - 2. AAMA 810.1, Type 2m for glazing applications in which the tape is used in conjunction with a full bed of liquid sealant.

2.7 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 of 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).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
- G. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.8 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for the Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- C. Grind smooth and polish exposed glass edges and corners.

2.9 INSULATING-GLASS TYPES

- A. Glass Type GL-1(Curtainwall, exterior storefront, windows): Low-e coated, tinted insulating glass (Note glazing must meet STC rating).
 - 1. Overall unit thickness: 1 inch
 - 2. Thickness of each glass lite: ¼ inch.
 - 3. Outdoor lite: Clear float glass, as required by code
 - 4. Indoor lite: Clear fully tempered float glass, as required by code.
 - 5. Low-E coating: "Basis Of Design" PPG Solarban 60; minimum STC of 235 for system.
 - 6. Comply with ASTM E774 and E773 Class CBA.
 - 7. Purge interpane space with dry hermetic air.
- B. Glass Type GL-2 (Aluminum framed entrances and automatic entrances): Low-e coated, clear insulating glass (Note glazing must meet STC rating).

1. Overall unit thickness: 1 inch
2. Thickness of each glass lite: ¼ inch.
3. Outdoor lite: Clear float glass, as required by code
4. Indoor lite: Clear fully tempered float glass, as required by code.
5. Comply with ASTM E774 and E773 Class CBA.
6. Purge interpane space with dry hermetic air.

C. Insulated Tempered Glass Units where required by building code. Double pane with glass to elastomer edge seal.

1. Outer pane of ¼ inch clear tempered glass, inner pane of clear tempered glass.
2. Place low E coating on No. 3 surface within the unit.
3. Comply with ASTM E774 and E 773, Class CBA.
4. Purge interpane space with dry hermetic air.
5. Total unit thickness of 1 inch minimum.

2.10 MONOLITHIC-GLASS TYPES (Interior storefront, borrowed lites)

A. Glass Type GL-2: Clear float glass. Clear, tempered.

1. Thickness: ¼ inch minimum.
2. Comply with ASTM C1046 Type I, transparent flat, Class I clear, quality Q3 (glazing select).

2.11 COATED GLASS

A. Glass Type SP-1: Ceramic-Coated Spandrel Glass: ASTM C 1048, Condition B, Type I, Quality-Q3, and complying with other requirements specified.

1. Ceramic Coating Color: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 GLAZING, GENERAL

- A. 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.
- B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
- C. 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.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- E. 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.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where length plus width is larger than 50 inches.
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass, install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide 12/8 inch minimum-bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H. 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.
- I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

- L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.2 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. 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.
- D. 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.
- E. Apply heel bead of elastomeric sealant.
- F. 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.
- G. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.3 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. 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.
- C. Installation with Drive-in Wedge Gaskets: 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 weather tight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weather tight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

- E. Install gaskets so they protrude past face of glazing stops.

3.4 SEALANT GLAZING (WET)

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

3.5 LOCK-STRIP GASKET GLAZING

- A. Comply with ASTM c 716 and gasket manufacturer's written instructions. Provide supplementary wet seal and weep system unless otherwise indicated.

3.6 CLEANING AND PROTECTION

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.
- E. Wash glass on both exposed surfaces in each area of Project no more than four days before date scheduled for inspections that establish date of Substantial completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 088000

Pittsburgh Arena Hotel Associates, L.P.
New Arena Hotel
March 24, 2009

SECTION 088300 - MIRRORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes the following types of silvered flat glass mirrors:
 - 1. Tempered glass mirrors qualifying as safety glazing.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachments to other work.
- C. Samples:
 - 1. Mirrors: 12 inches square, including edge treatment on two adjoining edges.
 - 2. Mirror Clips: Full size.
 - 3. Mirror Trim: 12 inches long.
- D. Preconstruction test reports.
- E. Maintenance data.
- F. Warranty: Sample of special warranty.

1.3 QUALITY ASSURANCE

- A. Glazing Publications: Comply with GANA's "Glazing Manual" and "Mirrors, Handle with Extreme Care: Tips for the Professional on the Care and Handling of Mirrors."
- B. Safety Glazing Products: For tempered mirrors, provide products complying with testing requirements in 16 CFR 1201 for Category II materials.
- C. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing and substrates on which mirrors are installed.

1.4 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which mirror manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to

maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.

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

PART 2 - PRODUCTS

2.1 SILVERED FLAT GLASS MIRRORS

- A. Glass Mirrors, General: ASTM C 1503;

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Binswanger Mirror; a division of Vitro America, Inc.
- b. Lenoir Mirror Company.
- c. Carolina Mirror Company.

- B. Tempered Clear Glass: Mirror Glazing Quality, for blemish requirements; and comply with ASTM C 1036 for Kind FT, Condition A, tempered float glass before silver coating is applied.

1. Nominal Thickness: Quality mirror select, 1/4 inch.

- C. Silvering: Provide electro-deposited silvering in two coats.

2.2 MISCELLANEOUS MATERIALS

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

- B. Edge Sealer: Approved by mirror manufacturer.

- C. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors.

- D. Film Backing for Safety Mirrors: Film backing and pressure-sensitive adhesive; both compatible with mirror backing paint as certified by mirror manufacturer.

2.3 MIRROR HARDWARE

- A. Top and Bottom Aluminum J-Channels: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover bottom and top edges of each mirror in a single piece.

1. Finish: Clear bright anodized.

- B. Mirror Bottom Clips: Continuous cup at base.

- C. Mirror Top Clips: Knape and Vogt Model No. 318, 9/16 inch wide x 1 1/4 inch long.

- D. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.
- E. Anchors and Inserts: Provide devices as required for mirror hardware installation.
- F. Mirror Adhesive: Chemically compatible with mirror coating and substrate.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.
 - 1. Verify compatibility with and suitability of substrates, including compatibility of mirror mastic with existing finishes or primers.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.
- B. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.
- C. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.
- D. Wall-Mounted Mirrors: Install mirrors with mastic and mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
- E. Protect mirrors from breakage and contaminating substances resulting from construction operations.
- F. Do not permit edges of mirrors to be exposed to standing water.
- G. Maintain environmental conditions that will prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.
- H. Wash exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash mirrors as recommended in writing by mirror manufacturer.

END OF SECTION 088300

SECTION 089000 - LOUVERS AND VENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fixed, extruded-aluminum and formed-metal louvers.
 - 2. Wall vents (brick vents).
- B. See Division 23 Sections for louvers that are a part of mechanical equipment.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design louvers, including comprehensive engineering analysis by a qualified professional engineer, using structural performance requirements and design criteria indicated.
- B. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors.
 - 1. Wind Loads: Determine loads based on pressures as indicated on Drawings.
- C. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.
- B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.
- C. Samples: For each type of metal finish required.
- D. Delegated-Design Submittal: For louvers indicated to comply with structural performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- E. Product Test Reports: Based on tests performed according to AMCA 500-L.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum Extrusions: ASTM B 221 Alloy 6063-T5, T-52, or T6.
- B. Aluminum Sheet: ASTM B 209, Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
- C. Galvanized-Steel Sheet: ASTM A 653/A 653M, G60 zinc coating, mill phosphatized.
- D. Fasteners: Use types and sizes to suit unit installation conditions.
 - 1. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
 - 2. For fastening galvanized steel, use hot-dip-galvanized steel or 300 series stainless-steel fasteners.
 - 3. For color-finished louvers, use fasteners with heads that match color of louvers.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.2 FABRICATION, GENERAL

- A. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
- B. Join frame members to each other and to fixed louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.3 FIXED, EXTRUDED-ALUMINUM LOUVERS

- A. Horizontal Storm-Resistant Louver:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Air Balance Inc.; a Mestek company.
 - b. Air Flow Company, Inc.
 - c. Airolite Company, LLC (The).
 - d. All-Lite Architectural Products.
 - e. American Warming and Ventilating, Inc.; a Mestek company.
 - f. Arrow United Industries; a division of Mestek, Inc.
 - g. Construction Specialties, Inc.
 - h. Greenheck Fan Corporation.
 - i. Industrial Louvers, Inc.
 - j. NCA Manufacturing, Inc.
 - k. Nystrom Building Products.

- l. Reliable Products, Inc.
 - m. Ruskin Company; Tomkins PLC.
 - n. United Enertech Corp.
2. Louver Depth: 5 inches.
 3. Frame and Blade Nominal Thickness: Not less than 0.060 inch (1.52 mm) for blades and 0.080 inch (2.03 mm) for frames.
 4. Louver Performance Ratings:
 - a. Free Area: Not less than 50 percent.
 - b. Air Performance: Not more than 0.10-inch wg static pressure drop at 600-fpm free-area velocity.
 - c. Wind-Driven Rain Performance: Not less than 99 percent effectiveness when subjected to a rainfall rate of 3 inches per hour and a wind speed of 29 mph.
 5. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.4 LOUVER SCREENS

- A. General: Provide screen at each exterior louver.
- B. Louver Screen Frames: Same kind and form of metal as indicated for louver to which screens are attached.
- C. Louver Screening:
 1. Bird Screening: Aluminum, 1/2-inch- square mesh, 0.063-inch wire.

2.5 WALL VENTS (BRICK VENTS)

- A. Extruded-Aluminum Wall Vents:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Air Flow Company, Inc.
 - b. Airolite Company, LLC (The).
 - c. Arrow United Industries; a division of Mestek, Inc.
 - d. Construction Specialties, Inc.
 - e. Dowco Products Group; Safe-Air of Illinois, Inc.
 - f. Greenheck Fan Corporation.
 - g. Hohmann & Barnard, Inc.
 - h. Industrial Louvers, Inc.
 - i. Louvers & Dampers, Inc.; a division of Mestek, Inc.
 - j. Metal Form Manufacturing Inc.
 - k. Nystrom Building Products.
 - l. Reliable Products, Inc.
 - m. Ruskin Company; Tomkins PLC.
 - n. Sunvent Industries; Division of Sylro Sales Corp.

o. United Enertech Corp.

2. Extruded-aluminum louvers and frames, not less than 0.125-inch nominal thickness, assembled by welding; with 18-by-14- mesh, aluminum insect screening on inside face; incorporating weep holes, continuous drip at sill, and integral waterstop on inside edge of sill; of load-bearing design and construction.

2.6 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- D. Repair damaged finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory and refinish entire unit or provide new units.
- E. Protect galvanized and nonferrous-metal surfaces that will be in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint.

END OF SECTION 089000